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## Program Report

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### Program on Children

Jonathan Gruber\*

Policymakers and the public in general have shown intense interest in recent years in issues related to the well-being of children. For example, the 1997 Children's Health Insurance program, which potentially made millions of new children eligible for public health insurance, was the single largest health insurance coverage expansion of the past 30 years. Debates over crime, the justice system, and access to guns, particularly in the wake of recent school shootings, have especially focused on juvenile crime. The comprehensive tobacco regulation legislation proposed by the Clinton administration in 1998 was aimed primarily at reducing youth smoking. And education policy, in particular questions of school choice and the federal role in regulating education decisions, is a central issue in this year's presidential elections.

The NBER's Program on Children aims to take advantage of this growing interest and the expertise among academic economists in issues related to child well-being. It has benefited from an Integrated Research Program Grant from the National Institute of Child Health and Human Development, through which a number of our researchers have found sponsorship for their work. In this report, I summarize the activities of the Program over the past several years. These activities have focused on five broad areas: education, transfer programs, family structure, youth employment, and risky behaviors.

#### Education

Education is a centerpiece of the work done by members of the Program on Children. They have focused in particular on assessing the benefits to youths from different types of educational interventions, either contemporaneously in terms of test scores or other educational outcomes, or in the long

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run in terms of improved labor market prospects.

A central research question in labor economics is: what is the rate of return to additional years of education? But a fundamental difficulty with answering that question is that years of education are not assigned randomly to individuals but rather are chosen, and these educational choices may be correlated with the individual's underlying ability. Orley C. Ashenfelter and Cecilia E. Rouse attempt to address this issue by using data from a sample of twins to control for underlying differences in ability across families. They confirm that there is a substantial rate of return to an additional year of education, in the form of a 9 percent rise in earnings.<sup>1</sup> Work by John Cawley, James J. Heckman, and Edward Vytlačil implicitly confirms this conclusion, noting that the rising return to education in recent years is not attributable solely to a rising return to ability.<sup>2</sup>

One way to increase the educational attainment of high school dropouts is through the General Educational Development (GED) degree. But again, one cannot simply compare the outcomes of those with and without GED degrees, because it may be only dropouts with higher ability who go on to take this additional educational step. John H. Tyler, Richard J. Murnane, and John R. Willett take into account variations in state standards for attaining a GED degree; they find substantial returns to a GED degree, including an increase in earnings of 10–19 percent.<sup>3</sup> These returns are concentrated in the least able GED recipients.<sup>4</sup>

How might governments improve the quality of a given level of education, and thereby raise the return to any level of attainment? Perhaps they could reduce the number of pupils per teacher in the classroom. Alan B. Krueger evaluates an influential social experiment run by the state of

Tennessee in which some children were assigned randomly to smaller size classrooms. He finds that these children perform significantly better than the other students on exams as youths and are more likely to take (and do well on) college entrance examinations as teens.<sup>5</sup> This effect is particularly large for minority students, with small classes cutting in half the black/white gap in college test taking. Anne Case and Motohiro Yogo similarly find significant benefits of smaller class sizes for blacks in South Africa.<sup>6</sup>

On the other hand, Caroline M. Hoxby notes that real variations in pupil-teacher ratios arise from the natural variation in the population of school-age children; she finds that these class-size variations have no impact on student outcomes.<sup>7</sup> Erik A. Hanushek, John F. Kain, and Steven G. Rivkin conclude that, while smaller classes do appear to provide a modest benefit for lower income children in earlier grades, their effects are small relative to the effects of changing teacher quality.<sup>8</sup> Paying teachers more does not greatly improve teacher quality, though, according to these three economists; the primary determinant of teacher quality appears to be the quality of the student body being instructed.<sup>9</sup> Finally, Joshua D. Angrist and Victor Lavy find that in Israel increasing teacher training induced significant improvements in student achievement and may have been more cost effective than reducing class sizes.<sup>10</sup>

A significant component, perhaps the majority, of the rise in educational spending in recent years has been the special educational resources devoted to disabled students. Hanushek, Kain, and Rivkin find that more spending on special education students significantly improves the outcomes of those students without lowering the outcomes of regular education students.<sup>11</sup> But Julie B. Cullen notes that

financial incentives for labeling students as disabled lead to more students being served in special education, suggesting an important trade-off for policy design in this area.<sup>12</sup>

Another contentious area of educational policy has been school choice and the availability of vouchers, which parents can use to pay for an alternative to their local public school. Rouse evaluates a targeted voucher program in Milwaukee and finds that it had positive effects on student mathematics exam scores, but not on their reading scores.<sup>13</sup>

Finally, there is the critical area of higher education. Susan M. Dynarski has studied the impact of educational subsidies paid under the Social Security program on the educational attainment of children of deceased parents. She finds that these substantial grants have led to more college attendance and completion; at standard rates of return to college education, this was a very cost-effective program.<sup>14</sup> But Stephen V. Cameron and James J. Heckman conclude that long-term factors, such as parental income and educational attainment, are most important for determining children's higher educational attainment.<sup>15</sup> In either case, David Card and Thomas Lemieux confirm that the returns to attending college are large and rising over the past several decades; these returns may be attributable to the falling supply of college graduates, which has not been explained.<sup>16</sup> There are also differential returns, though, to attending the "right" college: Stacey B. Dale and Krueger find that attending a more selective college does not have significant returns in the labor market, but attending a more expensive college does.<sup>17</sup>

### **Transfer Programs**

There are a large number of government transfer programs that affect

the well-being of children. Perhaps the most important is the Medicaid program, which provides health insurance to low-income children (and other groups). A substantial body of work that I have reviewed finds that the expansions of the Medicaid program over the 1980s and early 1990s raised Medicaid coverage of children (while lowering, to a lesser extent, their private insurance coverage), increased their health care utilization, and improved their health outcomes.<sup>18</sup> In other work with Janet Currie, I find that Medicaid eligibility increases the intensity with which low-income populations are treated in the hospital. However, eligibility also reduces treatment intensity for middle-income populations who may be dropping their private coverage and moving to Medicaid coverage, which provides lower reimbursement levels to physicians.<sup>19</sup> Leemore Dafny and I find that Medicaid eligibility reduces the incidence of avoidable hospitalizations among youth, presumably by improving their use of preventative care.<sup>20</sup> This conclusion is confirmed by Robert Kaestner, Theodore Joyce, and Andrew Racine, but they find little impact of Medicaid eligibility on self-reported measures of health.<sup>21</sup>

Finally, a major current concern with the Medicaid program is that many children who are eligible for this benefit do not take it up. Currie and Jeffrey Grogger find that as Medicaid eligibility expands there is both more Medicaid coverage and more use of medical care, but that both fall as the welfare system contracts, as it has in recent years.<sup>22</sup>

Cash welfare payments represent another transfer program of particular interest to both the research and policy communities. Christina Paxson and Jane Waldfogel find that reductions in welfare benefit levels are associated with increases in child maltreatment.<sup>23</sup> Phillip B. Levine and

David J. Zimmerman find no evidence of an association between welfare benefits and child cognitive outcomes, though.<sup>24</sup> Robert F. Scheoni and Rebecca M. Blank observe that recent reforms to the welfare system have led to significant reductions in public assistance participation and to increases in family earnings.<sup>25</sup> Bruce D. Meyer and Daniel T. Rosenbaum also find that reforms of the welfare system have led to increased labor supply for single mothers, although this represents only a small share of the striking upward trend in the 1990s in work by single mothers. They suggest that expansions in the Earned Income Tax Credit are a much more important explanation for this trend.<sup>26</sup>

Other studies have focused on related transfer programs targeted to low income populations. Richard B. Freeman and Waldfogel find that the substantial expansions in child support programs across the states over the past two decades have increased awards and receipt of child support significantly, explaining as much as one-fifth of the impressive gains in child support payments over this period.<sup>27</sup> Currie and Duncan Thomas have documented substantial gains in test scores from participation in the Head Start preschool program, but these effects appear to fade out quickly for blacks, because of the low quality schools in which they enroll after this intervention.<sup>28</sup> Currie and Aaron Yelowitz show that, while public housing projects have substantial disadvantages, they are better than the alternative housing arrangements available to children who receive this entitlement: public housing reduces residential crowding and grade repetition for those children.<sup>29</sup>

Another major focus of NBER researchers is child care and parental leave policies. Patricia M. Anderson and Levine find that lower prices for child care significantly increase the odds of work among mothers.<sup>30</sup>

Robert J. Lemke, Ann D. Witte, Magaly Queralt, and Robert Witt conclude that child care subsidies are an important determinant of the work decisions of welfare mothers.<sup>31</sup> But Karen Norberg sounds a cautionary note about attempting to measure the effect of child care on youth outcomes: she points out that the mothers of the least able children do not appear to put these children into child care settings. Thus it is difficult to do simple comparisons of the typical child in and out of a child-care setting.<sup>32</sup> In related work that focuses on parental leave, Christopher Ruhm finds that, across developed nations, increased access to leave is associated with significant improvements in child health.<sup>33</sup>

### Family Structure

The past several decades have witnessed a remarkable shift in the nature of the American family; a number of NBER researchers have studied the factors relating to this shift and its implications for youth outcomes. One of the most important changes over this period was the increased availability of abortion. A key question raised by this increase is: what would have happened to the children who were instead aborted? Levine, Douglas Staiger, and I examine the characteristics of cohorts born before and after the expanded availability of abortion in the early 1970s and conclude that the children who were not born would have lived in much worse circumstances than the average child, with a higher likelihood of living in poverty or in a household headed by a single female.<sup>34</sup>

Another key demographic shift that has been studied is the rising incidence of teen motherhood. Somewhat surprisingly, V. Joseph Hotz, Seth G. Sanders, and Susan W. McElroy find that women who become teen mothers do not appear to suffer, in terms of later educational

or labor market outcomes, relative to otherwise comparable women whose childbearing is delayed because of miscarriages.<sup>35</sup> Furthermore, Angrist and Lavy conclude that being born to a teen mother has no impact on childhood disabilities, while it has a sizeable effect on the incidence of grade repetition.<sup>36</sup>

Finally, family structure has been modified by growth in nontraditional family arrangements. Case, I-Fen Lin, and Sara McLanahan find that children raised in stepfamilies receive less food, for example, than children raised by their biological mothers. This suggests that biological ties to parents may be important for child outcomes.<sup>37</sup>

### Employment

A number of NBER researchers are interested in the determinants and implications of work by youth. Francine D. Blau and Lawrence M. Kahn find that youth employment and wages are higher in Germany than in the United States; these differentials appear to be the result of a much stronger public sector presence in the German labor market.<sup>38</sup> David Neumark and William Wascher conclude that higher minimum wages reduce youth employment across developed nations, but this impact is mitigated by labor market flexibilities (such as a youth subminimum wage).<sup>39</sup> In terms of implications, Hotz and his co-authors find that, in the United States the net effects of work during the high school years are uncertain and probably modest.<sup>40</sup>

### Risky Behaviors

The pursuit of risky activities by teens — including substance use and abuse (smoking, drinking, using marijuana), criminal activities, unprotected sex, dangerous driving, dropping out of school, poor nutrition, and suicide — is a critical issue for the well-being of children.

Recently, I coordinated a project on these topics entitled *Risky Behavior among Youth: An Economic Analysis*.<sup>41</sup> This project brought together papers that focused on the determinants and implications of risk taking by youth.

The studies in this project presented three important conclusions. First, economic incentives — in the form of prices, regulations, or opportunity costs — are an important determinant of the decision to engage in virtually every risky behavior we studied. For example, Jonathan Zinman and I find that youth smoking is very sensitive to the price of cigarettes, with each 10 percent rise in price leading to a 6.7 percent decline in the incidence of smoking by high school seniors.<sup>42</sup> Rosalie L. Pacula and her co-authors conclude that use of marijuana among young people is also fairly price sensitive.<sup>43</sup> Steven Levitt and Lance Lochner find that a central determinant of the criminality of youths relative to adults is the stringency of the legal system with respect to youth versus adult crime.<sup>44</sup> Thomas S. Dee and William N. Evans observe that mandatory seat belt laws reduce vehicle fatalities among youths by 8–10 percent, and higher minimum legal drinking ages are also associated with significant declines in fatalities.<sup>45</sup> Phillip J. Cook and Michael J. Moore find that the legal drinking age is a key determinant of the pattern of drinking among youth, and particularly of binge drinking.<sup>46</sup> Levine shows that the incidence of unprotected sex among teens falls with the availability of labor market opportunities for women and the incidence of AIDS.<sup>47</sup> Card and Lemieux find that state college tuition policy is an important determinant of the decision to dropout of high school: when state tuition is low, individuals are more likely to complete high school, because the cost of continuing education is reduced.<sup>48</sup> And Jay Battycharya and Currie conclude that

exposure to free meals in school improves the quality of diet of youth.<sup>49</sup>

However, economic incentives alone cannot explain much of the dramatic trends over time that we have seen in these risky behaviors. In the 1990s, substance use among youths was rising significantly, with a one-third increase in the rate of smoking and a doubling in the rate of marijuana use. But there were equally significant reductions in youth crime (40 percent) and teen pregnancy (20 percent). There is no simple unifying story to explain these disparate trends, nor do the papers in this volume find a dominant explanatory role for the factors already discussed. Clearly, more work is needed to understand what is driving the striking and inconsistent movements in these indicators of risk taking by youths.

Finally, some of these studies show that there are important long-run implications of youth risk taking. Zinman and I find that higher smoking rates among groups of young people are associated with higher smoking rates by those same groups as adults. We also find that those who faced higher taxes on cigarettes as youths were less likely to smoke in their adult years.<sup>50</sup> Similarly, Cook and Moore show that those who faced lower drinking ages as youths are more likely to be binge drinkers as adults.<sup>51</sup> Finally, Card and Lemieux find that youths who drop out of school in response to lower unemployment rates do not return later in life to complete their education.<sup>52</sup>

## Conclusions

The work summarized here obviously encompasses a wide range of topics, and this summary does not even include other recent work by Program affiliates on an additional variety of subjects. A common theme throughout these papers is careful attention to making a convincing case

for the behavioral effects being documented. This work is on the cutting edge of empirical public finance and labor economics methods that are increasingly able to surmount the traditional problems of sample selection and endogeneity which plagued previous efforts to assess the impact of economic factors on child well being. The result is a convincing set of studies on some of the most important policy questions affecting children today.

The Children's Program continues to grow and expand its scope. Through projects such as those described above, the members of this Program are forming a strong base of evidence that can both advance economists understanding of the determinants of child well being, and provide an empirical basis for rational policy making for this important population group.

<sup>1</sup> O. C. Ashenfelter and C. E. Rouse, "Income, Schooling, and Ability: Evidence from a New Sample of Identical Twins," NBER Working Paper No. 6106, July 1997.

<sup>2</sup> J. Cawley, J. J. Heckman, and E. Vytlacil, "Cognitive Ability and the Rising Return to Education," NBER Working Paper No. 6388, January 1998.

<sup>3</sup> J. H. Tyler, R. J. Murnane, and J. B. Willett, "Estimating the Impact of the GED on the Earnings of Young Dropouts Using a Series of Natural Experiments," NBER Working Paper No. 6391, February 1998.

<sup>4</sup> R. J. Murnane, J. B. Willett, and J. H. Tyler, "Who Benefits from Obtaining a GED? Evidence from High School and Beyond," NBER Working Paper No. 7172, June 1999.

<sup>5</sup> A. B. Krueger, "Experimental Estimates of Education Production Functions," NBER Working Paper No. 6051, June 1997; and A. B. Krueger and D. Whitmore, "The Effect of Attending a Small Class in the Early Grades on College Test Taking and Middle School Test Results: Evidence from Project STAR," NBER Working Paper No. 7656, April 2000.

<sup>6</sup> A. Case and M. Yogo, "Does School Quality Matter? Returns to Education and the Characteristics of Schools in South Africa," NBER Working Paper No. 7399, October 1999.

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<sup>46</sup> P. J. Cook and M. J. Moore, "Environment and Persistence in Youthful Drinking Patterns," in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

<sup>47</sup> P. Levine, "The Sexual Activity and Birth Control Use of American Teenagers," in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

<sup>48</sup> D. Card and T. Lemieux, "Dropout and Enrollment Trends in the Post-War Period:

*What Went Wrong in the 1970s?*" in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

<sup>49</sup> J. Battycharya and J. Currie, "Youths at Nutritional Risk: Malnourished or Misnourished?" in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

<sup>50</sup> J. Gruber and J. Zinman, "Youth Smoking in the United States: Evidence and Implications," in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

<sup>51</sup> P. J. Cook and M. J. Moore, "Environment and Persistence in Youthful Drinking Patterns," in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

<sup>52</sup> D. Card and T. Lemieux, "Dropout and Enrollment Trends in the Post-War Period: What Went Wrong in the 1970s?" in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

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## Research Summaries

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### Stock Markets, Behavior, and the Limits of History

William N. Goetzmann\*

Like many of my colleagues in financial economics, I have long been fascinated by the dynamics of the stock market. While the highs and lows of the Dow Jones Industrials Index are a topic of constant discussion in the financial press, the underlying forces behind its movements — both in the long and the short term — largely remain a mystery. For example, few scholars have a good explanation for why stock prices on a given day suddenly may be worth 20 percent less than the day before. By the same token, scholars disagree widely over the magnitude of the equity premium — that is, how much investors expect to be compensated for taking stock market risk over the long term. However, despite our lack of understanding of its daily and long-term motivating forces, most of us are will-

ing to invest a substantial portion of our savings in the stock market.

I have conducted much of my research on the stock market in close collaboration with co-authors intrigued by the same questions. In one way or another, our work has been tied closely to the dominant, underlying model of stock market behavior, Brownian motion, otherwise known as the random walk. In simplest terms, we look at what causes the market's apparent Brownian motion, when the market violates the laws of Brownian motion, and what happens when Brownian motion interacts with the forces of history.

Biologist Robert Brown in 1827 first observed through his microscope the curious random dance of suspended pollen particles, but it took nearly a century for science to understand how the movement results from bombardment by unseen molecules. The impact of tiny particles only could be inferred from motion, not observed directly. Until recently, stock market researchers have confronted the same problem. While we can chart the path of the market on a minute-by-minute basis, we rarely observe who buys, who

sells, and how demand and supply shocks affect price movements. We have many interesting theories about how the behavior of different investors moves prices, but empirical evidence on the critical link between observable investor decisions and price dynamics is hard to find.

#### Investor Behavior and the Brownian Price Process

Despite the dearth of direct empirical links between demand and price changes in asset markets, some interesting exceptions exist.<sup>1</sup> For example, when the composition of the widely held S&P 500 Index changes, investment funds that hold the index need to rebalance. It is now well established that on such rebalancing days, the prices of added stocks move up and the prices of deleted stocks move down.<sup>2</sup> This evidence recently led my co-author Massimo Massa and me to ask whether daily shifts in demand by index funds could move the value of the entire S&P 500 Index rather than moving just one stock. In our NBER Working Paper,<sup>3</sup> we document a positive relationship between daily demand shifts by investors in S&P 500 Index funds and broad movements in the stock market. We

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reject the hypothesis that the market causes investor behavior: demand shifts are associated only with late-day price dynamics. However, we find some evidence that market declines cause some panic: the outflows are higher following down days. Curiously, we also find that investors respond to measures of the dispersion of beliefs about the market. Thus, while the stock market process very nearly follows a random walk, its random movements in part reflect aggregate daily decisions about the prospects for the market and uncertainty about those prospects.

Although index fund flows are an interesting special case, Massa, K. Geert Rouwenhorst, and I document dramatic correlations between mutual fund flows across broad asset classes.<sup>4</sup> We find that on days when money flows out of bond funds, it flows into stock funds. In effect, individual investor portfolio decisions are correlated strongly in time, suggesting the existence of an aggregate behavioral structure behind price dynamics. Other investigators offer intriguing current research in this area.<sup>5</sup>

Using individual account data from one large index mutual fund, Massa and I have sought to understand investors' behavioral differences.<sup>6</sup> We classify investors according to their pattern of response to the market and then examine the relative salience in the demand effects of these investor types over time. We find some evidence suggesting that the marginal investor type shifts over time according to market conditions.

My co-authors and I hope that these three studies represent useful steps towards empirically documenting the direct effect of investor behavior on asset prices. Other research teams also are working with individual account and security data, most notably Brad M. Barber and Terry Odean;<sup>7</sup> Kenneth A. Froot, Paul

G. J. O'Connell, and Mark S. Seasholes;<sup>8</sup> and Mark Grinblatt and Matti Keloharju.<sup>9</sup> Their research undoubtedly will lead to a more complete understanding of the previously nearly invisible economic forces driving asset price processes.

### **Brownian Motion and the Limits of History**

Almost everything we know about financial markets comes from empirical studies of past data. At the same time, the existence of this data is conditioned on survival, or on the efforts of researchers to reconstruct the past. Continuing the analogy to modern physics, we cannot observe economic data apart from the effects of the observation itself. For example, our measures of the equity risk premium are based on the geometric return of the U.S. stock market from 1926 to the present. Indeed, we are fortunate to have 75 years' worth of U.S. capital market data on which to base this estimate. If not for the efforts of market researchers such as Alfred Cowles (1939),<sup>10</sup> Lawrence Fisher and James H. Lorie,<sup>11</sup> and Roger G. Ibbotson and Rex Sinquefeld,<sup>12</sup> such long-term measures of market return might not even exist.

Yet while history provides rich information about the behavior of capital markets, we only analyze the data that exist. Unfortunately, more often than not, history is written by the winners. The very fact that quantitative data has survived to be analyzed by the econometrician, or is of interest to the current marketplace, may distort the lessons we draw from studying it.

In my 1995 paper with Stephen J. Brown and Stephen A. Ross,<sup>13</sup> we specify stock market dynamics in continuous time as a simple Brownian motion with drift and an absorbing lower bound. Our analysis shows that even very simple forms of market survival can bias inferences

about the long-term expected return of the market. The higher the conditioning survival threshold, the greater is the positive bias in ex post equity returns. This analysis led us to a conjecture: could the well-known equity premium puzzle be attributed to the fact that we typically use U.S. data to measure it?

To address this question empirically, Philippe Jorion and I collected monthly returns on 39 of the world's equity markets over much of the twentieth century.<sup>14</sup> The results surprised us. We find that the United States has the highest uninterrupted real rate of capital appreciation of all countries, at 4.3 percent annually from 1921 to 1996 (excluding dividends, which added an average of more than 2 percent to the yield over the past 50 years). For other countries, the median real appreciation rate was only 0.8 percent. The high return premium obtained for U.S. equities therefore appears to be the exception rather than the rule. The real growth rate of a GDP-weighted world equity market over the period, excluding the U.S. market, was 3.39 percent. That is nearly 1 percent per year lower than the growth rate of the U.S. market. While this difference is not big enough to explain the equity premium puzzle, it does suggest that extrapolating past U.S. stock returns to forecast the future equity premium may be too optimistic.

Our survivorship analysis suggests in general that conditioning on market survival would have the greatest effect on econometric studies of markets that are in particular danger of disappearing. One clear example is emerging markets, defined as equity markets in developing countries. These markets have enjoyed a decade of popularity with U.S. investors because of their potential for high returns and their low correlation to markets in the developed countries. While investors regard most emerging markets as new opportuni-

ties, many of them have a long history of Western investment. As often as not, their recent emergence results from having been submerged at some time in the past. In our 1997 paper,<sup>15</sup> Jorion and I explore the implications of using data on a market only since its last emergence, that is, collecting data in an unbroken string as far back as possible and neglecting earlier periods in the market's history.

Through simulation and analysis of emerging market histories, we show that statistics about emerging markets may be strongly biased by survival bias and by "sorting" bias. A recently emerged market that has existed for a long time is more likely to be a market with a low expected rate of return. We also verify through simulation that a recently emerged market is likely to have low historical correlation to the market index. This evidence is consistent with the studies by Geert Bekaert and his co-authors<sup>16</sup> on the distinctive statistical characteristics of emerging markets.

The magnitude of the effects of analyzing only market data since emergence is striking. Of 11 emerging markets for which we have pre-emergence data — that is, data from the period before which they are deemed investible by the International Financial Corporation — we find pre-emergence returns to be 1.3 percent per year compared to 23.7 percent per year post-emergence. The implication for investors and researchers alike is that pre-emergence data may tell a very different story about the market. While a natural explanation for the difference between pre-emergence and post-emergence returns may be a fundamental economic shift in the economies of these countries, it would seem prudent to verify such changes in fundamentals before relying solely on post-emergence data for forecasting.

Survival conditioning also may have other effects beyond bias in means. Brown, Ross, and I<sup>17</sup> find that survived series tend to appear more mean-reverting *ex post*. The intuition for this is straightforward. Economic time series that drift to extremes are less likely to survive than those that return to equilibrium. This issue is particularly relevant to tests of long-term reversion in stock market returns and reversion in dividend yields.

### Deviations from Brownian Motion

Much empirical research in financial economics over the past two decades has focused on forecasting the stock market, something that would be impossible if it truly followed a random walk. For example, in broadly cited research, Eugene F. Fama and Kenneth R. French<sup>18</sup> investigate mean reversion in stock price indexes and the forecasting power of dividend yields in the U.S. market since 1926 and find evidence of predictability at multiple year horizons. The problem is that long-horizon price dynamics require very long time series to draw reliable inference. While some scholars, most notably James Stock and Matthew Richardson,<sup>19</sup> have made creative use of econometric procedures to fully exploit the U.S. time-series data, another approach — one that my co-authors and I have taken — is to collect more data from U.S. and global capital market history.

In a 1993 paper,<sup>20</sup> I extend the analysis of long-horizon mean reversion to earlier periods in the New York Stock Exchange (NYSE) and the London Stock Exchange using spliced price series. I find some long-horizon evidence of persistence in the London market. In a 1995 paper,<sup>21</sup> Jorion and I examine U.S. and U.K. dividend yields from 1870 to the present. We find that dividend

yields forecast U.K. stock returns from 1926 to the present, although evidence for the United States is weaker. In recent research, Ibbotson, Liang Peng, and I<sup>22</sup> construct a monthly database of individual security prices and dividends for the NYSE through much of the nineteenth and twentieth centuries. We use it to test for deviations from the random walk in the U.S. market and find weak evidence of predictability for different subperiods.

In light of survival issues, of course, the availability of long-term U.S. and U.K. data is both a blessing and a curse. While the data represent long and nearly independent samples for testing predictability, they also owe their existence to the success of the markets. For example, much of the predictive power of U.K. dividend yields is associated with the early 1970s, when share prices plunged but yields did not. Was a bet on U.K. stocks at the nadir of the market a good one? Yes, *ex post*. Was recovery really a certainty for the London market? We will never know. To what extent are positive results on the predictability of dividend yields attributable to the survival of the U.K. market? To address this issue econometrically, Jorion and I<sup>23</sup> use simulations to evaluate the effects of survival on dividend yield regressions and on Dickey-Fuller tests of yield reversion. Survival makes a difference: the co-efficients from regressions based on survived markets are biased towards rejection of the null. This result is of potential interest to econometricians working on co-integration, and we hope that closed-form corrections to the problem will emerge.

### Conclusion

In 1905, Albert Einstein was awarded a Nobel Prize for his work, which finally solved the puzzle of Brownian motion 78 years after its

discovery. Financial economists have puzzled over the motion of the stock market for nearly a century, and we are nowhere near a complete understanding of the complexities of the process. While Brownian motion is convenient for many practical problems in financial economics, the forces underlying market motion and the long-term implications of the market diffusion process are economically significant for research as well as for investment decisions. Perhaps the difficulty we face is that the asset price process ultimately is driven by people rather than by particles, and our ability to observe it is sometimes an accident of history.

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<sup>2</sup> C.f. A. Shleifer, "Do Demand Curves for Stocks Slope Down?," *Journal of Finance*, 41 (July 1986), pp. 579-90; L. Harris and E. Gurel, "Price and Volume Effects Associated with Changes in the Standard and Poors 500 List — New Evidence for the Existence of Price Pressure," *Journal of Finance*, 41 (July 1986), pp. 815-29; R. W. Holthausen, R. W. Leftwich, and D. Mayers, "Large Block Transactions, the Speed of Response, and Temporary and Permanent Stock Price Effects," *Journal of Financial Economics*, 26 (July 1990), pp. 71-95; M. Garry and W. N. Goetzmann, "Does De-listing from the S&P 500 Affect Stock Price?," *Financial Analysts Journal*, 42 (March 1986), pp. 64-9; U. S. Dhillon and H. Johnson, "Changes in the Standard and Poor's 500 List," *Journal of Business*, 64 (January 1991), pp. 75-85; M. D. Beneish and R. Whaley, "An Anatomy of the 'S&P Game': The Effects of Changing the Rules," *Journal of Finance*, 51 (July 1996), pp. 1909-30; A. W. Lynch and R. R. Mendenhall, "New Evidence on Stock Price Effects Associated with Changes in the S&P 500 Index,"

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<sup>3</sup> W. N. Goetzmann and M. Massa, "Index Funds and Stock Market Growth," NBER Working Paper No. 7033, March 1999.

<sup>4</sup> W. N. Goetzmann, M. Massa, and K. G. Rouwenhorst, "Behavioral Factors and Mutual Fund Flows," *Yale International Center for Finance Working Paper No. 00-14*, 2000.

<sup>5</sup> See, e.g., R. M. Edelen and J. B. Warner, "Why Are Mutual Fund Flows and Market Returns Related? Evidence from High-Frequency Data," *University of Pennsylvania Working Paper*, 1999.

<sup>6</sup> W. N. Goetzmann and M. Massa, "Daily Momentum and Contrarian Behavior of Index Fund Investors," NBER Working Paper 7567, February 2000.

<sup>7</sup> B. M. Barber and T. Odean, "Trading Is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors," *Journal of Finance*, 55 (April 2000), pp. 773-806; T. Odean, "Are Investors Reluctant to Realize Their Losses," *Journal of Finance*, 53(5) (October 1998), pp. 1775-98; "Volume, Volatility, Price, and Profit When All Traders Are Above Average," *Journal of Finance*, 53 (December 1998), pp. 1887-1934; "Do Investors Trade Too Much?," *American Economic Review*, 89 (December 1999), pp. 1279-98.

<sup>8</sup> K. A. Froot, P. G. J. O'Connell, and M. S. Seasholes, "The Portfolio Flows of International Investors," NBER Working Paper No. 6687, August 1998.

<sup>9</sup> M. Grinblatt and M. Keloharju, "The Investment Behavior and Performances of Various Investor Types: A Study of Finland's Unique Dataset," *Journal of Financial Economics*, January 2000; "Distance, Language, and Cultural Bias: The Role of Investor Sophistication," *UCLA Working Paper*, February 2000; "What Makes Investors Trade?," *UCLA Working Paper*, January 2000.

<sup>10</sup> A. Cowles, *Common Stock Indices*. Bloomington, IN: Principia Press, 1939.

<sup>11</sup> L. Fisher and J. Lorie, "Rates of Return on Investments in Common Stocks: The Year by Year Record (1926-65)," *Journal*

of Business, 41 (July 1968), pp. 408-31; *A Half-Century of Returns on Stocks and Bonds*. Chicago: University of Chicago Press, 1977.

<sup>12</sup> R. G. Ibbotson and R. Sinquefeld, "Stock, Bonds, Bills and Inflation: Year-by-Year Historical Returns (1926-74)," *Journal of Business*, 49 (January 1976), pp. 11-47.

<sup>13</sup> S. J. Brown, W. N. Goetzmann, and S. A. Ross, "Survival," *Journal of Finance*, 50(3) (July 1995), pp. 853-73.

<sup>14</sup> P. Jorion and W. N. Goetzmann, "A Century of Global Stock Markets," NBER Working Paper No. 7565, February 2000.

<sup>15</sup> W. N. Goetzmann and P. Jorion, "Re-emerging Markets," NBER Working Paper No. 5906, January 1997.

<sup>16</sup> G. Bekaert and C. Harvey, "Time-Varying World Capital Market Integration," *Journal of Finance*, 50 (June 1995), pp. 952-52; G. Bekaert and M. S. Urias, "Diversification, Integration and Emerging Market Closed-End Funds," *Journal of Finance*, 51 (July 1996), pp. 835-69.

<sup>17</sup> S. J. Brown, W. N. Goetzmann, and S. A. Ross.

<sup>18</sup> E. F. Fama and K. R. French, "Permanent and Temporary Components of Stock Prices," *Journal of Political Economy*, 96 (April 1988), pp. 246-73; "Dividend Yields and Expected Stock Returns," *Journal of Financial Economics*, 22 (October 1988), pp. 3-26.

<sup>19</sup> M. Richardson, "Temporary Components of Stock Prices, a Skeptic's View," *Journal of Business Economics and Statistics*, 11 (April 1993), pp. 199-207.

<sup>20</sup> W. N. Goetzmann, "Patterns in Three Centuries of Stock Market Prices," *Journal of Business*, 66 (April 1993), pp. 249-70.

<sup>21</sup> W. N. Goetzmann and P. Jorion, "A Longer Look at Dividend Yields," *Journal of Business*, 68 (October 1995), pp. 483-508.

<sup>22</sup> R. G. Ibbotson, L. Peng, and W. N. Goetzmann, "A New Historical Database for the NYSE 1815 to 1925: Performance and Predictability," *Journal of Financial Markets*, forthcoming.

<sup>23</sup> W. N. Goetzmann and P. Jorion, "A Longer Look at Dividend Yields."

## Special Interest Groups and Economic Policy

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In the idealized democratic society, economic policy is determined by "one man, one vote." But in all real societies, special interest groups play an important role in the process that determines economic policy. Pressure groups represent relatively narrow interests, for example of peanut farmers, auto workers, or shareholders of firms that produce semiconductors. They also represent broader interests, such as those of retired workers, capital owners, and those with special concerns for the environment.

Hardly a day passes without the media reporting on the activities and influence of special interests. Discussions of campaign finance reform in the United States have focused attention on one important way in which interest groups seek to influence policies: interest groups are contributing ever-larger sums to political campaigns and political parties, apparently to encourage politicians to take positions favorable to their causes and to aid those who do so in their bids for election. Contributions by Political Action Committees to congressional candidates, which in 1975-6 totaled less than \$23 million, exceeded \$430 million in the 1995-6

electoral cycle.<sup>1</sup> Interest groups also engage in public display, such as the highly visible protests that surrounded the World Trade Organization (WTO) meetings in Seattle and the recent International Monetary Fund and World Bank meetings in Washington, DC. These displays are meant to demonstrate to politicians the strength of the groups' convictions and to educate the public about the policy issues. Less visible but still important are the everyday activities of the legion of lobbyists in Washington, Brussels, and other capitol cities. According to the Center for Responsive Politics, the number of registered lobbyists in Washington grew from 14,946 in 1997 to 20,512 in 1999.<sup>2</sup> These lobbyists spend a good portion of their days meeting with elected officials in order to share their alleged expertise and to persuade the policymakers about the worthiness of their causes.

In the early 1990s, we began to study the effects that special interests have on trade policy deliberations and outcomes. Trade is an area where interest groups have been especially visible. Groups representing workers and firms figured prominently in the protection afforded the U.S. steel, auto, textile, and footwear industries in the 1970s and 1980s. Agricultural interests were active and effective in pushing the Common Agriculture Policy of the European Community (now the European Union). Groups representing labor and environmentalists were vociferous in their opposition to the North American Free Trade Agreement, while many business groups lobbied in favor of that agreement. These same groups are joined by still others in the current debate about the future of the WTO.

Although an extensive literature on the political economy of trade policy

existed by the time we became interested in the subject — with important contributions from William Brock and Stephen Magee, Robert E. Baldwin, Jagdish Bhagwati, Anne O. Krueger, and Wolfgang Mayer, among others — the prevailing approaches took shortcuts that seemed to obscure important relationships and to limit the purview of the theory and empirics. For example, the framework used often was ill suited to making predictions about the variation in rates of protection, despite the fact that much of the empirical work focused on exactly this sort of evidence.

Our early work on special interest politics focused on campaign contributions (of time and money) as the tool by which interest groups might influence the policy process. In our first paper, we develop an analytical approach that emphasizes the strategic interaction between interest groups and policymakers on the one hand and the strategic interaction among the interest groups on the other.<sup>3</sup> We suggest that trade policies can be viewed as objects "for sale," with the policymaker as seller and special interest groups as buyers. This assumes that the policymaker cares about general welfare and, in this sense, represents the interest of the voters. But, in addition, the policymaker covets political contributions, which can be used to finance a bid for re-election. Our approach endows the policymakers with an objective function that is a weighted sum of aggregate welfare and contributions, thereby rendering them as "common agents" of the special interests. Special interest groups are assumed to represent industry interests in an economic model in which those with (human or physical) capital invested in an industry stand to gain from protection or subsidization

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of their sector.

In the model, every organized interest group makes a bid for influence. These bids take the form of "contribution schedules" that link the amount that a group will contribute to the policymaker to the collection of trade policies that the policymaker adopts. We impose no restriction on the design of these offers, except that no group can contribute negatively.<sup>4</sup> Each group understands that the others also will be bidding for influence and that, ultimately, the policymaker will set trade policies to maximize a political objective function that includes aggregate welfare and aggregate contributions as arguments. The groups design their contributions to maximize the welfare of their members, assuming that other groups will be behaving similarly and that the policymaker is politically motivated.

Using this approach, we can derive a formula for the equilibrium structure of protection in a small country that takes international prices as given. The rate of protection to an industry is the product of two components: the first component, common to all industries in a polity, reflects the weight that the policymaker attaches to aggregate social welfare and the fraction of the population that is represented by an organized interest group. This can be regarded as a summary of the political environment. The second component varies by industry according to its economic characteristics. It implies that more protection will be provided to politically organized industries with a high ratio of output-to-imports and to those industries for which the demand for imports is relatively inelastic.

Our formula stands up well to empirical analysis. Pinelopi K. Goldberg and Giovanni Maggi, using measures of nontariff protection of U.S. industries as their independent variable, have estimated the relation-

ship between the structure of protection and the determinants we identify.<sup>5</sup> They find that the model fits the data, and that other variables usually included in cross-industry regressions of rates of protection add little to the model's explanatory power. According to their estimates, U.S. policymakers appear to place a high weight on aggregate welfare, and most voters are represented by one special interest group or another.

Next, we apply our model to the interaction between large countries.<sup>6</sup> The governments of these countries might either compete or cooperate in setting their trade policies. Our framework captures a "two-level game," to borrow Robert Putnam's terminology. On one level, the interest groups compete for domestic influence. On another level, the governments compete or cooperate in their international relations.

When governments do not cooperate, as arguably was the case in the early postwar years, they set trade policies to promote their domestic special and general interests. Promoting the general interest dictates policies that better the terms of trade. Promoting special interests requires protection of politically powerful industries, as in "Protection for Sale." The outcome is a blend of these two, with each country protecting its industries with inelastic import demands and inelastic foreign export supplies.

Our analysis of the noncooperative equilibrium reveals a motive for international cooperation that does not rely on the benevolence of national governments. A noncooperative equilibrium is not efficient for the various policymakers, inasmuch as each government fails to take account of the *political* harm it causes the other by not granting market access to the other's export industries. In an international tax negotiation, such as those that have taken place under the auspices of the

General Agreement on Tariffs and Trade (now WTO), each government can benefit politically by gaining market access for its politically powerful export industries while granting access to foreign countries whose domestic import-competing interests are not so strong. As before, political strength is determined by a combination of political factors (the weight the government places on social welfare and the fraction of the population that is represented by an organized interest group) and economic factors (the ratio of domestic output-to-trade and the elasticity of import demand or export supply). In fact, the tariff formula derived in "Protection for Sale" gives an exact measure of an industry's political strength. If a group representing an export industry is politically stronger than its counterpart in the importing country, then trade will be relatively unfettered in a politically negotiated trade agreement. If the import-competing interests are stronger, then high trade barriers will persist under an international agreement.

We also study the formation of free trade areas.<sup>7</sup> Interest groups line up for or against such agreements depending on whether they stand to gain or lose. The organized groups that will benefit from an agreement offer contributions to the policymaker that are paid if the agreement comes to pass. Those who will be harmed make their offers contingent on the opposite outcome. In a political-economic equilibrium, a free trade agreement is viable if and only if it garners sufficient political support from those who would gain in all member countries.

One important result from our analysis is that free trade agreements are most likely to be politically viable when they might be socially harmful. A free trade agreement will be socially harmful if it induces a great deal of trade diversion; that is, if the preferential treatment afforded to

members induces the countries to import goods from their partners that could be purchased more cheaply from the outside. When trade diversion occurs, the exporting interests prosper, but the import-competing industry does not suffer. Thus, the prospect of trade diversion generates political support for the agreement from some special interests and little opposition from others. In contrast, social welfare gains require that new trade be created, but that would spell income losses for workers and firms in the import-competing industries. These groups then would be inclined to oppose the agreement. Thus, the political prospects for an agreement that would create trade are surely worse than for those that would mostly divert it.

Our work on the political economy of protection leads us to examine more carefully the relationship between voters, candidates, and special interest groups.<sup>8</sup> In our early analyses, we did not treat voters explicitly; they were only indirectly represented by an assumed concern of the policymaker for aggregate social welfare. In subsequent work, we introduce voters explicitly and allow them to choose between two slates of candidates.<sup>9</sup> These slates are offered by competing political parties each aiming to maximize their share of the vote. The parties have certain policy positions that they regard as inviable, but others on which they are willing to be more flexible. The parties might choose their positions on the latter set of issues either to appeal to knowledgeable voters or to cater to the special interests that are willing to contribute to their campaigns. Campaign funds are potentially valuable to the political parties because they can be used to purchase advertising that is effective in swaying impressionable voters.

We characterize an equilibrium of a multi-stage political game. First, the

many interest groups bid for influence from one or both of the political parties. The bids take the form of contribution schedules that link campaign gifts to the positions adopted by the parties. Next, the parties choose their platforms for the issues on which they can be flexible. Finally, the voters cast their ballots, with the knowledgeable ones voting for the party that offers the most attractive package of policies and the impressionable ones influenced somewhat by the parties' campaign spending.

Several interesting conclusions emerge from this analysis. First, we find that interest groups typically contribute to both political parties. This is very much in keeping with the evidence for the United States and Israel. Second, the groups rarely give more than the minimum amount needed to exert their influence. Since the offers are used to push the parties toward positions that are unpopular with the average knowledgeable voter, the gift from any one group has no marginal effect on the recipient's electoral success. In this sense, the groups' contributions can be seen as motivated only by a desire for influence and not by a desire to help their favorite parties to win more seats. Third, the positions chosen by the parties maximize a weighted average of campaign contributions and the aggregate welfare of knowledgeable voters. Importantly, the voting environment determines the relevant weights. Parties place more weight on social welfare relative to campaign contributions as the fraction of knowledgeable voters increases, as campaign spending on attracting impressionable voters becomes less effective, and as the preferences of the knowledgeable voters become less dispersed in regard to the issues on which the parties' positions are fixed. Finally, we find that the party whose fixed

positions are more popular among voters is more likely than its rival to cater to the special interests.

More recently, we have been studying how interest groups might use their specialized expertise as a tool to influence policy. An interest group is likely to know quite a bit about its particular areas of interest. For example, a group representing the firms in an industry is likely to be well informed about industry conditions, while one representing environmentalists may know a great deal about ecological sciences. Interest groups are a potential source of information for voters and policymakers alike. The groups can advise the voters about the wisdom of different candidates' positions and can advise the policymakers about what policy approaches would be desirable. But the recipients of the advice must be wary because the group has a stake in the outcome. Our research focuses on what types of statements and actions by interest groups will be credible and how these actions can affect the policy outcomes.

In one paper, we study the issuance of endorsements by special interest groups.<sup>10</sup> Endorsements may be seen as a means by which the leaders of interest groups can communicate with their rank-and-file members and with other voters. An endorsement indicates which of the candidates has a position that better serves the common interests of the group members. This message may be useful to the voters if they are imperfectly informed about the policy issues. There are circumstances in which the ability to issue an endorsement confers a benefit to a special interest group and circumstances in which it does not. If the issue is one of pure distribution, where anything the members gain comes at the expense of voters who are not members of the group, then the endorsement will have no effect on the

candidates' positions or on the outcome of the election. Nonmembers will interpret the endorsement in the same way that members do and realize that the candidate who would better serve the group's interests would be harmful to their own. These voters will be less inclined than otherwise to vote for an endorsed candidate, so the candidates will be wary of being endorsed. But if the policy issue is not one of pure distribution, an endorsement can have real effects. The endorsed candidate will capture a greater share of the votes of interest group members than otherwise, while losing relatively fewer votes among nonmembers. In this event, the candidates will "compete for the endorsement" by adopting positions that cater to the interest group.

Our forthcoming book will discuss other ways that interest groups might use their knowledge of the issues to influence the policy process.<sup>11</sup> Among these are attempts at persuasion by lobbyists in one-on-one meetings with policymakers, public information campaigns aimed at the general voter, and resorting to costly displays such as those that took place in Seattle. Our book will also provide an integrated treatment of campaign contributions as a means of policy

influence and will incorporate numerous examples of applications to specific policy questions.

<sup>1</sup> See B. A. Loomis and A. J. Cigler, "Introduction: The Changing Nature of Interest Group Politics," in *Interest Group Politics* (5th edition), A. Cigler and B. Loomis, eds. Washington, D.C.: CQ Press, 1998.

<sup>2</sup> See the summary of Influence, Inc., 1999 edition, at [www.opensecrets.org/pubs/lobby98](http://www.opensecrets.org/pubs/lobby98) (accessed May 16, 2000).

<sup>3</sup> G. M. Grossman and E. Helpman, "Protection for Sale," *American Economic Review*, 84 (September 1994), pp. 833-50.

<sup>4</sup> Actually, all we need is a lower bound on the size of contributions. So, we can allow for negative contributions and think of these as gifts promised to the incumbent policymaker's opponent.

<sup>5</sup> P. K. Goldberg and G. Maggi, "Protection for Sale: An Empirical Investigation," NBER Working Paper No. 5942, February 1997.

<sup>6</sup> G. M. Grossman and E. Helpman, "Trade Wars and Trade Talks," *Journal of Political Economy*, 103 (August 1995), pp. 675-708.

<sup>7</sup> G. M. Grossman and E. Helpman, "The Politics of Free Trade Agreements," *American Economic Review*, 85 (September 1995), pp. 667-90.

<sup>8</sup> Our published work on the politics of protection also includes an analysis of tariff jumping by multinational corporations in G. M. Grossman and E. Helpman, "Foreign Investment with Endogenous

Protection," in *The Political Economy of Trade Policy*, R. Feenstra, G. Grossman, and D. Irwin, eds. Cambridge, MA: MIT Press, 1996; and a comparison of alternative theoretical approaches to the political economy of trade policy in E. Helpman, "Politics and Trade Policy," in *Advances in Economics and Econometrics: Theory and Applications*, D. Kreps and K. Wallis, eds. New York: Cambridge University Press, 1997.

<sup>9</sup> G. M. Grossman and E. Helpman, "Electoral Competition and Special Interest Politics," *Review of Economic Studies*, 63 (April 1996), pp. 265-86.

<sup>10</sup> G. M. Grossman and E. Helpman, "Competing for Endorsements," *American Economic Review*, 89, June 1999, pp. 501-24.

<sup>11</sup> G. M. Grossman and E. Helpman, *Special Interest Politics*, Cambridge, MA: MIT Press, forthcoming.



## Research on Pensions and Social Security

Alan L. Gustman and  
Thomas L. Steinmeier\*

Pensions and Social Security are fundamental parts of saving. They each account for about a quarter of the \$500,000 in total wealth held on average by families approaching retirement age.<sup>1</sup> Pensions have a large effect on retirement incentives as well. A man with a defined benefit (DB) pension plan who works in the year before qualifying for early retirement on average will find his benefits increased by about 60 percent of one year's pay. For a woman, the increase amounts to about one-third of a year's pay.<sup>2</sup> Accordingly, it is necessary to have accurate measures of pensions and Social Security in order to measure the wealth of those entering retirement, to understand saving and retirement behavior, and to determine the true impact of policies meant to influence saving and retirement.

### The Health and Retirement Study

To further our understanding of pensions, Social Security, and their effects, we recently helped to develop and analyze data from the Health and Retirement Study (HRS).<sup>3</sup> The HRS, originally fielded in 1992 as a panel survey of 12,652 individuals from households with at least one member born in 1931–41, now has added additional cohorts (age groups) so that it is representative of the U.S. population over the age of 50. Crucial to our work, the HRS has collected pension Summary Plan

Descriptions (SPDs) from the employers of two-thirds of those in the original survey who were covered by a pension in 1992. The HRS also collected detailed descriptions of pensions from this group's employers on previous jobs. Also central to our work, 80 percent of the survey respondents granted permission to the HRS to obtain their earnings histories from the Social Security Administration. Social Security records were linked successfully for 95 percent of those granting permission, or 75 percent of the HRS sample.

The HRS cohort is an interesting group to study: they are the group closest to retirement age and the first covered by Social Security to learn that the present value of their benefits will fall below the present value of their taxes paid.<sup>4</sup> Thus, the HRS data can teach us a great deal about: retirement incentives; the relationship of pensions and Social Security to total saving and retirement outcomes; complexities in behavior beyond those incorporated in the simple life-cycle model; and the relationship between pension and Social Security policies and the distribution of benefits plus behavioral outcomes.

### Distributions of Pensions, Social Security, Wealth, and Lifetime Earnings

From the HRS data, we have learned a great deal about the distribution of total wealth and its components — including pensions and Social Security — and about how they vary with lifetime earnings, for households and for individuals. Contrary to the general impression, pensions are distributed widely among households. Although only half of the employed individuals in the HRS have a pension, three-fourths of HRS households were cov-

ered by a pension at one time, and two-thirds of HRS households own the rights to a pension or pension income. In 1992, pension wealth was worth \$191,000 per HRS household with a claim on a pension. Moreover, less than 10 percent of pension wealth has been lost because covered respondents have cashed out their benefits after leaving a pension-covered job.

The share of family wealth held as pensions increases with family lifetime earnings, rising from less than 5 percent of total wealth for those in the bottom 10 percent of lifetime earners, to 30 percent of total wealth for those in the 75th to 95th percentiles of lifetime earners.<sup>5</sup> Although men hold pensions that are much more valuable than the pensions held by women — for example, at age 55, men hold DB pensions worth \$200,000, while women's holdings are \$108,000 — the differences are explained largely by differences in earnings. Benefit-earnings ratios are actually higher for women with DB plans than men: for example, at age 60, benefit-earnings ratios are 20 percent for women and 16 percent for men. From age 55 on, the ratio of pension accrual-to-earnings is higher for women than men: for example, at age 60, it is 10 percent higher.<sup>6</sup>

Contrary to the impression left by the progressive Social Security benefit formula, Social Security does not do a very good job of redistributing benefits among families. When families are arrayed by their lifetime earnings, redistribution of benefits amounts to less than half of what is suggested by the progressive benefit formula as applied to individuals. Low-wage earners are primarily women who have worked for fewer years than men have but are married to a spouse with higher earnings; thus they enjoy disproportionately

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high spouse and survivor benefits under Social Security. Most of the redistribution among families, therefore, is from families in which both spouses work much of their lives to families in which only one spouse had a long-term commitment to the labor market.

When individuals are ranked according to their earnings, almost 11 percent of total Old-Age and Survivors Insurance (OASI) benefits are redistributed from those with high lifetime earnings to those with low lifetime earnings. When families are ranked according to lifetime earnings, only 5 percent of total benefits paid are redistributed. Further, when households are ranked according to their earnings in years when they are fully committed to the labor market, a little more than 2 percent of total Social Security benefits are redistributed. So, if those currently approaching retirement had a system of privatized accounts instead of benefits determined by the current Social Security formula, there would be little difference in benefit redistribution.<sup>7</sup>

The same mechanism that favors families whose members work under Social Security only part of their lifetimes also favors immigrants. The benefit calculation assumes that in the years before entering this country, the immigrants had no earnings. The mechanism's effect is to lower the Average Indexed Monthly Earnings (AIME) on which their benefits are based; using the progressive segment of the benefit formula generates benefits that are a higher share of their average yearly earnings than someone born in the United States who had the same average yearly earnings would receive. Simply prorating the benefits of immigrants based on time spent in the United States would reduce their benefits by 7 to 15 percent, saving Social Security an additional \$50 billion to \$100 billion in present value. Nor is the favorable treatment of immigrants

under Social Security justified by differences in income or wealth. Indeed, the current formula favors immigrants with high earnings who have been in the country a relatively short period of time.<sup>8</sup>

The same mechanism that favors the treatment of immigrants and families whose members work only part of their lifetimes also will favor those who would opt out of a voluntary Social Security system, especially during the transition to such a system.<sup>9</sup> But the safeguards that could limit benefits for immigrants could also work during the transition to a voluntary privatized system. One possibility would be to average benefits only for the time the individual has spent in covered employment, and then to reduce the basic benefit by the ratio of years-spent-in-covered-employment-to-total-years-used-in-computing-benefits, for example, the 35 years currently used as the base period when counting AIME.

### **Pensions Do Not Stand Still**

Changes in coverage and plan generosity alone have more than doubled the value of pensions held by older households between 1969 and 1992, increasing the value of pensions by 145 percent.<sup>10</sup> There have also been fundamental changes in other pension characteristics. Most notably, the typical covered worker now is more likely to have a defined contribution (DC) plan, that is, a pension held in the form of an account. Looking at a panel of pensions between 1983 and 1989 alone, we observe that the early retirement date declined by a year, while the generosity of early retirement benefits increased. By 1992, three-fourths of those in the HRS with a DB plan were eligible for early retirement benefits by age 55.<sup>11</sup> Although changes in pensions are exaggerated in cross-sectional comparisons, they are large enough that studies match-

ing plan descriptions to panel data should refresh the pension plan matches periodically.<sup>12</sup> That is, in panel data the pension plan descriptions obtained from employers and matched in a particular year should not be treated as if they remain unchanged in all future years. Moreover, pension plans have changed so sharply over time that those who are now retiring could not have projected the characteristics and values of plans that are currently in force.

### **Pensions, Social Security, and Saving<sup>13</sup>**

We next consider the relationship between total wealth and lifetime earnings, and its implications. Except for those in the bottom decile of the lifetime earnings distribution, the ratio of wealth — including the present value of pensions and Social Security — to lifetime earnings is relatively constant, averaging about 40 percent from the 25th to 95th percentiles of the lifetime earnings distribution. With these wealth-earnings ratios, the majority of those in the HRS are well prepared for their retirement. Annuitying their wealth on the assumption of a two-thirds joint and survivor annuity, at their expected retirement age, the median nominal replacement rate for HRS households will be 96 percent of final earnings, while the median real replacement rate will be 62 percent of final earnings. Only those with the lowest quarter of replacement rates appear to be in significant trouble.

Because pensions and Social Security are such a large share of wealth, it is natural to ask whether they affect saving. We use the wide variation in pension plans in the HRS to measure substitution with other forms of saving. We find that pensions add to total wealth by at least half the value of the pension, and in most specifications by a good deal

more. Thus, those with higher pensions do not reduce their holdings of other wealth correspondingly. Although our finding of a constant wealth-to-earnings ratio across much of the lifetime earnings distribution also might be construed as evidence in favor of the simple life-cycle hypothesis, the lack of substitutability between pensions and other forms of wealth suggests a more complicated relationship.

Pensions may be a good substitute for other forms of wealth, but this is not apparent in our regressions; because people with pensions are informed by their employers and others about the need for retirement saving, they save more. But even if those with pensions are better informed about the need for retirement saving than those without pensions, they are still not very well informed about their own pensions. Only half the HRS respondents with linked pension data correctly identify their plan type, and fewer than half identify, within one year, the dates of eligibility for early and normal retirement benefits. Benefit reduction rates essentially are not reported. Respondents do better at reporting pension values, but the unexplained variation is still considerable. Only 40 percent of respondents who knew enough to actually report a value for their pension correctly identified the relatively wide bracket in which their plan value actually falls.<sup>14</sup>

### **Pensions, Social Security, and Retirement**

In the HRS panel, we find that 77 percent of the transitions among the different retirement states — retired, partially retired, and not retired — involve continuations in the same state between waves; 17 percent of transitions involve a move from greater to lesser participation; and, more difficult to model, 6 percent of transitions involve a move from a

state of lesser to greater labor-force participation.<sup>15</sup>

Comparing retirement outcomes in the HRS data with comparable information from the old Retirement History Survey (RHS), we find that both full and partial retirement are occurring at much younger ages. Although more than 75 percent of the males in the RHS were working full time at age 60, only 61 percent of the males in the HRS are. The large spike in the population leaving full-time work at age 65 observed in the RHS is reduced by half in the HRS, while the share leaving full-time work at age 62 has almost doubled over time. Of the HRS sample, 22 percent report that they were partially retired at some time in the first four waves of the survey. Changes in pensions clearly appear to have reduced the early retirement age and to have decreased the age at which early retirement actually takes place. Applying structural models of retirement, it seems that changes in pensions and Social Security are capable of explaining about one-fourth of the trend toward earlier retirement observed over the 1970s and 1980s.<sup>16</sup>

However, the puzzles that we find in estimating savings models do not leave us sanguine about applying simple life-cycle models to retirement behavior. Structural retirement models typically assume that saving behavior consistent with a life-cycle model is taking place in the background as respondents make retirement decisions in accordance with the incentives created by pensions and Social Security.<sup>17</sup> But as we have seen, saving behavior does not appear to be fully consistent with the predictions of the life-cycle model. People are poorly informed about crucial features of their pensions. Nor do they substitute pension wealth for other forms of wealth. We also find that workers who are “liquidity constrained” retire later.

Moreover, when we investigate the

relationship between retirement and saving in the HRS data, we find other anomalies. A simple life-cycle model suggests that, unless there is a correlation between the tastes for leisure and time preference, the earlier one wants to retire, the more will be saved for retirement. Accordingly, those characteristics associated with earlier retirement also should be associated with higher saving. Yet we find no evidence of such a relationship in the data.<sup>18</sup>

We also find that reduced-form models of retirement that ignore saving are not capable of explaining the spike in retirement at age 62. There is some general confusion about how to value the cost of funds when calculating the future reward to postponed retirement. For example, when calculating the increase in Social Security benefits from working longer, it is often assumed that people value the expected actuarial increase in Social Security benefits. Yet those family members who would benefit from further delaying receipt of Social Security almost uniformly claim their benefits immediately upon retiring. In contrast, unmarried men who should claim their benefits immediately upon retiring have a greater tendency to postpone benefit acceptance.<sup>19</sup> Reduced-form models that relate retirement to measures of Social Security benefit accrual — for example, peak or premium value — predict, counterintuitively, that reducing the Social Security early retirement age will induce more people to retire early.

### **An Agenda for Further Research**

To resolve these puzzles, we are extending our structural models of retirement to also model saving.<sup>20</sup> Similarly we are expanding our analyses of family retirement decisions to incorporate household sav-

ing.<sup>21</sup> The HRS is crucial for this analysis because, unlike many other surveys, it provides pension and employment records for both spouses in the household. We also hope to incorporate uncertainty into a dynamic structural model, while integrating the saving and retirement decisions explicitly into the model. Eventually we should be able to explain the complex flows among retirement states observed in the HRS panel. In the process, we also would like to allow for the influence on saving and retirement outcomes of imperfect information and incomplete understanding of the maximization process. This is an ambitious agenda, but one that must be met if we are to understand the effects of pension and Social Security policies into the future. Indeed, we cannot understand the effects of those modifications of Social Security policies that are already in place, such as the extension of the Social Security normal retirement age, or the increase in the delayed retirement credit to 8 percent, without understanding linkages among retirement, saving, and benefit-claiming behavior. Nor can we understand the likely effects of such fundamental policy changes as privatizing Social Security.

investigators. Charles Brown and Olivia S. Mitchell are the co-investigators we have worked with on questions pertaining to retirement, pensions, and Social Security. Under the leadership of Richard Suzman, the HRS has been supported by the National Institute on Aging, with additional support from the Social Security Administration and the Pension Welfare Benefits Administration of the Department of Labor. Our own work also has received generous support from these agencies.

<sup>4</sup> A. L. Gustman and T. L. Steinmeier, "Effects of Pensions on Savings: Analysis with Data from the Health and Retirement Study," Carnegie-Rochester Conference Series, 50 (July 1999), pp. 271–326.

<sup>5</sup> *Ibid.*

<sup>6</sup> A. L. Gustman and T. L. Steinmeier, "Employer-Provided Pension Data in the NLS Mature Women's Survey and in the Health and Retirement Study," Research in Labor Economics, vol. 19, forthcoming.

<sup>7</sup> A. L. Gustman and T. L. Steinmeier, "How Effective Is Redistribution under the Social Security Benefit Formula?," NBER Working Paper No. 7597, March 2000.

<sup>8</sup> A. L. Gustman and T. L. Steinmeier, "Social Security Benefits of Immigrants and U.S. Born," in Issues in the Economics of Immigration, G. J. Borjas, ed. Chicago: University of Chicago Press, 2000.

<sup>9</sup> A. L. Gustman and T. L. Steinmeier, "Privatizing Social Security: First-Round Effects of a Generic, Voluntary, Privatized U.S. Social Security System," in Privatizing Social Security, M. Feldstein, ed. Chicago: University of Chicago Press, 1998.

<sup>10</sup> A. L. Gustman and T. L. Steinmeier, "Pensions and Retiree Health Benefits in Household Wealth: Changes from 1969 to 1992," Journal of Human Resources, 35 (1) (Winter 2000), pp. 30–50.

<sup>11</sup> A. L. Gustman and T. L. Steinmeier, "Employer Provided Pension Data in the NLS Mature Women's Survey and in the Health and Retirement Study," Research in Labor Economics, vol. 19, forthcoming.

<sup>12</sup> A. L. Gustman and T. L. Steinmeier, "Changing Pensions in Cross-Section and Panel Data: Analysis with Employer-Provided Plan Descriptions," in Proceedings, National Tax Association, November 8–10, 1998, published 1999. The Health and Retirement Study is conducting a new employer pension survey now so that researchers can incorporate changes in pension plans made since

1992, as well as provide basic information on the pensions covering the cohort that has been newly added to the survey.

<sup>13</sup> The information in the first four paragraphs of this section is from A. L. Gustman and T. L. Steinmeier, "Effects of Pensions on Savings: Analysis with Data from the Health and Retirement Study," Carnegie-Rochester Conference Series, 50 (July 1999), pp. 271–326.

<sup>14</sup> A. L. Gustman and T. L. Steinmeier, "What People Don't Know about Their Pensions and Social Security: An Analysis Using Linked Data from the Health and Retirement Study," NBER Working Paper No. 7368, October 1999.

<sup>15</sup> A. L. Gustman and T. L. Steinmeier, "Retirement Outcomes in the Health and Retirement Study," NBER Working Paper No. 7588, March 2000.

<sup>16</sup> P. M. Anderson, A. L. Gustman, and T. L. Steinmeier, "Trends in Male Labor-Force Participation and Retirement: Some Evidence on the Role of Pensions and Social Security in the 1970s and 1980s," Journal of Labor Economics, 17 (4) (October 1999), pp. 757–83.

<sup>17</sup> A. L. Gustman and F. T. Juster, "Income and Wealth of Older American Households: Modeling Issues for Public Policy Analysis," in Assessing Knowledge of Retirement Behavior, E. A. Hanushek and N. L. Mariato, eds. Washington, D.C.: National Academy Press, 1996.

<sup>18</sup> A. L. Gustman and T. L. Steinmeier, "Retirement and Wealth," paper presented at Michigan Retirement Research Conference, June 2000. Our findings suggest that those with a stronger taste for leisure may also have higher time preference.

<sup>19</sup> *Ibid.*

<sup>20</sup> A. L. Gustman and T. L. Steinmeier, "A Structural Retirement Model," *Econometrica*, 54 (3) (May 1986), pp. 555–84 and A. L. Gustman and T. L. Steinmeier, "Changing Social Security Rules for Workers over 65: Proposed Policies and Their Effects," *Industrial and Labor Relations Review*, 44(4) (July 1991), pp. 733–45.

<sup>21</sup> A. L. Gustman and T. L. Steinmeier, "Retirement in a Family Context: A Structural Model for Husbands and Wives," *Journal of Labor Economics*, 18 (3) (July 2000), pp. 503–45. We find that coordination of retirement by husbands and wives is not attributable to incentives, but rather to correlation in tastes. Each spouse, and in particular the husband, values retirement more once the other spouse has retired.

<sup>1</sup> A. L. Gustman, O. S. Mitchell, A. A. Samwick, and T. L. Steinmeier, "Pension and Social Security Wealth in the Health and Retirement Study," in *Wealth, Work and Health, Innovations in Measurement in the Social Sciences*, J. Smith and R. Willis, eds. Ann Arbor: University of Michigan Press, 1999.

<sup>2</sup> A. L. Gustman and T. L. Steinmeier, "Employer-Provided Pension Data in the NLS Mature Women's Survey and in the Health and Retirement Study," Research in Labor Economics, vol. 19, forthcoming. A defined benefit plan uses a formula to determine the yearly benefit paid to a retired worker. Typically the amount of the benefit is determined by years of service and final pay.

<sup>3</sup> We are co-principal investigators of the Health and Retirement Study. F. Thomas Juster and Robert Willis are the principal

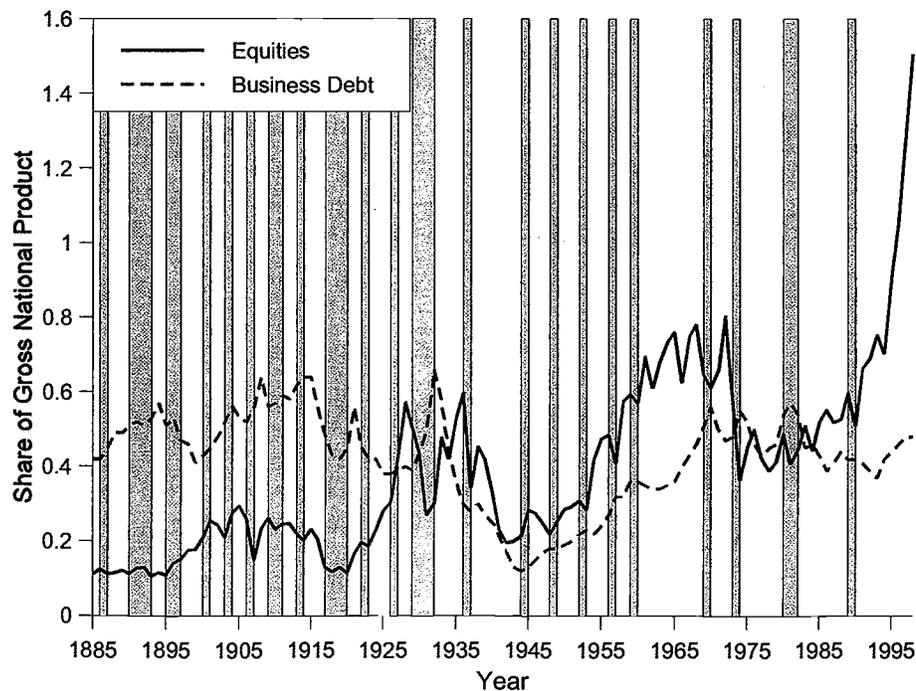
# Technology and the Stock Market

Boyan Jovanovic\*

This article reviews my work on the relationship between technological change and the stock market. My co-authors in this area are Jeremy Greenwood, Bart Hobijn, and Peter L. Rousseau. The papers that we have written so far are listed at the end of this article.

## Creative Destruction in the Stock Market

Figure 1 shows that U.S. stock market capitalization has risen relative to GNP by a factor of about 12 over a 113-year period. On the other hand, business debt — bank loans and corporate bonds — begins and ends the period at about 40 percent of GNP, which implies that the debt-equity ratio has fallen by a factor of 12.



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Although the long-run shift is out of debt and into equity, in the medium run equity and debt move together, which means that the waves in the stock market are not the result of shifts between the two modes of finance. Figure 1 also shows the official NBER recession dates, which are about as likely to appear when the stock market is low as when the stock market is high relative to GNP.

Can technological progress explain some of the medium-run swings in the stock market? I would argue that a "stock market wave" forms when major invention triggers a process of Schumpeterian creative destruction in technologies, in products, and (most relevant here) in firms. Briefly, what happens is: a new technology signals the end of an era, and the signal is bad news for the stock market incumbents. Large firms — the com-

panies that account for the lion's share of the stock market capitalization — are good at routine innovation and good at improving methods they use and products they sell, but in small ways, a step at a time. The corporation thrives under "business as usual" conditions; in times of change, it is held down by ignorance, outdated training, and the vested interests of its employees. Its stock price then will fall if investors fear that the equipment and techniques it uses soon will be obsolete and that it will resist the new technology. The corporation's very survival may require a major overhaul, and current management may not be up to the task. The market drops until a wave of new entrants causes it to rise again. Inventions such as computers tend to be developed in small, privately held companies. These inventions do not add any value to the stock market until the small companies go public or are acquired. Thus, technological progress destroys values of old firms, and only later leads to stock-market entry and to a boost in productivity and earnings.

## The Post-1973 Wave

Greenwood and I argue that the J-shaped post-1973 wave is an example of just such a process. By late 1972, Intel had developed its second computer chip. Within two years there existed affordable personal computers that, in spite of lacking a screen and keyboard, could be used by a capable programmer to do calculations that earlier would have required the use of a mainframe computer with queues, delays, and so forth. Investors thus should have been aware of the potentially rapid progress in computing power. So, while the information technology (IT) revolution was gathering momentum in the 1970s, stock prices fell; some companies went out of business, and some declined. Total market capitalization dropped from 113 percent of GDP in 1968 to 45

percent of GDP in 1974 and remained there for the next ten years. The price-earnings ratio on the S&P 500 Index fell from 19.5 in December 1972 to 7.5 two years later. Stocks that would later gain from the IT boom were not yet quoted; Microsoft, for example, only had its initial public offering (IPO) in 1986, and, as other IT developers started going public and growing in the 1980s, Wall Street surged. By 1996, the market's value was 132 percent of GDP. Older companies, those traded on major stock markets in 1968, accounted for less than one-fifth of the 1981 to 1996 rise in market capitalization.

Hobijn and I offer several reasons why the shock that caused all this was indeed IT, and why, as far back as 1973, the market probably did predict future developments well. First, the hardest-hit stocks in 1973-4 were those in IT-intensive sectors. Services' stocks did worse than many manufacturers. Second, if expectations of an IT boom were to blame for the crash, one would expect households to have saved less in anticipation of higher future incomes. And this is exactly what they did: lower equity wealth should have reduced consumption, but wealth instead was being created in garages and other places that the stock market does not measure; on those grounds consumption should have risen, and it did. Third, the alternative explanations for the post-1973 crash, such as the oil shock and negative surprises to old technologies, are implausible. The oil shock explanation does not make theoretical sense because such shocks should have hit current earnings harder than future earnings, and the capitalization-GNP ratio should have risen, not fallen as it did. Moreover, even in the early 1970s, oil was too small a fraction of costs to have much effect on dividends; what is more, the stocks in oil-intensive

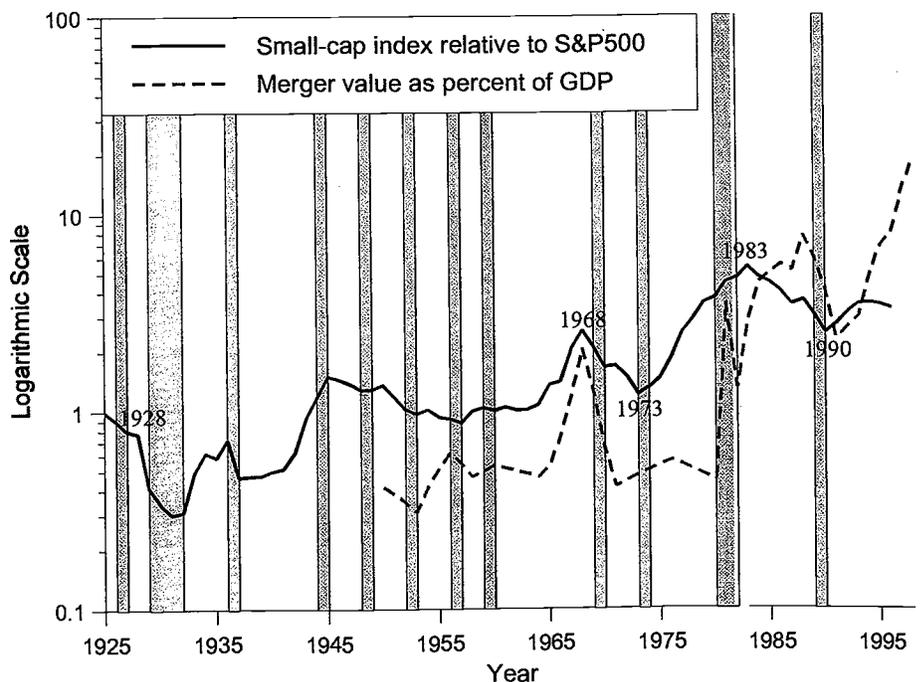
sectors were not hit any harder than other stocks. Finally, a negative technological shock does not make sense either. Technological surprises really make sense only when they are positive and about a new technology, like the microprocessor chip. Old technologies are too well understood to produce the sort of negative surprise that would explain a market drop of the magnitude we saw in 1973-4.

### The Disciplining Role of M&As

Theory says that the stock market is a good thing because it allows an inefficient firm to be taken over and managed better; that is socially cheaper than forcing the firm out through the entry of more efficient competitors. Figure 2 shows the ratio of the Ibbotson small-cap index to the S&P 500 Index. At high frequencies, we observe what we may have expected: Recessions are worse for small-cap stocks than they are for the S&P 500 Index — in only 3 out of the 12 recessions did the ratio of the two indexes rise. But recessions are

uncorrelated with the medium-run shifts, and our interest is in the period immediately following the arrival of the microprocessor. During 1974-82, small-cap stocks outperformed the S&P 500 Index by a factor of nearly four, probably because the larger firms resisted the new technology.

If this signaled an inefficiency on the part of large firms, then theory says that takeovers should have followed. According to the dashed line in Figure 2, this is exactly what happened. As a fraction of GDP, mergers and acquisitions surged in 1980. There followed a wave of hostile takeovers in which a new instrument, the "junk bond," was an effective financing tool. The large firm has bounced back since the early 1980s. One suspects that the junk bond was a response to the falling valuation of the large firm. More generally, mergers seem to occur after large firms lose value — tests for 1950-96 show the solid line Grainger-causing the dashed line at the 5 percent level. In any event, the junk-bond era dawns in the early 1980s, and it ends in the



leveraged buyout of RJR Nabisco by Kohlberg Kravis Roberts; it bought the company for \$24.5 billion in cash and debt in 1989, the same year that Congress denied the tax deduction on junk-bond interest payments. But the S&P 500 Index has done better since the mid-1980s, and by 1990 the ratio of the two indexes was back where it had stood in 1968. Large firms apparently had managed to adapt to the new IT era, not only thanks to a greater threat of takeover, but also perhaps to the increased use of management stock options and to other incentives for managers to act in the shareholders' interest. Moreover, today's giants probably do better because they are much younger than they used to be: Microsoft, Cisco, MCI, and Dell, for example, were all incorporated in the last two decades.

### Lessons from the Jazz Age

What date in the electrification era corresponds to today? One way to date things is by how far a technology has spread among American households and businesses. Today, roughly 50 percent of households own a personal computer (PC). The corresponding date in the diffusion of electricity was 1924. So, to learn what will happen to the wave of IT upstarts that "IPO'd" in recent years, one can look at what happened to the wave of 1920s entrants, or what Rousseau and I call the "Jazz Age vintage." The 1920s are like the present because both are epochs of widespread adoption of revolutionary technologies: in the 1920s it was electricity and the automobile; today it is the PC and the Internet. The 1920s spawned the secondary wave of electricity-era entrants that brought in the products that the newly electrified factories and households demanded. The new firms issued patents that surged in the teens and 1920s, just as they are surging now.

Our findings do not support the conventional view of the 1920s as an era of misguided optimism that ended with a crash and depression. Hindsight shows that the New York Stock Exchange firms of the 1920s were somewhat overvalued, but this overvaluation was concentrated among the then-old economy. Moreover, the stock market exit rate was low during the Depression — one does not see an "echo" exit effect in the 1930s following the great wave of entry of the 1920s. The 1920s entrants had staying power. Figure 2 shows that small-cap stocks declined about two or three times as sharply as large-cap stocks, but they recovered slowly, and their recovery was led by the Jazz Age cohort. At the end of it all, the firms that went public between 1918 and 1934 did much better than the adjacent vintages.

accounts for nearly \$1.5 trillion of 1998 stock market value — far more than any decade-cohort before the 1960s. Indeed, the 1920s vintage accounts for almost as much value as the 1970s vintage, even though nearly four times as much was invested in the 1970s (see the dark line — presumably investment in the 1970s was biased towards the pre-1970s vintage firms). The companies that went public in the 1920s were then the New Economy. The Jazz Age firms did very well later in spite of the crash of 1929 and the ensuing Great Depression; that suggests that they were selling good products and using good technologies, qualities that enabled them to ride out the hard times they had to face in their infancy. Indeed, the experience of the 1920s suggests that the survivors among today's Internet cohort will not only make up for the

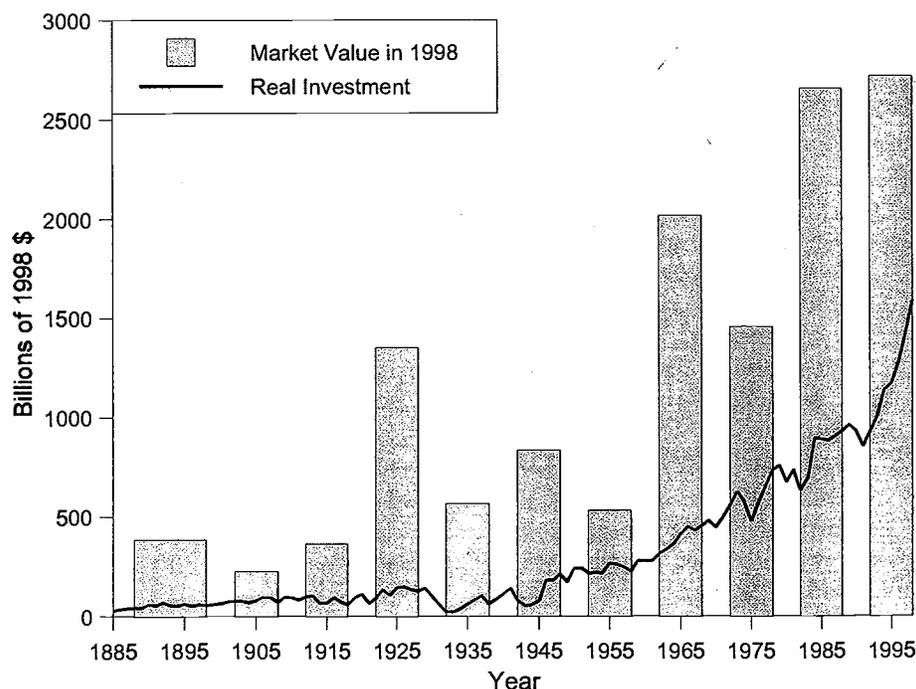


Figure 3 shows the 1998 worth of eleven vintage portfolios — what each decade-cohort was worth by 1998. The cohort of the 1920s

losers, but also will do so to an extraordinary extent.

How long will this new prosperity last? Again, let us look to the past for

the answer. The last time we had a sweeping technological transformation was when electricity and the internal combustion engine were commercialized, roughly the 45-year period from 1890–1935. What is the survival record of the Jazz Age stock market entrant, and, to be specific, how long did the pre-1935 companies continue to thrive? Figure 4 tries to answer this question by plotting the share of the stock market that the pre-1935 vintages lost each year. The figure shows that until the early 1970s these companies were losing market share at a rate of only 2.2 percent per year. After 1974, however, the rate of loss jumps to 3.4 percent per year.

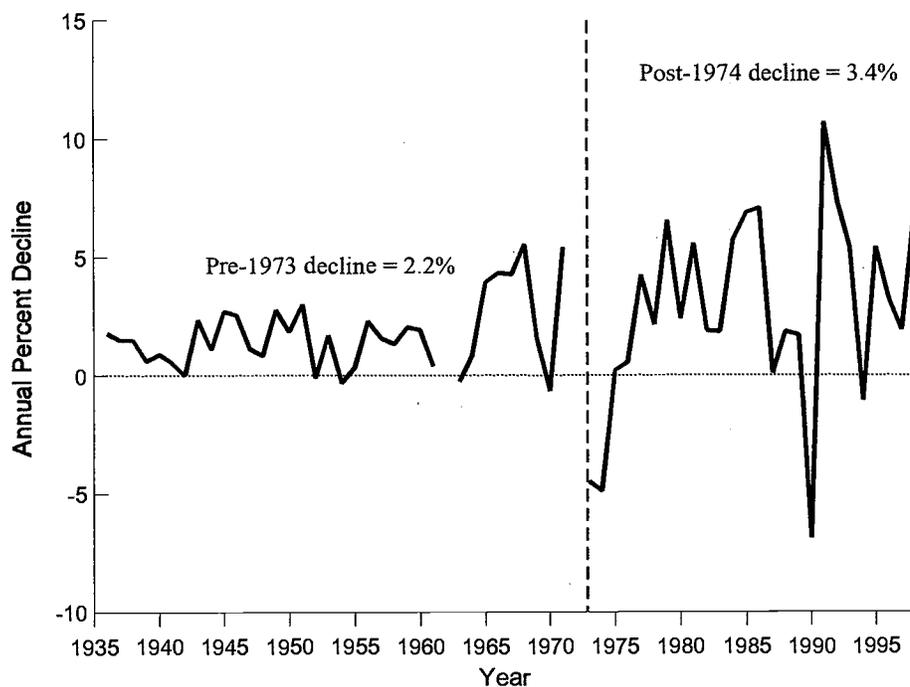
the new generations of firms could. The current prosperity should continue until the next big technology arrives. If history were to repeat itself, the next major technology would arrive in the year 2040, and we could expect a decline then in the performance of today's IT leaders.

### The Next Stage: The Transition from Steam to Electricity

The 113 years of U.S. stock market data carry a lot of information, but they still cover just two industrial revolutions — the electricity-diesel era and the IT era — and hence just one transition from an old economy to

1820s, the start of the railway era. These data will tell us more about how the steam engine gave way to electricity and diesel. Rousseau and I are gathering these data now so that we can take an even longer view and learn more about how technology and the financing process interact.

<sup>1</sup> J. Greenwood and B. Jovanovic, "The Information-Technology Revolution and the Stock Market," American Economic Association (*Papers and Proceedings*), 89(2) (May 1999), pp. 116–22.  
<sup>2</sup> B. Hobijn and B. Jovanovic, "The Information-Technology Revolution and the Stock Market: Preliminary Evidence," NBER Working Paper No. 7684, May 2000.  
<sup>3</sup> B. Jovanovic and P. L. Rousseau, "Accounting for Stock Market Growth: 1885–1998," NBER conference paper, June 2000.



The higher rate of loss probably was caused by the inability of the Jazz Age and earlier vintages to absorb the next major technological wave — the PC and IT — as well as

the new. The U.S. stock market is rather thin before 1900 and is dominated by railway stocks. The London stock market was much broader, and we plan to study it as far back as the

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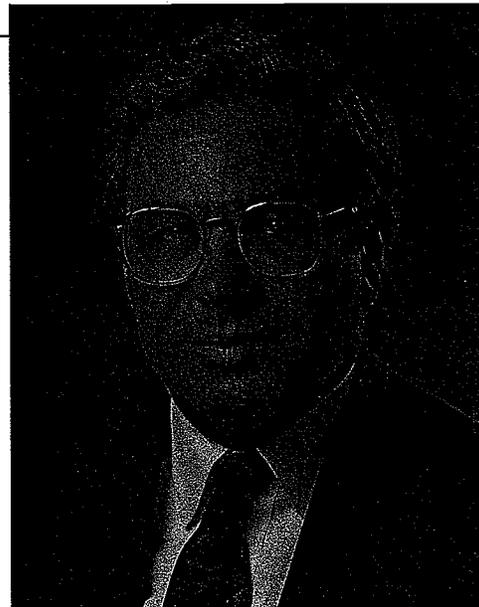
## NBER Profile: *Peter C. Aldrich*

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Peter C. Aldrich has been a Director-at-Large of the NBER since 1994. He is the founder, and recently retired Chairman, of AEW Capital Management, one of the oldest real estate investment advisors in the United States. Aldrich is also Chairman of AEGIS, LLC, an investment holding company, and Faculty

Chairman of the Research Council on Global Investment of the Conference Board.

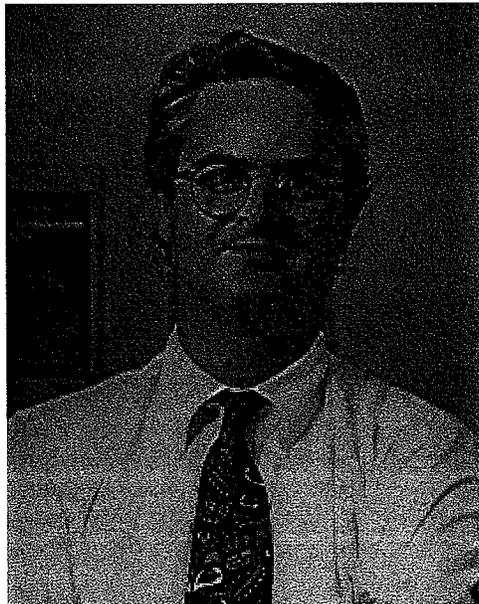
Aldrich holds a B.A. and an M.B.A. from Harvard University. He has taught at Harvard Business School, at Yale's Graduate School of Management, and is the founder of the Pension Real Estate Association.



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## NBER Profile: *William N. Goetzmann*

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William N. Goetzmann is a Research Associate in the NBER's Program on Asset Pricing and the Edwin J. Beinecke Professor of Finance and Management

Studies at the Yale School of Management. He has taught at the Yale School of Management for five years and taught previously at Columbia Business School for four years. He holds a B.A., an M.B.A., and a Ph.D. from Yale.

Goetzmann's research topics include the behavior of individual investors, global investing, the long-term historical performance of markets, hedge funds, mutual funds, real estate, and art as an investment. His articles have appeared in virtually all of the leading academic and practitioner-oriented finance journals and in the popular press. Goetzmann currently serves on the board of the American Finance Association. He has also served as editor of the leading academic real estate journal, *Real Estate Economics*.

Goetzmann has a background in arts and media management. As a

documentary filmmaker, he has written and co-produced programs for "Nova" and the "American Masters" series, including a profile of the artist Thomas Eakins. A former director of Denver's Museum of Western Art, Goetzmann co-authored the award-winning book, *The West of the Imagination*. He currently serves as the academic advisor to "Treasure and Trade," a planned PBS series on the history of money and finance, and as executive producer and chief consultant to "Pacific Storm," a PBS documentary planned on the impact of globalization on Asia.

Will, his wife Mariko, and six-year old daughter Zoë live in New Haven, where Mariko practices architecture with the firm of Cesar Pelli and Associates and Zoë is an enthusiastic participant in NBER family functions. They enjoy taking random walks together.

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## NBER Profile: *Elhanan Helpman*

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Elhanan Helpman has been a Research Associate in the NBER's Programs on International Finance and Macroeconomics and International Trade and Investment since 1985. He is also a professor of economics at Harvard University and the Archie Sherman Professor of International Economic Relations at Tel Aviv University.

Helpman received a B.A. in economics and statistics from Tel Aviv University, an M.A. in economics from the same institution, and a Ph.D. in economics from Harvard University. His research focuses on international trade, economic growth, and political economy. Much of his work in these areas is summarized in his books: *Market Structure and Foreign Trade* (Paul R. Krugman, coauthor, MIT Press, 1985), *Trade Policy and Market*

*Structure* (Krugman, coauthor, MIT Press, 1989), *Innovation and Growth in the Global Economy* (Gene M. Grossman, coauthor, MIT Press, 1991) and *Special Interest Groups* (Grossman, coauthor, MIT Press, forthcoming).

Helpman was awarded the Mahalanobis Memorial Medal by the Indian Econometric Society, the Bernhard-Harms Prize by the Institute of World Economics, and the Israel Prize. He is also a Fellow and current President of the Econometric Society, a member of the Israeli Academy of Sciences and Humanities, and a Foreign Honorary Member of the American Academy of Arts and Sciences.

He is married to Ruth Helpman, a financial analyst. They have two daughters. His main hobby is the opera.

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## NBER Profile: *Boyan Jovanovic*

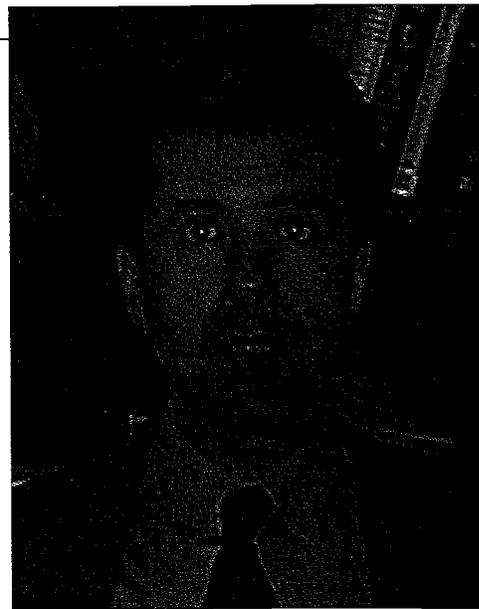
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Boyan Jovanovic has been a Research Associate in the NBER's Program on Productivity since 1991 and is a professor of economics at New York University.

Jovanovic received a B.Sc. and M.Sc. from the London School of Economics and a Ph.D. in economics from the University of Chicago. He became an assistant professor of economics at Columbia University in 1977. In 1978, he joined the technical staff at Bell Laboratories before mov-

ing back to academia at New York University in 1983. Jovanovic was named an associate professor in 1984 and a full professor in 1986.

Jovanovic has been a visiting professor at Yale University and the University of Pennsylvania, and will spend the coming academic year at the University of Chicago. He is also a Fellow of the Econometric Society. In his leisure time, Jovanovic enjoys listening to music and going to the theater.



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## Conferences

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### Brazil in the 1997-9 Financial Turmoil

The fourth in a series of country-specific meetings of the NBER Project on Exchange Rate Crises in Emerging Market Countries, directed by NBER President Martin Feldstein and Research Associate Jeffrey A. Frankel, both of Harvard University, took place in Cambridge on April 14 and 15. This gathering focused on "Brazil in the 1997-9 Financial Turmoil," and was organized by Eduardo Loyo of Harvard University and Andres Velasco of NBER and New York University. Like earlier NBER meetings on Mexico, Thailand, and Korea, this occasion brought together academics, individuals representing the country, international bankers, and government officials in the hopes of developing an in-depth understanding of Brazil's economic situation.

The two-day meeting was divided into four sessions. In Session 1, a panel consisting of Edmar Bacha, BBA Securities, Gustavo Franco, PUC-Rio, and John Williamson, Institute for International Economics, discussed the events leading up to the crisis. They asked, for example: Was the cause of real appreciation and disinflation actually inflation inertia or nominal appreciation? How does one choose a gradual realignment strategy, as opposed to a prompt realignment, or a totally fixed

exchange rate? What are the costs of realigning slowly, both fiscal and in terms of activity? And, what is the perceived benefit of gradual realignment in terms of avoiding a persistent inflation backlash?

In Session 2, the experts discussed the way that the crisis was managed. The panelists were: Luiz Correa do Lago, PUC-Rio; Peter Garber, Deutsche Bank; and Thomas Glaessner, World Bank. This group focused on the following questions: Was the 1998 impact on Brazil an example of pure contagion? Was the G-7 "playing for time" and did it work? How exposed was Brazil to speculative attacks, compared to other crisis countries? Did it stand a better chance of defending the peg with high interest rates? What was the health of the financial system, the public debt problem at the time, capital account freedom, and what was the "narrow exit door" argument? Would a firmer commitment to a peg have avoided the devaluation? Did Brazil fold under overwhelming external pressure or did it invite the attack with its indecisiveness? What have we learned about the value of "preventive" rescue packages?

In Session 3, panelists Eliana Cardoso, the World Bank, Marcio Garcia, PUC-Rio, and Paulo Leme,

Goldman Sachs & Co., considered what fiscal retrenchment would have accomplished in Brazil. They asked such questions as: Was it all a fiscal problem? How does fiscal retrenchment relate to domestic absorption, and to the dynamics of public debt? Could fiscal retrenchment have avoided the devaluation? And, how does public debt management proceed under external speculative pressure?

In the fourth session, Suman Bery of the World Bank, Ilan Goldfajn, PUC-Rio, and Nouriel Roubini, NBER and the U.S. Department of Treasury, described the devaluation and subsequent fallout. They asked: Why has pass-through been so small? Why has the contractionary impact of the devaluation been so small? How fast could interest rates be reduced? Was it worth defending the peg for so long? What would have been the outcome of letting go earlier? And, what impact did the devaluation have on the region?

In addition to these sessions, there was an off-the-record after-dinner presentation by Arminio Fraga Neto, Governor of the Central Bank of Brazil. A summary of the other discussions appears on the NBER's web site at [www.nber.org/crisis/BrazilSum](http://www.nber.org/crisis/BrazilSum).



## Industrial Organization of Medical Care

As part of its ongoing search on health care, the NBER held a Conference on the Industrial Organization of Medical Care in Nashville, Tennessee, on April 26-29. David M. Cutler, NBER and Harvard University, organized the program, which included site visits to health care organizations and facilities in the Nashville area as well as discussion of the following papers:

**Richard Arnould** and **Kevin E. Hallock**, University of Illinois, and **Marianne Bertrand**, NBER and Princeton University, "Does Market Competition Change the Nonprofit Mission? Managed Care and the Managerial Labor Market in Nonprofit Hospitals"

Discussant: Nancy Beaulieu, Harvard University

**David M. Cutler** and **Janice Seinfeld**, Harvard University, "Managerial Background and Decisionmaking: Evidence from the Hospital Industry"

Discussant: Douglas O. Staiger, NBER and Dartmouth College

**Susan C. Athey** and **Scott Stern**, NBER and MIT, "The Impact of Information Technology and Job Design on Emergency Health Care Outcomes"

Discussant: Iain Cockburn, NBER and Boston University

**William M. Gentry**, NBER and Columbia University, "Endowment

Assets, Tax-Exempt Debt, and the Capital Structure of Not-for-Profit Hospitals"

Discussant: Frank A. Sloan, NBER and Duke University

**Frank R. Lichtenberg**, NBER and Columbia University, and **Tomas J. Philipson**, NBER and University of Chicago, "Creative versus Uncreative Destruction: An Empirical Examination of the U.S. Pharmaceuticals Market"

Discussant: Ariel S. Pakes, NBER and Harvard University

**Kevin A. Hassett**, American Enterprise Institute, and **R. Glenn Hubbard**, NBER and Columbia University, "Noncontractible Quality and Organization Form in the U.S. Hospital Industry"

Discussant: Edward J. Glaeser, NBER and Harvard University

**Janet Currie**, NBER and University of California, Los Angeles, and **John Fair**, University of California, Los Angeles, "Managed Care and Hospital Provision of Charity Care: The Case of California"

Discussant: Helen Lew, University of Chicago

**Jeanette Chung**, University of Chicago, and **David Meltzer**, NBER and University of Chicago, "Effects of Competition under Prospective Payment on Hospital Costs among High and Low Cost Admissions: Evidence from California, 1983-93"

Discussant: Mark B. McClellan,

NBER and Stanford University

**Daniel P. Kessler** and **Mark B. McClellan**, NBER and Stanford University, "The Effects of Hospital Ownership on Medical Productivity"

Discussant: Elizabeth Richardson Viggor, Duke University

**Jason R. Barro**, NBER and Harvard University, "Efficiency and Monopoly as Explanations for Hospital Mergers"

Discussant: Catherine D. Wolfman, NBER and Harvard University

**Elaine Silverman**, Veterans Administration Medical Center, and **Jonathan Skinner**, NBER and Dartmouth College, "Are For-Profit Hospitals Really Different? Medical Licensing and Market Structure"

Discussant: Louise Shamer, Federal Reserve Board of Governors

**Laurence C. Baker**, NBER and Stanford University, and **Garin S. Phibbs**, Stanford University, "Managed Care, Technology Adoption, and Health Care: The Adoption of Neonatal Intensive Care"

Discussant: Michael Chenoweth, University of Michigan

**Mark G. Duggan**, NBER and University of Chicago, "Hospital Market Structure and Medical Care for the Poor"

Discussant: Douglas O. Staiger, NBER and University of Chicago

Discussant: Douglas O. Staiger,

**Arnould, Bertrand, and Hallock** examine the effect of the competitive pressures introduced by health maintenance organization (HMO) penetration on the labor market for managers in not-for-profit hospitals. Using data on about 1,500 nonprofit hospitals from 1992-6, they find that

top executive turnover rises after an increase in HMO penetration. Moreover, the increase in turnover is concentrated among the hospitals that have low levels of economic profitability and are highly leveraged financially. While the link between top executive pay and for-profit per-

formance measures is very weak on average, it tightens with increasing HMO penetration: as HMO penetration increases, top executives are compensated more for improving the profitability of their hospitals. These results are consistent with the view that HMO penetration increases the

importance of for-profit performance objectives among not-for-profit hospitals. Boards appoint new managers that are better able to compete in the new market environment and they reward incumbent managers for achieving for-profit goals. However, there is no evidence that not-for-profit boards directly reduce the incentive for their top managers to provide high-quality care. If anything, HMO penetration seems to lead hospital boards to encourage more efficiency in the fulfillment of the not-for-profit objectives.

**Cutler and Seinfeld** first address the impact of chief executive officers (CEOs) on hospital financial performance. Specifically, they ask if hospitals operated by managers with different backgrounds report different net profits, or if CEOs respond to crises in different ways. Their primary measures of managerial background are the educational degree of the highest-ranking executive in the hospital and the quality of the institution from which the degree was obtained. Their results suggest three primary conclusions. First, financial acumen matters. Chief executives with only a B.A. earn lower profits per adjusted admission than chief executives with advanced degrees. This is attributable to higher costs — hospitals run by B.A.s have longer patient stays and more payroll expenses than hospitals run by people with other degrees. In addition, hospitals run by M.D./Ph.D.s have lower profits, probably because of lower revenues. Second, the quality of the educational institution attended matters. Graduates of top ten programs perform significantly better than graduates of non-top ten programs, particularly in cutting costs. Third, Cutler and Seinfeld find that these differences are most pronounced during “good times.” Managerial background is related to performance when HMO enrollment is low. As HMO enrollment increases, the effect of different managerial

background shrinks.

**Athey and Stern** analyze the productivity of technology and job design in emergency response systems (or 911 systems). The technologies include Basic 911, whereby callers access emergency services using the single phone number 911, and Enhanced 911 (E911), where information technology is used to link automatic caller identification to a detailed database of address and location information. Both basic 911 and E911 may improve the timeliness of emergency response systems. Job design choices involve the use of Emergency Medical Dispatching (EMD), by which call-takers gather medical information, provide medical instructions over the telephone, and prioritize the allocation of ambulance and paramedic services. The authors evaluate the returns to these practices in the context of data from Pennsylvania counties in 1994–6; during that time (in response to statewide legislation), about half of the 67 counties experienced a change in technology, EMD, or both. The authors measure productivity using the health status of cardiac patients upon ambulance arrival, which could be improved by timely response. They also consider is the total hospital charges incurred by the patient, which may incorporate the benefits of precision in ambulance allocation. Their main finding is that E911 improves several health status indicators that are related closely to mortality. Scaled in terms of the probability of death from a cardiac emergency, E911 is associated with at least a 10 percent decrease on the baseline mortality rate (which is itself 7.4 percent). E911 also reduces total charges. The results on EMD are more subtle, though. Although the average benefit of EMD in this sample is negligible, technology adoption is more productive in counties without pre-existing EMD programs, at least for some productivity measures. This latter result

suggests that EMD and E911 may be substitutes in providing timely emergency responses to cardiac patients.

**Gentry** examines the financial decisions of not-for-profit hospitals. These hospitals benefit from special tax rules that allow state authorities to issue tax-exempt bonds on their behalf. Relative to having access only to higher cost taxable debt, this access to tax-exempt debt affects the incentives for the investment and financing choices of not-for-profit hospitals. Hospitals may respond by increasing their investment in physical assets; however, they may also engage in tax arbitrage by using the tax-exempt debt while maintaining endowment assets. In Gentry's sample of tax (information) returns of not-for-profit hospitals from 1993 to 1995, the results are consistent with substantial tax planning. Of the \$53.6 billion in tax-exempt liabilities of hospitals in 1995, as much as \$28.1 billion could have been eliminated if hospitals spent their endowments instead of borrowing. Furthermore, after controlling for hospital size (in terms of revenues and operating assets), Gentry finds that endowment assets increase the propensity of not-for-profit hospitals to have tax-exempt liabilities and the amount of these liabilities. In contrast, endowment assets reduce the probability that a not-for-profit hospital has taxable debt; this suggests that the effect is related to the tax status of the debt rather than to the demand for credit.

A patent only protects an innovator from others producing the *same* product, not from others producing *better* products under new patents. Therefore, the source of destruction of innovative returns falls into two categories: *uncreative destruction* following patent expiration and *creative destruction* by new and superior patents, both before and after patent expiration. **Lichtenberg** and **Philipson** attempt to estimate the relative magnitudes of creative and

uncreative destruction in the U.S. pharmaceuticals market. Twenty percent of the drugs approved during 1950–93 were obsolete — no longer on the market — by 1999. The authors estimate that creative destruction, most of which occurs while the drug is under patent, costs the innovator at least as much as uncreative destruction, which cannot occur until the drug is off patent. The reduction in the present discounted value of the innovator's sales from creative destruction appears to be at least as large as the reduction from uncreative destruction and may be much larger — perhaps twice as large.

Despite the widespread attention paid to the determinants of equilibrium ownership structures and organizational form in private, for-profit firms, there has been much less attention paid to equilibrium choices of not-for-profit versus for-profit status. **Hassett** and **Hubbard** examine this choice for firms in the U.S. hospital industry which conforms well to recent theoretical advances stressing the importance of contractual failure in explaining organizational form. In addition, the frequency of conversions among private for-profit, private not-for-profit, and government organizational status allows the authors to empirically examine the key predictions of these theories and to compare those predictions to explanations based on altruistic or tax-related explanations of ownership status. Four principal findings emerge. First, among not-for-profit hospitals, government hospitals have higher relative input use, serve less-well-off markets, and have more bed-days represented by Medicaid patients. Second, consistent with a role for noncontractible quality, not-for-profit hospitals with a relatively high share of revenues devoted to wages are less likely to convert to for-profit status; for-profits tend to acquire not-for-profits in markets in which households have relatively low

levels of educational attainment or income. Third, consistent with the noncontractible quality explanation, not-for-profits are more likely to shed not-for-profit status when there is no other government or not-for-profit hospital in the same market. Fourth, other transitions are also broadly consistent with the movement toward an equilibrium distribution of ownership status with variation explained in part by proxies for variation in preferences for noncontractible quality.

**Currie** and **Fahr** examine the effects of the penetration of managed care on the provision of charity care by hospitals, using data on all hospital discharges in California between 1988 and 1996. Their estimates suggest that higher managed care penetration rates shift the composition of Medicaid and uninsured patients across public and private hospitals. In response to higher managed care penetration, public hospitals end up with lower shares of Medicaid births and higher shares of uninsured and other Medicaid patients. They also end up with higher fractions of the charity caseload being admitted from the emergency room, which may indicate that the patients are sicker. In contrast, private hospitals reduce the fraction of the charity caseload that is admitted from the emergency room, with the biggest reduction coming in the “other Medicaid” category.

Competition and prospective payment systems (PPS) have been used widely in an attempt to control health care costs. Though much of the increase in medical costs over the past half-century has been concentrated among a few high-cost users of health care, PPS may provide incentives for selectively reducing expenditures on those users relative to low-cost users, and this pressure may be increased by competition. **Chung** and **Meltzer** use data on hospital charges and cost-to-charge ratios from California in 1983 and 1994 to examine the effects of competition on costs

for high- and low-cost admissions both before and after the establishment of the Medicare Prospective Payment System (MPPS). Comparing persons above and below age 65 before and after the establishment of MPPS, the authors find that competition is associated with increased costs before MPPS in both age groups but with decreased costs afterwards, especially among those above age 65 who had the highest costs. **Chung** and **Meltzer** conclude that the combination of competition and PPS may result in incentives to selectively reduce spending among the most expensive patients. This raises important issues about the use of competition and PPS to control costs; it implies at a minimum the need to carefully monitor outcomes for the sickest patients under PPS in competitive environments.

**Kessler** and **McClellan** develop new evidence on the effects of hospital ownership and other aspects of hospital market composition on health care productivity. They analyze longitudinal data on nonrural elderly Medicare beneficiaries hospitalized for new heart attacks from 1985 to 1994. Their analysis differs from previous studies in several ways. First, they consider effects on both resource use and health outcomes. Second, they model individual patients' hospital choices as a function of exogenous patient, area, and hospital characteristics, particularly relative distances. Based on these estimates, the authors construct area-based measures of the “density” of hospitals of different types that depend only on these exogenous characteristics; the authors also include zip code fixed effects. This allows them to avoid the problem of patient selection into different types of hospitals on the basis of unobservable characteristics. It also allows them to examine “spillover” effects of ownership and other hospital characteristics — for example, the effects of

changes in ownership on the behavior of *other* hospitals in a market. The authors find that spillover effects of ownership are quantitatively important. Moving from essentially no presence of for-profit ownership in a market to any nontrivial presence is associated with significant reductions in hospital expenditures in less competitive markets. The "direct" effect of for-profit ownership appears to be less important, suggesting that within a market, for-profit and not-for-profit behavior is not that different. Greater teaching hospital presence and public hospital presence also have important spillover effects, particularly in less competitive markets. Hospital systems reduce expenditures, particularly in more competitive markets. At all levels of market competition, these differences in market composition generally have limited if any consequences for patient health. Differences in ownership and other aspects of market composition influence hospital productivity, mainly through spillover effects.

**Barro** undertakes an empirical examination of the Massachusetts hospital market reorganization experience. This paper builds on anecdotal evidence from an earlier case study paper on hospital mergers written with Cutler. In this paper, Barro empirically tests the conclusions from the case studies. He finds that consolidation facilitates partial closure through the reduction in the number of hospital beds, but does not lead to a greater likelihood of complete facility closure. The results on bed reduction, as well as results on staff reduction following consolidation, support the consolidation-for-efficiency motivation. In addition, the theory is supported by the fact that consolidations are more likely between pairs that overlap in their markets. However, the most direct implication of that theory — cost reduction — is not found in the data. Correspondingly, the most direct

implication of the consolidation for market power hypothesis — revenue increases — also are not found. The evidence most in support of the market power hypothesis is indirect. The empirical results concerning efficiency gains, bed reduction, and market overlap are much weaker in explaining consolidations between hospitals that are farther apart from one another. That suggests a different motivation for those consolidations, which comprise one-third to one-half of all consolidations in Massachusetts.

In what way do for-profit and not-for-profit hospitals differ? **Silverman** and **Skinner** consider one dimension, the "upcoding" behavior of hospitals, that is, the shifting of a patient's diagnostic related group (DRG) to one that yields a greater reimbursement from the Medicare system. Upcoding has figured prominently in recent federal lawsuits against for-profit hospitals. More importantly, though, upcoding behavior provides a valuable window into the economic behavior of hospitals. The authors focus on hospital admissions involving pneumonia and respiratory infections; it is often difficult to distinguish between these diagnostic classifications, but the latter pays 50 percent more to the hospital. Between 1989 and 1996, the upcoding index rose from 21 to 33 percent among not-for-profits, but increased from 29 to 51 percent among for-profit hospitals (since then the index has fallen somewhat). There is no detectable difference in health outcomes among these groups. Finally, not-for-profit hospitals operating in heavily for-profit markets behaved much like their for-profit brethren, showing similar degrees of upcoding. In sum, for-profit hospitals were more likely to engage in upcoding and in turn may have influenced upcoding behavior by not-for-profit hospitals.

Advances in medical technology have been identified as a major driver of increases in health care costs,

but increases in managed care activity may alter the incentives associated with the acquisition of new technologies and with their use. **Baker** and **Phibbs** discuss mechanisms by which managed care could influence the adoption of new technologies. They also empirically examine the relationship between HMO market share and the diffusion of neonatal intensive care, a collection of technologies for the care of high-risk newborns. They find that managed care slowed the adoption of midlevel neonatal intensive care units (NICUs) but did not influence the adoption of the most advanced units. Slowing the adoption of midlevel units should have generated savings and also could have benefited patients, because health outcomes for seriously ill newborns are better in higher-level NICUs and reductions in the availability of midlevel units appear to increase the chance of receiving care in a high-level center. Thus, in this case slowing the adoption of a new technology may unambiguously improve welfare.

**Duggan** investigates whether the behavior of private not-for-profit hospitals is influenced significantly by the share of competitors that are organized as profit-maximizing firms. He shows that not-for-profits in markets with more for-profit firms provide a smaller share of care to the indigent in their community, but they are also more responsive to financial incentives to treat the indigent. Government-owned hospitals in markets with more for-profit hospitals bore a greater share of the indigent care burden prior to the change in incentives caused by DSH but have since experienced a much greater change in their patient mix.

These papers will be published in the *Rand Journal of Economics*. In advance of the publication of that journal, most of these papers will be available at "Books in Progress" on the NBER's web site, [www.nber.org](http://www.nber.org).

## Asset Pricing and Portfolio Allocation

An NBER-Universities Research Conference on "Asset Pricing and Portfolio Allocation," organized by Michael W. Brandt, University of Pennsylvania, and John C. Heaton, University of Chicago, took place in Cambridge on May 12 and 13. The program was:

**Ravi Jagannathan**, NBER and Northwestern University, and

**Zhenyu Wang**, Columbia University, "Efficiency of the Stochastic Discount Factor Method for Estimating Risk Premiums"

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

**Mark Loewenstein**, Washington University, and **Gregory A. Willard**, MIT, "Convergence, Trades, and Liquidity: A Rational Theory of Hedge Funds"

Discussant: Peter Kyle, Duke University

**Blake LeBaron**, NBER and Brandeis University, "Evolution and Finite Horizons in an Agent-Based Stock Market"

Discussant: John Duffy, University of Pittsburgh

**Darrell Duffie** and **Lasse Heje Pedersen**, Stanford University, and **Kenneth J. Singleton**, NBER and Stanford University, "Modeling Sovereign Yield Spreads: A Case Study of Russian Debt"

Discussant: Pedro Santa-Clara, University of California, Los Angeles

**Monika Piazzesi**, Stanford University, "An Econometric Model of the Yield Curve with Macroeconomic Jump Effects"

Discussant: Heber Painsworth, Washington University

**John Ameriks**, Columbia University, and **Stephen P. Zeldes**,

NBER and Columbia University, "How Do Household Portfolio Shares Vary with Age?"

Discussant: Andrew Metrick, NBER and University of Pennsylvania

**Michael Kremer**, NBER and Harvard University, and **Paras Mehta**, MIT, "Globalization and International Public Finance"

(NBER Working Paper No. 7575)

Discussant: Dimitrios Vayanos, NBER and MIT

**Alon Bray**, Duke University,

**George M. Constantinides**, NBER and University of Chicago, and

**Christopher C. Geczy**, University of Pennsylvania, "Asset Pricing with Heterogeneous Consumers and Limited Participation: Empirical Evidence" (NBER Working Paper No. 7406)

Discussant: Pierluigi Balduzzi, Boston College

The stochastic discount factor (SDF) method provides an elegant and unified general framework for econometric analysis of linear and nonlinear asset pricing models, including derivative pricing models. But **Jagannathan** and **Wang** ask whether the generality of the SDF methodology comes at a cost in estimation efficiency. They show that for linear beta pricing models, the SDF method provides estimates of factor risk premiums that are as precise as those obtained using classical regression methods. In the special case where the mean and variance of the factors are known, though, the common practice of ignoring the implied restrictions on the moments of the factors makes the SDF method substantially less precise than the regression method. However, proper incorporation of relevant restrictions can make the SDF method as asymp-

totically precise as the classical regression method.

**Loewenstein** and **Willard** describe a rational competitive equilibrium for an economy in which some investors' liquidity needs are uncertain in terms of timing. Apparent arbitrage opportunities, such as convergence trades, exist in this equilibrium. These arbitrages are sure to ultimately produce a profit, but their intermediate marked-to-market valuations are risky. Investors facing liquidity risk optimally do not exploit potential arbitrages, but those who can withstand temporary losses — for example, leveraged hedge funds — exploit arbitrages to a finite scale determined by the endogenous supply of credit. Loewenstein and Willard provide new results pertaining to the significant and sometimes counterintuitive effects of illiquidity on empirical tests.

Recent research in finance has shown the importance of time horizons in models of learning. The dynamics of how agents adjust to ultimately believe that the world around them is stationary may be just as crucial in the convergence to a rational expectations equilibrium as getting parameters and model specifications correct in the learning process. **LeBaron** explores this evolution in a simple agent-based financial market. His results indicate that, while the simple model structure he uses replicates the usual rational-expectations results with long-horizon agents, evolving a population of both long- and short-horizon agents to only long horizons may be difficult. Furthermore, populations with both long- and short-horizon agents increase the variability of returns and leave patterns in volatility and trading volume that are similar to actual

financial markets.

**Duffie, Pedersen, and Singleton** construct a model for pricing sovereign debt which accounts for the risks of default and restructuring and for the compensation for illiquidity. Using a new and relatively efficient method, they estimate the model using data on Russian dollar-denominated bonds. The authors consider the determinants of the Russian yield spread; the yield differential across different Russian bonds; and the implications for market integration, relative liquidity, relative expected recovery rates, and implied expectations of different default scenarios.

**Piazzesi** develops an arbitrage-free time-series model of yields that incorporates central bank policy. The model introduces a class of linear-quadratic jump diffusions as state variables. She uses a special case of this setup to describe U.S. interest rates, the Federal Reserve's target rate, and key macroeconomic aggregates. The U.S. application captures: 1) target-rate moves on Federal Open Market Committee (FOMC) meeting days, 2) "exceptional" policy moves outside of FOMC meetings, and 3) releases of macroeconomic news that are likely to affect future Federal Reserve actions. To fit the model, she extends the simulated maximum-likelihood estimation to allow for jump diffusions. Introducing the target rate as a fourth, observable factor into a framework with three latent factors is a tractable way of improving the overall term-structure fit, especially at short maturities. A policy inertia factor influences the conditional probability of changes in the target. Fed policy is linked to the increased volatility of yields on FOMC meeting and release days and to the observed "snake-shaped" term structure of yield volatility.

Using pooled cross-sectional data from the 1962-3, 1983, 1989, 1992, and 1995 Surveys of Consumer Finance and panel data from TIAA-

CREF, **Ameriks** and **Zeldes** examine the relationship between age and portfolio choice and especially between age and the fraction of wealth held in the stock market. They illustrate and discuss the importance of the well-known identification problem that prevents unrestricted estimation of age, time, and cohort effects in longitudinal data. **Ameriks** and **Zeldes** also document three important features of household portfolio behavior: significant nonstock ownership, wide-ranging heterogeneity in allocation choices, and the infrequency of active portfolio allocation changes. By including age and time effects (but excluding cohort effects), they show that equity ownership has a hump-shaped pattern with age, while equity shares conditional on ownership are nearly constant across age groups. Including age and cohort effects (but excluding time effects) shows that equity portfolio shares increase strongly with age. Following the same individuals over time, the authors find that almost half of the sample members made no active changes to their portfolio allocations over the nine-year sample period; the vast majority of those who did make changes increased their allocations to equity as they aged.

**Kremer** and **Mehta** examine the effect of reduced transactions costs in the international trading of assets on the ability of governments to issue debt. In their model, governments care about the welfare of their citizens and thus are more inclined to default if debt is held largely by foreigners. Reductions in transactions costs make it easier for domestic citizens to share risk by selling debt to foreigners. This may increase tendencies for governments to default and thus raise the cost of credit and reduce welfare. **Kremer** and **Mehta** find that even in the absence of transactions costs, there may be a home bias in the placement of government debt; in the presence of default risk,

the return on government debt is correlated with the tax burden required to pay the debt. Asset inequality may reduce this home bias and, by increasing foreign ownership, increase incentives for default. Finally, if foreign creditors are less risk averse than domestic creditors, there may be one equilibrium in which domestic creditors hold the asset and default risk is low and another in which foreign creditors hold the asset and default risk is high.

**Brav, Constantinides, and Geczy** analyze household consumption of nondurables and services, as reconstructed from the Consumer Expenditure Survey database. They observe that the estimated co-efficient of relative risk aversion for the representative household decreases, and the estimated unexplained mean equity premium decreases, as infra-marginal asset holders are eliminated from the sample. These results provide evidence of limited capital market participation. The estimated unexplained mean equity premium decreases when the assumption of complete consumption insurance is relaxed. The estimated correlation between the equity premium and the cross-sectional variance of the households' consumption growth is negative, as required, if the relaxation of market completeness is to contribute towards the explanation of the premium. The overall evidence from asset prices in favor of relaxing the assumption of complete consumption insurance is weak. An extensive Monte Carlo investigation highlights the relationship between the economic implications of limited participation and the resulting statistical properties of commonly used test statistics. The simulation results provide direct evidence relating observation error in consumption to the resulting small sample properties of the test statistics.

## Trans-Atlantic Public Economics Seminar

The NBER's annual Trans-Atlantic Public Economics Seminar on Taxation of Financial Income took place in Gerzensee, Switzerland, on May 22-4. Roger H. Gordon, NBER and University of Michigan, and Philippe Bacchetta, Studienzentrum Gerzensee, organized the conference and selected the following papers for presentation.

**Lars P. Feld** and **Gebhard Kirchgassner**, Universität St. Gallen, "The Impact of Corporate Income Taxes on Employment: Some Panel Evidence from the Swiss Cantons."

Discussants: James M. Poterba, NBER and MIT, and Lars Bovenberg, Tilburg University.

**Christian Keuschnigg**, Universität des Saarland, and **Soren Bo Nielsen**, Copenhagen Business School, "Tax Policy, Venture Capital, and Entrepreneurship."

Discussants: Thomas Gehrig, Universität Bielefeld, and Kevin A. Hassett, American Enterprise Institute.

**Rosanne Altshuler**, Rutgers University, and **Harry Grubert**,

U.S. Department of the Treasury, "Repatriation Taxes, Repatriation Strategies, and Multinational Financial Policy."

Discussants: Mihir A. Desai, NBER and Harvard University, and Michael Devereux, Warwick University.

**Rosanne Altshuler** and **R. Glenn Hubbard**, NBER and Columbia University, "The Effect of the Tax Reform Act of 1986 on the Location of Assets in Financial Services Firms."

Discussants: Henry Tukenes, CORF, and Bernd Huber, Universität München.

**Brian Engen**, Federal Reserve Board of Governors, and **William Gale**, Brookings Institution, "Effects of 401(k) Plans on Household Wealth" (NBER Working Paper No. 7392).

Discussants: R. Glenn Hubbard, and Andrew A. Samwick, NBER and Dartmouth College.

**James M. Poterba** and **Andrew A. Samwick**, "Taxation and Household Portfolio Composition: U.S. Evidence from the 1980s and 1990s."

Discussants: William Gale and Rosanne Altshuler.

**Harry Huizinga**, Tilburg University, and **Soren Bo Nielsen**, "Withholding Taxes on Information Exchange: Flow to Tax International Interest Flows."

Discussants: Alan J. Auerbach, NBER and University of California Berkeley, and Philippe Bacchetta.

**Alan J. Auerbach** and **Kevin Hassett**, "On the Marginal Source of Investment Funds" (NBER Working Paper No. 7321).

Discussants: Soren Bo Nielsen, and William M. Gentry, NBER and Columbia University.

**Thomas Gehrig**, "Capital Income Taxation in Fractional Asset Markets."

Discussants: Eckhard Janßen, NBER and University of Colorado, and Christian Keuschnigg.

**Clemens Fuest** and **Bernd Huber**, Universität München, and **Soren Bo Nielsen**, "Why Is the Corporate Tax Rate Lower than the Personal Tax Rate?"

Discussants: Roger H. Gordon and Lars P. Feld.

The impact of corporate income taxes on the location decisions of firms is a frequent subject of discussion. While there has been some evidence of personal income tax competition between the Swiss states (cantons), little information has been available on the impact of differences between cantons in corporate income taxes on the location decisions of businesses within Switzerland. Using a panel dataset of the 26 Swiss cantons from 1984 to 1997, **Feld and Kirchgassner** present econometric evidence on the influence of corporate income taxes

on the location of firms and on cantonal employment. They show that corporate income taxes deter firms with above average rates of return from locating in a canton and reducing cantonal employment.

**Keuschnigg and Nielsen** study the effects of tax policy on venture capital activity. In their model, entrepreneurs pursue their own single high-risk project but have no resources of their own. Financiers provide equity finance. In addition to providing equity finance, venture capitalists assist with valuable business advice to enhance survival rates.

This paper investigates the effects of taxes on the equilibrium level of entrepreneurship and managerial advice. The authors consider differential wage and capital income taxes, a comprehensive income tax, incomplete loss offset, progressive taxation, and investment and output subsidies to the entrepreneurial sector.

The literature on the behavior of multinational corporations (MNCs) tends to focus on a limited range of financial flows between foreign affiliates and parents. In the standard model, the MNC chooses between direct dividend distributions to the

parent and further real investment in the foreign affiliate. However, real investment in the foreign affiliate is only one of many alternatives to direct dividend repatriations. The MNC can engage in a variety of other strategies that have the effect of achieving the equivalent of repatriation without incurring the home country tax on direct repatriations of low-tax income. **Altshuler** and **Grubert** explore several of these strategies. They show how the availability of different strategies can have an effect on real investment both for a low-tax subsidiary and throughout a worldwide corporation. Using firm level data for U.S. MNCs and their affiliates, they conclude that controlled foreign corporations that face high repatriation taxes make larger investments in related affiliates and send a greater share of their dividends to other foreign affiliates. In addition, those corporations pay off more local debt as they accumulate retained earnings.

**Altshuler** and **Hubbard** examine the effects of the Tax Reform Act of 1986 on the international location decisions of U.S. financial services firms. Among other changes, the act made it substantially more difficult for U.S. MNCs to defer U.S. taxes on overseas financial services income. The same rule changes were not applied to other forms of income, though. In particular, income generated from active manufacturing operations was still eligible for deferral after the act was passed. Using information from the tax returns of U.S. corporations for 1984, 1992, and 1994, Altshuler and Hubbard find that, before the 1986 act, the location of assets in financial subsidiaries responded to differences in host-country effective tax rates across jurisdictions. After the act, however, differences in host-country effective tax rates no longer explained the distribution of assets held in financial services subsidiaries abroad. At the

same time, the assets held in manufacturing subsidiaries became more sensitive to variations in effective tax rates over time. Taken together, these results suggest that the tightening of the antideferral provisions applicable to financial services companies has been successful in neutralizing the effect of host country income taxes on the investment location decisions of financial firms.

**Engen** and **Gale** provide a new econometric specification and new evidence on the impact of 401(k) plans on household wealth. Allowing the impact of 401(k)s to vary over both time and earnings groups, and including the impact of 401(k)s on wealth, wealth-earnings ratios, and the natural logs of these values, their specification generalizes earlier work in the literature. Using data from the Survey of Income and Program Participation, they show that the impact of 401(k)s on wealth varies significantly by earnings level; 401(k)s held by groups with low earnings or low saving in other forms are more likely to represent net wealth than 401(k)s held by high-earnings or high-saving groups; and, between 0 and 30 percent of 401(k) balances represent net additions to saving.

**Poterba** and **Samwick** explore the relationship between household marginal income tax rates, the set of assets that households own, and the portfolio shares accounted for by each of these assets. They use data from the 1983, 1989, 1992, and 1995 Surveys of Consumer Finances and develop a new algorithm for imputing federal marginal tax rates to households in these surveys. They find that a household's marginal tax rate has an important effect on its asset allocation decisions. The probability that a household owns tax-advantaged assets is related strongly to its tax rate on ordinary income. In addition, the amount of investment through tax-deferred

accounts, such as 401(k) plans and Individual Retirement Accounts, is an increasing function of the household's marginal tax rate. Holdings of corporate stock — which is taxed less heavily than interest-bearing assets — and of tax-exempt bonds also increase along with the household's marginal tax rate. Holdings of heavily taxed assets, such as corporate bonds and interest-bearing accounts, decline as a share of wealth as the household's marginal tax rate increases.

**Huizinga** and **Nielsen** consider withholding taxes and information exchange as alternatives for taxing international interest income. For each regime, they consider the maximum level of taxation of foreign-source income that can be sustained as the equilibrium of a repeated game. The "best" regime is the one that brings the level of taxation in the repeated game closest to the cooperative level of interest taxation. Sustainable levels of taxation in either regime depend, among other things, on the importance of bank profits and on the marginal cost of public funds. There also is an explicit possibility of the emergence of a mixed regime, with one country imposing a withholding tax and the other country providing information. The authors' basic model is extended to allow for size differences between the two countries and to incorporate a third, outside country.

Few important issues in corporate or public finance have remained unsettled for as long as the related questions of how corporations finance their new investment projects and how taxes affect their investment decisions. In particular, there is a long-standing controversy over the extent to which taxes on dividends affect investment. To address these issues, **Auerbach** and **Hassett** find evidence that dividends do respond to investment and cash flow for the nonfinancial corporate sector as a

whole. They also find that this dividend pattern varies according to firm characteristics that relate to capital market access. These results suggest that the impact of taxation may vary across firms of different types.

**Gehrig** shows that capital income taxation does affect information aggregation in frictional markets. He provides conditions under which a tax increase raises or reduces the transparency of prices and market depth. Gehrig shows that tax policies incorporate implicit subsidies or taxes on informed traders and hedgers. A welfare assessment of capital income taxes thus has to explicitly consider the differential

effects of capital income taxes on investors with different degrees of proprietary information.

In many OECD (Organization for Economic Cooperation and Development) countries, statutory corporate tax rates are lower than personal income tax rates. **Fuest**, **Huber**, and **Nielsen** suggest that this tax rate differentiation is optimal if there are problems of asymmetric information between investors and firms in the capital market. The reduction of the corporate tax rate below the personal tax rate encourages equity financing and thus mitigates the excessive use of debt financing induced by asymmetric

information. This theoretical result stands in marked contrast to the traditional view of corporate taxation and corporate finance theory, according to which there is a tax disadvantage to equity financing. However, more recent empirical evidence on this issue is in line with the authors' result.

These papers will be published in an upcoming issue of the *Journal of Public Economics*. In advance of publication of the journal, these papers are available at "Books in Progress" on the NBER's web site, [www.nber.org](http://www.nber.org).

## Frontiers in Health Policy Research

The NBER held its fourth annual conference on Frontiers in Health Policy Research in Arlington, Virginia, on June 14. NBER Health Care Program Director Alan M. Garber of Stanford University organized this program.

**Michael J. Moore**, NBER and Duke University, and **James W. Hughes**, Bates College, "The Health Care Consequences of Smoking and Its Regulation"

**Gabriel A. Picone**, University of South Florida, and **Frank A. Sloan**, NBER and Duke University, "How Costs Are Smokers to Other People: Longitudinal Evidence on the Near Elderly"

**Darius Lakdawalla**, RAND Corporation, and **Tomas Philipson**, NBER and University of Chicago, "Public Financing and the Market for Long-Term Care"

**Amber E. Bernato**, and

**Christopher R. Kagay**, Stanford University, **Alan M. Garber**, and **Mark C. McClellan**, NBER and Stanford University, "Trends in the Use of Intensive Procedures at the End of Life"

**Ernst R. Berndt**, NBER and MIT, **Susan H. Busch**, Harvard University, and **Richard G. Frank**, NBER and Harvard University, "Price Indexes for the Treatment of Depression"

The literature on the health economics of smoking presents two principal facts: that smoking increases health care costs and that restrictions on smoking lead to reductions in smoking prevalence and intensity. **Moore** and **Hughes** extend the literature and ask whether cigarette tax increases lead to lower health care costs. Using data from the 1991 and 1993 National Health Interview Surveys, they find that the

health care benefits of smoking cessation are greater than previously believed. There is also weak evidence that tax increases lead to higher rates of smoking cessation. In combination, these results suggest that, in addition to providing a source for funding excess health care costs, tax increases may lower health care costs directly by inducing smokers to quit.

**Picone** and **Sloan** use data from

four waves of the Health and Retirement Study to assess the impact of smoking on use of hospital and physicians' services and nursing home care. They limit their analysis to people aged 51 to 67 ("near elderly"); during this phase of the life cycle, many adverse effects of smoking, measured in terms of mortality and morbidity, begin to occur. In contrast to past studies, this one separates the health expenditure burden

of smoking by the type of health insurer, since smokers are more likely to be on public insurance and to be uninsured (holding a large number of other determinants of coverage constant). **Picone** and **Sloan** find that the net effect of smoking on expenditures for health care services is positive for this age cohort. The relative burden of cost is highly dependent on age.

**Lakdawalla** and **Philipson** develop a framework for understanding how economic forces govern the demand for and supply of long-term care, and how they affect the prevalence of public subsidies for long-term care. The authors argue that aging may actually lower the demand for market care by increasing the supply of family care-givers (which substitute for market care). This idea appears to explain important trends in the output of long-term care over the past 30 years. In addition, the authors document the extent to which public financing has grown over the past several decades in response to increased demand for nursing home care. They argue that by raising the private price of nursing-home care, the growth in demand provides incentives for people to qualify for public assistance

and thus expands the share of public output.

Drawing from a 20 percent sample of Medicare claims for decedents and a 5 percent sample of claims from survivors, **Bernato**, **Garber**, **McClellan**, and **Kagay** study the use of 45 intensive procedures among Medicare beneficiaries in 1985, 1990, and 1995. Each of the procedures was performed more frequently among decedents than survivors, and the relative growth in the utilization of all 45 procedures combined outpaced the growth in survivors. Expenditures associated with hospitalizations in which these 45 intensive procedures were performed grew faster than overall inpatient expenditures over time. This is consistent with the shift of less intensive procedures to outpatient settings. This trend in increasing intensity of treatment among Medicare recipients contributes to growth in expenditures that outpaces changes in demographics and the incidence of disease. Furthermore, the relative increases in intensity of care among decedents over survivors may explain why the increased use of less expensive services — such as hospice and home health care for some decedents — has failed to slow the

growth rate of expenditures at the end of life below the growth rate for the rest of Medicare beneficiaries.

**Berndt**, **Busch**, and **Frank** compare three major approaches to constructing price indexes for the treatment of depression: the methods used by the Bureau of Labor Statistics (BLS); an approach based on episodes of treatment which uses adherence to treatment guidelines as an indicator of outcome; and an episodes-based approach that incorporates information on expected treatment outcomes from the literature and expert clinical opinion. Their findings highlight the differences in results produced using the episodes-and outcome-based methods versus the service-based approach of the BLS. The BLS method shows a rising price index for depression treatment between 1991 and 1996 while the episodes-based approaches show a declining price index for treatment of depression.

These papers and their discussion will be published by the MIT Press in an annual: *Frontiers in Health Policy Research, Volume 4*. In advance of publication, these papers will be available at "Books in Progress" on the NBER's Web site, [www.nber.org](http://www.nber.org).



## Twenty-Third Annual International Seminar on Macroeconomics

The NBER holds its twenty-third Annual International Seminar on Macroeconomics at the Bank of Finland in Helsinki on June 16 and 17. Zvi Eckstein, Tel Aviv University and Andrew Rose, NBER and University of California, Berkeley, organized this program.

**Philippe Aghion**, European Bank for Reconstruction and Development; **Philippe Bacchetta**, Study Center Gerzensee; and **Abhijit Banerjee**, MIT, "Currency Crises and Monetary Policy in Economy with Credit Constraints." Discussants: Allan Drazen, NBER and Hebrew University of Jerusalem; and Linda S. Goldberg, Federal Reserve Bank of New York. **Graig Burnside**, The World Bank; and **Martin S. Eichenbaum** and **Sergio T. Rebelo**, NBER and Northwestern University, "Hedging and Financial Fragility in Fixed Exchange Rate Regimes." (NBER Working Paper No. 7143). Discussants: Susan M. Collins, NBER and Georgetown University; and Paolo Pesenti, Federal Reserve

Bank of New York. **Steven J. Davis**, NBER and University of Chicago; **Paul Willen**, Princeton University; and **Jeremy Nalewailik**, University of Chicago, "On the Gains to International Trade in Risky Financial Assets." (NBER Working Paper No. 7790). Discussants: Deborah F. Lucas, NBER and Northwestern University; and Robert C. King, NBER and University of Virginia. **Jordi Galí**, NBER and Universitat Pompeu Fabra; **Mark Gertler**, NBER and New York University; and **J. David Lopez-Salido**, Bank of Spain, "European Inflation Dynamics." Discussants: Francesco Giavazzi, NBER and Bocconi University; and Jeremy Nalewailik. **Juha Tarkka** and **David Maves**, Bank of Finland, "The Value of Publishing Official Central Bank Forecasts." Discussants: Zvi Eckstein and Jeffrey A. Frankel, NBER and Harvard University.

**Kjetil Storesletten**, Stockholm University; and **Amir Yaron**, NBER and University of Pennsylvania, "The Welfare Cost of Business Cycles: Revisited, Finite Lives, and Counterfactual Valuation of Earnings." Discussants: Mariana Baxter, NBER and Boston University; and Jose Victor Kroszberg, NBER and University of Pennsylvania. **Jonathan Eaton** and **Samuel S. Kortum**, NBER and Boston University, "Trade in Capital Goods." Discussants: Harry Flam, Stockholm University; and Asaf Razin, NBER and Tel Aviv University. **Bent E. Sorenson**, Federal Reserve Bank of Kansas City; **Lisa Willemenszorg**, Ottawa; and **Oved Yosha**, Tel Aviv University, "Output Restrictions and Fiscal Policy of State and Local Governments, 1975-94." Discussants: Antonio Fatas, Institut Monetari d'Administracion de Catalunya; and Valerie A. Ramey, NBER and University of California, San Diego.

**Aghion, Bacchetta, and Banerjee** present a simple model of currency crises that is driven by the interplay between the credit constraints of private domestic firms and the existence of nominal price rigidities. The possibility of multiple equilibriums, including a "currency crisis equilibrium" with low output and a depreciated domestic currency, results from the following: if nominal prices are "sticky," a currency depreciation will lead to an increase in the foreign currency debt-repayment obligations of firms, and thus to a drop in their profits. In a credit-constrained economy, this reduces firms' borrowing capacity, and therefore investment and out-

put. This in turn reduces the demand for the domestic currency and leads to a further depreciation. Aghion, Bacchetta, and Banerjee examine the impact of productivity, fiscal, and expectational shocks. They then analyze the optimal monetary policy regarding currency crises. The authors argue that currency crises can occur under both fixed and flexible exchange-rate regimes since the primary source of crises is the deteriorating balance sheet of private firms. Currency crises that coincide with banking crises tend to share at least two elements: governments provide guarantees to domestic and foreign bank creditors; and banks do not

hedge their exchange rate risk. **Burnside, Eichenbaum, and Rebelo** study banks' incentives to hedge exchange rate risk when government guarantees are available to foreign lenders. The authors show that guarantees completely eliminate banks' incentives to hedge the risk of a devaluation. Their model articulates one reason why governments might be tempted to provide guarantees to bank creditors: guarantees lower the domestic interest rate and lead to a boom in economic activity. But this boom comes at the cost of a more fragile banking system. In the event of a devaluation, banks renege on foreign debts and declare bankruptcy.

**Davis, Willen, and Nalewaik** develop and implement a framework for quantifying the gains to international trade in risky financial assets. They show that standard theory with full participation in the asset market implies enormous gains to trade when asset returns are calibrated to observed risk premiums. This gains-to-trade puzzle is closely related to, but distinct from, the equity-premium puzzle. While very high risk aversion rationalizes the equity premium in standard models, it merely alters the form of the gains-to-trade puzzle. In contrast, limited participation in asset markets can simultaneously address the equity premium and the gains-to-trade puzzles. The authors identify three reasons for limited international risk sharing. First, the requirement that asset markets span the space of national output shocks fails in a serious way. Second, for many countries the cost of using financial assets to hedge national output shocks greatly exceeds the benefits. Third, limited participation reduces the feasible gains from international risk sharing.

**Gali, Gertler, and Lopez-Salido** provide evidence on the fit of the New Phillips Curve (NPC) for the Euro area over the period 1970–98. They use the NPC as a tool to compare the characteristics of European versus U.S. inflation dynamics. They also analyze the factors underlying inflation inertia by examining the cyclical behavior of marginal costs, labor productivity, and real wages. Some of their findings can be summarized as follows: 1) the NPC fits Euro-area data very well, possibly better than it fits the U.S. data; 2) the degree of price stickiness implied by the estimates is substantial but in line with survey evidence and U.S. estimates; 3) inflation dynamics in the Euro area appear to have a stronger forward-looking component (that is, less inertia) than in the United States; 4) labor market frictions, as manifested in the behavior of the wage markup, appear to have played a key

role in shaping the behavior of marginal costs and, consequently, inflation in Europe.

**Tarkka and Mayes** analyze whether Central Banks should publish their macroeconomic forecasts and what could be gained in monetary policy if they did. They show that disclosing a Central Bank's assessment of the prevailing inflationary pressures in the form of a forecast improves macroeconomic performance, even if this assessment is imprecise. This is because it makes policy more predictable. Tarkka and Mayes also investigate what the useful content of the forecasts is if they are published, and whether it makes a difference if these official forecasts are "unconditional" — in the sense of incorporating the Central Bank's forecasts of its own policy as well — or "conditional" on some other policy assumption. The analysis comes out in favor of publishing unconditional forecasts, which reveal the intended results of monetary policy.

**Storesletten and Yaron** investigate the welfare costs of business cycles in an economy with heterogeneous agents with finite lives. These agents face uninsurable labor risk which is correlated countercyclically with aggregate productivity shocks. The authors find large welfare gains from eliminating business-cycle fluctuations. Almost all of those gains are attributable to eliminating business-cycle variations in the variance of idiosyncratic risk. The direct effects of simply smoothing aggregate productivity shocks, or the general equilibrium effects associated with changes in aggregate savings and prices, are very small. Storesletten and Yaron also find that the average welfare gain is actually smaller in this type of economy than in a similar economy in which agents are infinitely lived. However, the distribution of welfare gains is highly sensitive to age and the composition of wealth.

**Eaton and Kortum** develop a model of trade and growth in which

advances in technology are embodied in capital. Although technological innovations are highly concentrated in a few advanced countries, the benefits of better technology are distributed more evenly around the world because of the export of capital goods. The authors use the model to confront data on production and trade in capital goods and on the variation in prices of capital goods around the world. They also examine the extent to which barriers to trade in capital goods can explain productivity differences.

What are the cyclical properties of U.S. state and local government fiscal policies, **Sorensen, Wu, and Yosha** ask. The budget surpluses of local, and in particular state, governments are procyclical for both short- and medium-term horizons. Such surpluses are the result of strongly procyclical revenues and weakly procyclical expenditures. The budget surpluses of trust funds and utilities are also procyclical. This holds true whether aggregate (U.S.-wide) fluctuations are controlled for or not. Federal grants to state and local governments also are procyclical, but this is because of aggregate fluctuations. Federal grants are actually countercyclical with respect to state-level fluctuations. The cyclical patterns of state and local budget surpluses are affected by various political institutions: for example, budget surpluses are less procyclical in conservative states or in states with stringent balanced budget rules. Finally, there is no direct evidence that state and local off-budget accounts are more procyclical where balanced budget rules are tighter.

These papers and discussions will be published in a special edition of the *European Economic Review*. In advance of the publication of the journal, most of the papers will be available at "Books in Progress" on the NBER's Web site, [www.nber.org](http://www.nber.org).

## NBER Conference in Shanghai

The third annual NBER-CCER Conference, jointly sponsored by the National Bureau of Economic Research and the China Center for Economic Research at Peking University, took place in Shanghai on July 2 and 3. This year's conference focused on financial reforms in China. The topics for the conference sessions were: Macro and Currency Crises; Stock Markets and Banks; Exchange Rate Management around the World; Portfolio and Direct Investment in Emerging Markets;

Banks and Venture Capital; Real Estate and Insurance; and Fundamental Issues in China's Reform.

In addition to these presentations and discussions, a visit to Zhouzhuang Village and Township Village Enterprise rounded out the two-day program. U.S. participants at this year's conference were: NBER President Martin Feldstein of Harvard University, one of the organizers, and NBER Research Associates Michael Dooley, University of California, Santa Cruz,

R. Glenn Hubbard, Columbia University, William N. Goetzmann, Yale University, Robert Lipsey, Queens College (New York), Andrew Samwick, Dartmouth College, Linda Tesar, University of Michigan, and Shang-Jin Wei, Harvard University. Randall K. Morck, University of Alberta (Canada) also participated.

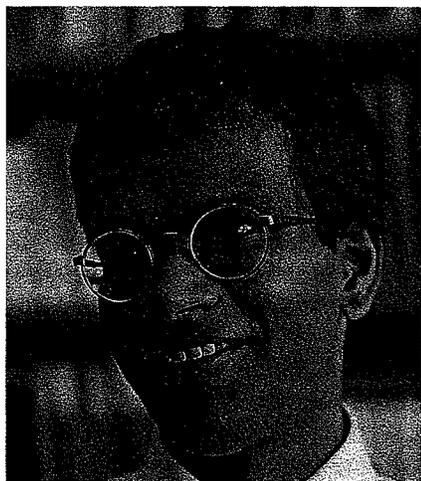
The entire conference program with links to other related information is available on the NBER's web site at [www.nber.org/china](http://www.nber.org/china).

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## Bureau News

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### Mullainathan is 2000/1 Griliches Fellow



Sendhil Mullainathan, an NBER Faculty Research Fellow in the Labor Studies and Corporate Finance Programs and the Mark Hyman, Jr.

Career Development Associate Professor of Economics at MIT, has been selected to receive the first Zvi Griliches Fellowship at the NBER for the academic year 2000/1. This fellowship, which will be awarded every two years, was created and funded by friends and colleagues of Professor Griliches to honor his memory and his tradition of mentoring young empirical economists.

Mullainathan plans to spend the coming year working on the financial behavior of firms in developing countries and on psychology and economics. In development and finance, he will empirically explore whether elusive phenomena such as transparency and tunneling can be reliably measured and, if so, test

whether various policy changes have affected their prevalence. In psychology and economics, he will explore a model of "categorical thinking," in which information is processed only coarsely and where decisionmakers categorize the objects of inference (workers, firms, and so on) into broad units rather than making fine distinctions between them. He will also test this model's empirical implications for asset pricing and discrimination in labor markets.

Mullainathan received his B.A. from Cornell University in 1993 and his Ph.D. from Harvard University in 1998. He has been at the economics department at MIT since 1998.

## Public Economics

The NBER's Program on Public Economics held its spring meeting in Cambridge on April 13 and 14. Program Director James M. Poterba of MIT organized the following agenda:

**John P. Conley**, University of Illinois, and **Antonio Rangel**, NBER and Stanford University, "Intergenerational Spillovers and Decentralization"

Discussion: **Dennis N. Fatas**, NBER and Carnegie Mellon University

**Julia Lynn Coronado**, Federal Reserve System, **Don Fullerton**, NBER and University of Texas, and **Thomas Glass**, Glass & Company, "The Progressivity of Social Security" (NBER Working Paper No. 7540)

Discussion: **Jeffrey B. Liebman**, NBER and Harvard University

**Jonathan Gruber**, NBER and MIT, and **Michael K. Lettau**, Bureau of Labor Statistics, "How Elastic Is the Labor Demand for Health Insurance?"

Discussion: **Douglas Holt-Eakin**, NBER and Syracuse University

**David F. Bradford**, NBER and Princeton University, **Rebecca Schlieckert**, BlackRock Financial, and **Stephen H. Shore**, Harvard University, "The Environmental Kuznets Curve: Exploring a Fresh Specification"

Discussion: **Lawrence H. Goulder**, NBER and Stanford University

**Kenneth L. Judd**, NBER and Stanford University, "Is Education as Good as Gold? A Portfolio Theory of

Human Capital Investment"

Discussion: **Casey Mulligan**, NBER and University of Chicago

**William M. Gentry** and **R. Glenn Hubbard**, NBER and Columbia University, "Tax Policy and Entrepreneurial Activity"

Discussion: **Bruce D. Meyer**, NBER and Northwestern University

**Todd M. Sinar**, NBER and University of Pennsylvania, and **Joseph P. Gyourko**, University of Pennsylvania, "The Asset Price Incidence of Capital Gains Taxes: Evidence from the Taxpayer Relief Act of 1997 and Publicly Traded Estate Funds"

Discussion: **Douglas A. Shackelford**, NBER and University of North Carolina, Chapel Hill

**Conley** and **Rangel** show that decentralized institutions have an advantage over centralized institutions in the provision of durable public goods (DPGs). The key feature of DPGs is that they generate intergenerational spillovers. **Conley** and **Rangel** show, based solely on intergenerational effects, that decentralization does better even with no sorting effects, because all of the agents have the same preferences over public goods. Their results imply that the level of government at which a particular DPG should be allocated depends on the interplay of three forces: intergenerational spillovers, sorting effects, and interjurisdictional externalities. If the intergenerational component is dominant, DPGs should be allocated at the local level. If the interjurisdictional externalities are strong enough, they should be allocated at the central level.

How much does the current social security system really redistribute

from rich to poor? **Coronado**, **Fullerton**, and **Glass** proceed to answer the question in seven steps. First, they classify individuals by annual income and use Gini co-efficients, finding that Social Security is highly progressive. Second, they reclassify individuals on the basis of lifetime income and find that Social Security is less progressive. Third, the authors remove the cap on measured earnings and find that Social Security is even less progressive. Fourth, they switch from actual to potential lifetime earnings (the present value of the wage rate times 4,000 hours each year). This measure captures the value of leisure and home production, so that those out of the labor force are less poor, and net payments to them are less progressive. Fifth, the authors assign to each married individual half of the couple's income. The low-wage spouse is then not so poor, and Social Security becomes even less progressive. Sixth, they incorporate mortality probabilities

that differ by potential lifetime income. Since the rich live longer and collect benefits longer, Social Security is no longer progressive at all. Finally, **Coronado**, **Fullerton**, and **Glass** increase the discount rate from 2 to 4 percent, which puts relatively more weight on the earlier-but-regressive payroll tax and less weight on the later-but-progressive benefit schedule. The whole Social Security system is then found to be regressive.

**Gruber** and **Lettau** investigate the impact of tax subsidies on the firm's decision to offer health insurance and on firm spending on that insurance. They use microdata underlying the Employee Compensation Index, which matches very high-quality compensation data with information on a sample of workers in the firm. **Gruber** and **Lettau** find overall that offering insurance is modestly elastic with respect to aftertax prices (elasticity of -0.3), but that insurance spending is highly elastic with respect to tax subsidies (elasticity of

-1.3). The elasticity of offering insurance is driven solely by small firms, whose elasticity is -0.7, but spending on insurance is more elastic in large firms. Gruber and Lettau also show how the aggregation of worker preferences determines decisions about providing benefits. In particular, they find evidence of a median voter model of benefits determination, along with some additional influence for the most highly compensated workers in the firm.

Using a new specification, **Bradford, Schlieckert, and Shore** re-analyze the data on worldwide environmental quality investigated by Gene M. Grossman and Alan B. Krueger in a well-known paper on the environmental Kuznets curve (which postulates an inverse U-shaped relationship between income level and pollution). The new specification enables the authors to draw conclusions from fixed effects estimation. In general, they find support for the environmental Kuznets curve for some pollutants and for its rejection in other cases.

Do we underinvest in education? One way to answer this question is to compare the expected returns to education to the returns on assets of comparable risk. **Judd** argues that the usual practice of comparing the

return to education to equity investments is incorrect. Under optimal contracting, the correct private risk premium for idiosyncratic risk is zero, the same as the social cost of idiosyncratic risk. Combining his results with conventional wisdom indicates that the correct hurdle rate is substantially less than the expected return to equity, perhaps down to that of gold.

Using the Panel Study of Income Dynamics for 1979-92, **Gentry and Hubbard** incorporate various effects of the income tax system in their empirical estimations of the probability that people will enter self-employment. The level of the marginal tax rate does not affect entry into self-employment in a consistent manner across specifications, but progressive marginal tax rates on the whole discourage entry into self-employment. The effects of the convexity of the tax schedule on entrepreneurial entry are rather large. For example, Gentry and Hubbard estimate that the Omnibus Budget Reconciliation Act of 1993, which raised the top marginal tax rate, lowered the probability of entry into self-employment for upper-middle-class households by about 20 percent.

**Sinai and Gyourko** examine how asset prices adjusted to the capital

gains tax cut in the Taxpayer Relief Act of 1997 (TRA97). By comparing two organizational structures in the real estate industry that differ only in how they should be affected by a change in capital gains tax rates, the authors are able to isolate the effect of the tax cut from industry trends and firm-level heterogeneity. In real estate, the benefit of a capital gains tax deferral accrued mainly to the buyer of an appreciated property; much of the value of the subsidy was capitalized into asset prices. Using share price data, Sinai and Gyourko find that on average real estate firms called "UPREITs," whose tax subsidy was reduced in TRA97, had 14 percent less price appreciation in 1997 relative to 1996 than companies known as "REITs," which had no tax change. Firms that appeared likely to be purchasers of property — and thus received the benefit from the tax subsidy before it was cut — were the only ones that had share prices that declined. In addition, those firms did not experience any relative movement in share prices during the previous year when capital gains tax rates did not change. Sinai and Gyourko also find that prices for new acquisitions rose for UPREITs relative to REITs after TRA97.



## Environmental Economics

The NBER's Project on Environmental Economics met in Cambridge on April 12. Project Director Don Fullerton of the University of Texas at Austin chose the following papers for discussion: **Richard J. Arnott**, NBER and Boston College, "Road and Rail: Second-best Pricing and Capacity

Discussion," **Kenneth A. Small**, University of California, Irvine; **Ronald J. Shadbegian**, University of Massachusetts, Dartmouth; **Wayne B. Gray**, NBER and Clark University; and **Jonathan Levy**, Harvard University, "Spatial Efficiency of Pollution Abatement Expenditures." Discussion: **Robert N. Stavins**, Harvard University.

**A. Ians Bovenberg**, Tilburg University, and **Lawrence H. Goulder**, NBER and Stanford University, "Neutralizing the Adverse Industry Impacts of CO<sub>2</sub> Abatement Policies: What Does It Cost?" (NBER Working Paper No. 7054). Discussion: **Gilbert F. Metcalf**, NBER and Tufts University.

Suppose that there are two modes of travel from point A to point B — road and rail — which are not perfect substitutes. Road congestion from A to B is underpriced; this distortion is unalterable. To respond to congestion, should the transportation planner choose a wider or narrower road, raise or lower the rail fare, and expand or contract rail capacity? **Arnott** and **Yan** review the literature on this problem and present some new results. Almost all existing work employs *local* analysis, examining how the second-best policy variables respond to an incremental increase in the road toll. However, such an analysis demands too much information to be useful in practical, quantitative terms. Thus future theoretical research should be redirected towards *global* analysis: deriving policy rules whose implementation demands less information.

Different pulp and paper plants spend different amounts on pollution abatement and achieve different levels of pollution reduction. **Shadbegian**, **Gray**, and **Levy** ask whether the allocation of pollution abatement expenditures is spatially

efficient. That is, do plants with higher benefits from abatement spend proportionately more on it than plants with lower benefits? Combining plant-level Census Bureau data on pollution abatement expenditures with measures of pollution abatement benefits at those plants, and examining water and air pollution abatement costs and benefits separately, the authors find that the benefits from pollution abatement on average outweigh the costs. This is particularly true for air pollution control. **Shadbegian**, **Gray**, and **Levy** also find that the abatement costs at a plant are significantly positively related to abatement benefits for that plant. However, costs are less sensitive to benefits than would be expected if the only regulatory goal were spatial efficiency.

Using an intertemporal numerical general equilibrium model of the United States, **Bovenberg** and **Goulder** examine how efficiency costs change when CO<sub>2</sub> abatement policies (such as carbon taxes) include features that neutralize adverse impacts on energy industries. The authors find that avoiding

adverse impacts on profits and equity values in fossil fuel industries involves a relatively small efficiency cost. That is because CO<sub>2</sub> abatement policies have the potential to generate revenues that are very large relative to the potential loss of profit. By enabling firms to retain a small fraction of these potential revenues, the government can protect firms' profits and equity values. If the government either grandfathered a small percentage of CO<sub>2</sub> emissions permits or exempted a small fraction of emissions from the base of a carbon tax, the results would be a small sacrifice of potential government revenue. Because the revenue sacrifice is small, the efficiency cost is also small. **Bovenberg** and **Goulder** further find that offsetting producers' carbon tax payments on a dollar-for-dollar basis (through cuts in corporate tax rates, for example) substantially overcompensates firms, raising profits and equity values significantly relative to the unregulated situation. This is because producers can shift onto consumers most of the burden from a carbon tax.

## Corporate Finance

The NBER's Program on Corporate Finance met in Cambridge on April 14. Program Director Raghuram Rajan of the University of Chicago chose the following papers for discussion:

**Eugene F. Fama**, University of Chicago, and **Kenneth R. French**, NBER and MIT, "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?

Discussant: John R. Graham, Duke University

**Oliver D. Hart**, NBER and Harvard University, and **John H. Moore**, London School of Economics, "On the Design of Hierarchies:

Coordination versus Specialization" (NBER Working Paper No. 7389).

Discussant: Bengt Holmstrom, NBER and MIT

**Antyom A. Durnev**, University of Michigan; **Randall Morck**, University of Alberta; and **Bernard Yeung**, New York University, "Do Stock Prices Guide the Allocation of Capital?"

Discussant: Gregorio M. Andrade, Harvard University

**Jeremy C. Stein**, NBER and MIT, "Information Production and Capital Allocation:

Decentralized versus Hierarchical Firms" (NBER Working Paper No. 7705).

Discussant: Jill Axelson, University of Chicago

**Rafael La Porta**, **Florencio Lopez-de-Silanes**, and **Andrei Shleifer**, NBER and Harvard University, "Government Ownership of Banks" (NBER Working Paper No. 7620).

Discussant: Mihir A. Desai, NBER and Harvard University

**Philippe Aghion**, University College London; **Patrick Bolton**, NBER and Princeton University; and **Jean Tirole**, MIT, "Exit Options in Corporate Finance: Incentives versus Incentives."

Discussant: Stewart C. Myers, NBER and MIT

The percent of firms paying cash dividends fell from 66.5 in 1978 to 20.7 in 1998. **Fama** and **French** suggest that this decline is attributable in part to the changing characteristics of publicly traded firms. The population of publicly traded firms is composed increasingly of small firms with low profitability and strong growth opportunities; these characteristics are typical of firms that have never paid dividends. Even after controlling for these characteristics, Fama and French show that firms are becoming less likely to pay dividends. This lower propensity to pay is at least as important as changing characteristics in the declining incidence of dividend payers.

**Hart** and **Moore** develop a model of hierarchies based on the allocation of authority. A firm's owners have ultimate authority over a firm's decisions, but they have limited capacity or desire to exercise this authority. Hence, owners may defer to subordinates. However, these subordinates also have limited capacity or desire to exercise authority, so they may

defer to their subordinates. Hart and Moore analyze the optimal chain of command given that different agents have different tasks: some agents are engaged in coordination and others in specialization. The authors' theory throws light on the nature of hierarchy, the optimal degree of decentralization, and firm boundaries.

**Durnev**, **Morck**, and **Yeung** show that industries with larger firm-specific variation in stock prices grow faster, adjust faster, allocate capital with greater precision, add more value, and use more external financing. These findings support the view that greater firm-specific variation in stock prices reflects the capitalization in stock prices of higher intensity firm-specific information and is associated with better firm-specific capital allocation. The authors propose that higher firm-specific price variation may be one indicator of greater functional-form market efficiency, in the sense of Tobin (1982).

**Stein** assesses different organizational forms in terms of their ability to generate information about invest-

ment projects and efficiently allocate capital to these projects. A decentralized approach — with small, single-manager firms — is most attractive when information about individual projects is "soft" and cannot be transmitted credibly. Holding firm size fixed, soft information also favors flatter organizations with fewer layers of management. In contrast, large hierarchical firms with multiple layers of management are at a comparative advantage when information can be "hardened" costlessly and passed along within the hierarchy. As a concrete application of the theory, Stein discusses the consequences of consolidation in the banking industry. When large banks acquire small banks, there is a pronounced decline in lending to small businesses. To the extent that small-business lending relies heavily on soft information, this result is consistent with the theory.

**La Porta**, **Lopez-de-Silanes**, and **Shleifer** investigate a neglected aspect of financial systems of many countries around the world: government ownership of banks. They

assemble data that establish four findings. First, government ownership of banks is large and pervasive around the world. Second, such ownership is particularly significant in countries with low levels of per capita income, underdeveloped financial systems, interventionist and inefficient governments, and poor protection of property rights. Third, government ownership of banks is associated with slower subsequent financial development. Finally, government ownership of banks is associated with lower subsequent growth of per capita income and, in particular, with lower growth of productivity

rather than slower factor accumulation. This evidence is inconsistent with the optimistic "development" theories of government ownership of banks common in the 1960s, but supports the more recent "political" theories of the effects of government ownership of firms.

**Aghion, Bolton, and Tirole** characterize optimal security design in the context of a corporate financing problem with monitoring and demand for liquidity. Optimal incentives to efficiently monitor the firm dictate that investments and compensation contracts be illiquid. But the liquidity premium on illiquid

investments may be so high that it might be efficient to trade optimal incentives for greater liquidity. Building on the fundamental complementarity between speculative monitoring (which increases the informativeness of prices) and active monitoring (which is enhanced when investments are more liquid), Aghion, Bolton, and Tirole then spell out the conditions on the underlying parameters under which more or less liquidity is warranted. Finally, the authors apply the model to the analysis of common exit provisions in venture capital financing.

## Monetary Economics

The NBER Program on Monetary Economics met in Cambridge on April 28. Christopher D. Farrell, NBER and Johns Hopkins University, and Stephen G. Cecchetti, NBER and Ohio State University, organized the program and chose the following papers for discussion:

**Athanasios Orphanides**, Federal Reserve Board of Governors, "The Quest for Prosperity without Inflation"

Discussion: **Karsten O. Svensson**, NBER and Princeton University

**James Bullard**, Federal Reserve Bank of St. Louis, and **Kaushik Mitra**, University of York, "Learning About Monetary Policy Rules"

Discussion: **Michael Woodford**, NBER and Princeton University

**Mark Zbaracki**, University of Pennsylvania, **Mark Ritson**, London Business School, **Daniel Levy**, Bar Ilan University, **Shantanu Dutta**, University of Southern California, and **Mark Bergen**, University of Minnesota, "The Managerial and Customer Dimensions of the Cost of Price Adjustment: Direct Evidence from Industrial Markets"

Discussion: **Julio J. Rotemberg**, NBER and Harvard University

**Michael Fratantoni**, Fannie Mae, and **Scott Schuh**, Federal Reserve Bank of Boston, "Monetary Policy, Housing Investment, and

Heterogeneous Regional Markets"

Discussion: **James H. Stock**, NBER and Harvard University

**David B. Gross**, University of Chicago, and **Nicholas S. Souleles**, University of Pennsylvania, "Consumer Response to Changes in Credit Supply: Evidence from Credit Card Data"

Discussion: **Simon Gilchrist**, NBER and Boston University

**David F. Laibson**, NBER and Harvard University, **Andrea Repetto**, University of Chile, and **Jeremy Iobaceman**, Harvard University, "A Debt Puzzle"

Discussion: **Stephen P. Zeldes**, NBER and Columbia University

In recent years, activist monetary policy rules in response to inflation and the level of economic activity have been advanced as a means of achieving effective output stabiliza-

tion without inflation. Advocates of such policies suggest that their flexibility may yield substantial stabilization benefits while avoiding the excesses of overzealous discre-

tionary fine-tuning that characterize the experience of the 1960s and 1970s. **Orphanides** demonstrates that these conclusions are misguided. He constructs a database of

information that was available to policymakers in real time from 1965 to 1993. He then performs counterfactual simulations under alternative assumptions about the knowledge that policymakers likely had about the state of the economy when they made policy decisions. His results overturn findings favoring activist policies in favor of prudent policies that ignore short-run stabilization concerns. The evidence suggests that the primary underlying cause of the 1970s' inflation was misperceptions of the economy's productive capacity. Further, apparent differences in the framework governing monetary policy decisions during the 1970s as compared to the more recent past have been greatly exaggerated, he concludes.

**Bullard** and **Mitra** study macroeconomic systems with forward-looking private sector agents and a monetary authority that is trying to control the economy through the use of a linear policy feedback rule. A natural question about this scenario is: will policy responses that are too aggressive actually destabilize the economy? Using stability under recursive learning as a criterion for evaluating monetary policy rules in this context, Bullard and Mitra find that considering learning substantially alters the evaluation of alternative policy rules. In some situations, overly aggressive rules indeed can destabilize the economies that they model. They also find that a certain type of rule is robustly associated with both determinacy and "learnability": an active, Taylor-type rule, with only a small positive reaction to variables other than inflation.

**Zbaracki, Ritson, Levy, Dutta,** and **Bergen** study a large U.S.-based industrial manufacturer and its customers. Using field interviews, non-participant observations, and analysis of corporate communications, data, and records used in the price change

process, they show that the costs of price adjustment are much more complex than previously has been believed. They identify three types of managerial costs — information gathering, decisionmaking, and communication costs — and two types of customer costs — communication, and negotiation costs. They find that the managerial costs of price adjustment are more than six times, and the customer costs more than 20 times, the actual physical costs associated with changing prices. In dollar terms, the authors' estimate that the total annual cost of price adjustment for this manufacturer in 1997 was \$1,233,245. Of this amount, 3.3 percent is the physical cost of changing prices, 22.7 percent is the managerial cost, and the remaining 74 percent is the customer cost. In relative terms, these costs of price adjustment comprise 1.23 percent of the company's revenue and 20.3 percent of the company's net margin. Each price change costs between \$2.47 and \$12.33. The authors' evidence suggests that many managerial and customer dimensions of the costs of price adjustment are convex — that is, they increase with the size of the price change — while many of the physical costs are nonconvex.

**Fratantoni** and **Schuh** quantify the importance of heterogeneity in regional housing markets for the conduct of monetary policy. Their model integrates a national financial market with regional housing markets, imposing all exact aggregation conditions. Monetary policy is transmitted to the real economy through the mortgage rate. The effect of monetary policy on the real economy depends on the extent and nature of regional heterogeneity, both of which vary over time. Using longitudinal data for specific U.S. regions, the authors estimate the effects of time variation and state dependence on the dynamic responses of their

model. These estimates, and aggregation bias, provide plausible and tangible explanations for "long and variable" lags in monetary policy.

**Gross** and **Souleles** use a unique new dataset on credit card accounts to analyze how people respond to changes in credit supply. The data consist of a panel of several hundred thousand individual credit card accounts from several different card issuers with associated credit bureau data included. These accounts were followed monthly for two to three years. The authors find that increases in credit limits generate an immediate and significant rise in debt. This response is sharpest for people starting near their credit limit, showing that liquidity constraints are binding. However, even people starting well below their credit limit respond significantly. There are other results that conventional models cannot easily explain though, such as the fact that many credit card borrowers simultaneously hold other low-yielding assets. Unlike most other studies, this paper shows strong effects from changes in account-specific interest rates. Debt is particularly sensitive to large declines in interest rates, which can explain the widespread use of "teaser rates." The long-run elasticity of debt to the interest rate is about  $-1.3$ . Less than half of this elasticity represents balance-switching across cards, with most of it reflecting net changes total borrowing. Overall, the results imply that the consumer plays a potentially important role the transmission of monetary policy and other credit shocks.

Over 60 percent of U.S. households with credit cards are currently borrowing on those cards (that is, paying interest). **Laibson, Repetto,** and **Tobacman** attempt to reconcile this high rate of credit card borrowing with observed levels of life-cycle wealth accumulation. They simulate a life-cycle model with five proper-

ties that create demand for credit card borrowing: 1) their calibrated labor income path follows a trajectory that is upward sloping early in life; 2) their income path has transitory shocks; 3) they introduce an illiquid asset that will attract substantial investment, but cannot be used to smooth transitory income shocks;

4) they give consumers the opportunity to declare bankruptcy, making credit card borrowing less costly; and 5) their simulated households have relatively more dependents early in the life cycle. The authors' calibrated model predicts that 20 percent of the population will borrow on their credit card at any point in time, far

less than the observed rate of over 60 percent. The resolution to this puzzle is hyperbolic time preferences: simulated hyperbolic consumers borrow actively in the revolving credit card market and accumulate relatively large stocks of illiquid wealth, matching observed data.

## Higher Education

The NBER's Working Group on Higher Education, directed by Charles J. Clotfelter of Duke University, met in Cambridge on May 5. The program was

**Jeffrey Groen** and **Michelle J. White**, University of Michigan: "In-State versus Out-of-State Students: The Divergence of Interest between Public Universities and State Governments"

Discussant: Caroline Minter Hoxby, NBER and Harvard University

**Ronald G. Ehrenberg**, NBER and Cornell University, and **John J. Cheslock** and **Julia Epifantseva**,

Cornell University: "Paying Our Presidents: What Do Trustees Value?"

Discussant: Michael Rothschild, NBER and Princeton University

**Bruce J. Sacerdote**, NBER and Dartmouth College: "Peer Effects with Random Assignment: Results for Dartmouth Roommates" (NBER Working Paper No. 7169)

Discussant: David Zimmerman, Williams College

**Larry D. Singell, Jr.** and **Joe A. Stone**, University of Oregon: "The Good, the Poor, or the Wealthy: Who Benefits Most from College Financial Aid?"

Discussant: John Siegfried, Vanderbilt University

**A. Abigail Payne**, University of Illinois: "Does the Barrel Contain Fat or Pork? The Effect of earmarking on Research Funding and Productivity at Universities"

Discussant: Irwin Feller, Pennsylvania State University

**Jill M. Constantine**, Williams College, and **Laura Perna**, University of Maryland: "Why Do So Many More Black Women than Black Men Enroll in College?"

Discussant: Sarah Lamer, University of Virginia

**Groen** and **White** examine the divergence of interest between universities and state governments concerning standards for admitting in-state versus out-of-state students. Considering both public and private universities, the authors find that both favor in-state students in admissions. They also find that states gain more in expected future tax revenues when marginal in-state students, rather than marginal out-of-state students, are admitted to public universities. That is because in-state students' higher probability of locating in the state after attending a uni-

versity there offsets their lower future state tax payments. Finally, the authors investigate whether states gain when very high ability students attend public universities. They find instead that states are better off when public universities are not highly selective, and when public universities restrict admission of out-of-state students, even those of high ability.

**Ehrenberg**, **Cheslock**, and **Epifantseva** use information on the changes in compensation and turnover of presidents of private universities and colleges to try to infer the factors that trustees of academic

institutions value. Data on presidents' salaries and benefits have been published in the *Chronicle of Higher Education* for approximately 400 private institutions for academic years 1992-3 through 1996-7. The authors merge these data with information about the characteristics of the presidents, such as age and experience, obtained from surveys conducted by the American Council on Education and from the presidents' entries published in *Who's Who in America*. Data on various performance measures of the institution — such as endowment growth, research fund-

ing growth, student test score changes, and changes in published rankings obtained from a variety of sources — are also taken into account. The authors' models are very successful at predicting presidents' compensation levels, but the preliminary findings do not strongly support the notion that changes in presidents' compensation are related to observed measures of institutional performance.

**Sacerdote** measures peer effects among college-age roommates. He finds that among Dartmouth College freshmen roommates and dormmates, who are randomly assigned, peer effects help to determine levels of academic effort and such social decisions as whether to join a fraternity. In other major life decisions, such as the choice of college major, residential peer effects are markedly absent. Peer effects on GPA occur at the individual room level, whereas peer effects on fraternity membership occur at both the room and dorm level, Sacerdote finds. Also, freshmen with high social ability are likely to remain with their roommates in their sophomore year, but freshmen with high academic ability are less likely to keep their roommates.

Both college- and government-sponsored financial-aid programs for students now focus more on merit than on need. However, there is little empirical evidence on the distributional effects of merit-based aid — that is, who benefits most. **Singell** and **Jones** use data for a large public university over several years and show that merit-based aid increases the likelihood of enrollment for all students. Well-to-do students benefit disproportionately, though, even with merit held constant. These findings also are supported by a natural experiment that substantially increased merit-based aid. Thus, the

increased emphasis on merit in college financial aid may exacerbate the trend toward greater income inequality in the United States, even among students of equal merit.

Do universities view earmarking of federal funds as merely a result of pork-barrel politics or as another means of obtaining federal funding which may be less expensive than seeking it through the peer-review method of allocation? To analyze this issue, **Payne** creates a dataset that combines measures on earmarked allocations to universities, total federal research funding distributed to universities, the number of articles published and citations to articles published, and the relationship between membership on the congressional appropriations committees and universities. She finds first that earmarked funding goes primarily to the research and doctoral universities that already receive a large portion of total federal research funding. However, earmarked funding is done through agencies that are not as heavily engaged in distributing peer-reviewed funding as other agencies. Second, the link between a member on the appropriations committees in Congress and affiliation with the university receiving the earmarked funding is not as strong as may be believed. After Payne controls for differences across universities, the effect of representation in Congress on predicting whether a university receives earmarked funding diminishes. Third, the effect of earmarked funding on articles published and citations per article published is unclear. However, the effect of total federal research funding on citations per article published is lower for those universities that received several years of earmarked funding than for those with no or few years of earmarked funding.

Why do African Americans, who share similar socioeconomic backgrounds, have such different college enrollment rates by gender? For over 20 years, black women have had much higher college enrollment rates and degree attainment rates than black men. The gender gap is partially explained by different high school graduation rates for black men and women. However, the gap in college enrollments is much larger than the gap in high school graduation rates. To answer the question, **Constantine** and **Perna** use the National Educational Longitudinal Study of 1988 eighth graders, which includes data on schooling and work histories of respondents through 1994, and controls for characteristics that are likely to affect high school persistence and college enrollment, such as test scores in eighth and tenth grade. In addition to test scores and the like, though, the authors take into account measures of "social capital," that is, high school and community characteristics that influence persistence through high school and college enrollment. Their preliminary results indicate that black women are more likely than black men to enroll in a two- or four-year institution upon graduating from high school. The authors break this difference in probability of enrollment into the portion explained by characteristics (other than simply being female) and the portion explained by the effect of those characteristics on an individual's probability of enrollment. All of the difference in four-year college enrollment can be explained by differences in characteristics that lead to higher probabilities of enrollment, the authors find. However, the difference in two-year college enrollment cannot be explained by differences in characteristics.

## Behavioral Finance

The NBER's Working Group on Behavioral Finance met in Cambridge on May 6. Robert Shiller, NBER and Yale University, and Richard H. Thaler, NBER and University of Chicago, organized the program, and chose the following papers for discussion.

**Nicholas C. Barberis**, NBER and University of Chicago, and **Ming Huang**, Stanford University,

"Mental Accounting, Loss Aversion, and Individual Stock Returns"

Discussant: Richard H. Thaler

**Matthew Rabin**, University of

California, Berkeley, "Inference by Believers to the Law of Small Numbers"

Discussant: Sanchit Mullainathan, NBER and MIT

**Blaskaran Swaminathan** and **Charles M. C. Lee**, Cornell University, "Do Stock Prices Overreact to Earnings News?"

Discussant: Andrei Shleifer, NBER and Harvard University

**Alon Bray**, Duke University, and

**James B. Heaton**, Barlett, Beck, Herman, Palenchar, & Scott (Chicago), "Competing Theories of Financial Anomalies"

Discussant: Jeremy C. Stein, NBER and MIT

**David E. Ikenberry** and **Sundaresk Ramnath**, Rice University, "Underreaction"

Discussant: Ron Michael, Cornell University

**William N. Goetzmann**, NBER and Yale University, **Massimo**

**Massa**, INSEAD, **K. Geert Rouwenhorst**, Yale University, "Behavioral Factors in Mutual Fund Flows"

Discussant: Andrew Metrick, NBER and University of Pennsylvania

**Barberis** and **Huang** study equilibrium asset prices in a model in which investors are loss averse. They consider two possibilities, corresponding to assumptions about how people do mental accounting and how they evaluate their investment performance. In one case, investors track their performance stock by stock and are loss averse in terms of individual stock fluctuations. In the other case, investors measure their performance at the portfolio level and are loss averse only about portfolio fluctuations. The authors find that loss aversion in regard to individual stock fluctuations is helpful for explaining a wide range of empirical facts. In simulated data, individual stock returns have a high mean and excess volatility, and are slightly predictable over time; moreover, there are large "value" and "size" premiums in the cross-section. The case where investors are loss averse over portfolio fluctuations, although normatively more appealing, is less successful in explaining the facts: individual returns are not volatile enough and are too correlated, while the premiums for value and size largely disappear.

Many people believe in the "law of small numbers," exaggerating the degree to which a small sample resembles the population from which it is drawn. To model this, **Rabin** assumes that a person exaggerates the likelihood that a short sequence of signals resembles the long-run rate at which those signals are generated. That person believes in the "gambler's fallacy," thinking that early draws of one signal increase the odds of subsequently drawing other signals. When uncertain about the rate, the person infers too much from short sequences of signals and is prone to thinking that the rate is more extreme than it is. When people make inferences about the frequency at which rates are generated by different sources — such as the distribution of talent among financial analysts — based on a few observations from each source, they tend to exaggerate how much the rates vary. Hence, Rabin's model predicts that people may pay for financial advice from "experts" whose expertise is entirely illusory. **Swaminathan** and **Lee** show that both intermediate-term momentum and long-term price reversal are linked to the release of

specific public news about a firm's earnings. The authors also show that glamour winners — positive surprise firms with a sequence of past positive earnings surprises, higher past trading volume, and low book-to-market ratios — exhibit faster price reversals. Value losers — whose characteristics are the opposite of glamour winners — also exhibit faster price reversals. In other words, the post-earnings announcement drift is attenuated when the most recent signal confirms the older signal, and vice versa. Overall, the evidence suggests a price formation process in which the market systematically underreacts to recent news and overreacts to longer-term (older) news.

**Bray** and **Heaton** compare two competing theories of financial anomalies: "behavioral" theories relying on investor irrationality and rational "structural uncertainty" theories relying on investor uncertainty about the structure of the economic environment. Each relaxes the traditional rational expectations theory in a certain way. However, the resulting theories are virtually indistinguishable empirically, although their implications differ radically. Given the

mathematical and predictive similarities of the theories, the authors argue that attention should probably shift from the behavioral-rational debate toward a greater (and perhaps less philosophical) focus on investor concern with structural uncertainty.

In the last decade, an emerging body of empirical literature examining self-selected corporate news events makes the observation that markets appear to underreact. In this paper, **Ikenbery** and **Ramnath** revisit the issue of underreaction by focusing on the simplest of corporate transactions: the stock split. Using a matched-control firm approach, the authors find abnormal returns of 9 percent in the year following the stock-split announcement for a recent sample of cases. They then examine how earnings expectations are revised subsequent to this type of news event. If the positive drift reported in this study and elsewhere is attributable to benchmark prob-

lems, then one might not expect to find surprising results with respect to revisions in earnings expectations. Yet this is not the case. Instead, revisions in earnings forecasts are just as sluggish as stock prices. This gradual revision in earnings expectations explains a significant portion of the drift in abnormal returns. At least with respect to this most simple of news events, it would indeed appear that markets underreact to news.

Using a sample of daily net flows to nearly 1,000 U.S. mutual funds over a year and a half, **Goetzmann**, **Massa**, and **Rouwenhorst** identify a set of systematic factors that explain a significant amount of the variation in those flows. The authors find that flows into equity funds — both domestic and international — are negatively correlated with flows into money market funds and precious metals funds. This suggests that investor rebalancing between cash and equity explains a significant

amount of trade in mutual fund shares. The negative correlation of equities to metals suggests that this timing is not simply caused by liquidity concerns but rather by sentiment about the equity premium. To address the question of whether behavioral factors spread returns, the authors use the mutual fund flow factors in a Fama-MacBeth asset pricing framework. They find that the factors derived from flows alone explain as much as 45 percent of the cross-sectional variation in mutual fund returns. The fund flow factors provide significant incremental explanatory power in the cross-sectional regressions on daily returns. The authors consider a number of alternatives to explain their evidence, including causality from returns to flows and vice versa. The evidence is consistent with the existence of a pervasive investor sentiment variable.



## Market Microstructure

The NBER's Working Group on Market Microstructure met in Cambridge on May 11. Organizers Bruce N. Lehmann, University of California, San Diego; Andrew White, NBER and MIT; Matthew Spiegel, Yale University; and Avardhar Subramaniam, University of California, Los Angeles, chose these papers for discussion:

**Michael J. Barclay**, NBER and University of Rochester, and **Terrence J. Hendershott**, University of Rochester, "Price Discovery and Trading Costs after Hours"

Discussant: **Marcel Fiaschi**, University of Georgia

**Roger Edelen** and **Simon Gervais**, University of Pennsylvania, "The Role of Trading Halts in Monitoring a Specialist Market"

Discussant: **Matthew Spiegel**  
**William G. Christie**, Vanderbilt University; **Shane A. Corwin**, University of Georgia; and **Jeffrey H. Harris**, University of Notre Dame, "Let It Breathe: The Role and Impact of Trading Halts in the Nasdaq Stock Market"

Discussant: **Kenneth A. Kavajecz**

University of Pennsylvania

**Utpal Bhattacharya** and **Hazem Daouk**, Indiana University, "The World's First on Insider Trading"

Discussant: **Charles F. Jones**, NBER and Columbia University

**Frederick H. Harris**, Wake Forest University; and **Thomas H. McInish** and **Robert A. Wood**, University of Memphis, "The Dynamics of Price Adjustment across Exchanges: An Investigation of Price Discovery for Dow Stocks"  
Discussant: **Janin Chordia**, Vanderbilt University

**Barclay** and **Hendershott** examine the trading process outside of normal trading hours. Although their trading volume is small, after-hours trades are more informative than trades during the day and are associated with significant price discovery. Spread-related trading costs are also more than twice as large after hours than during the trading day. Barclay and Hendershott observe two separate trading processes for Nasdaq-listed stocks in the after-hours market: larger less informative trades are negotiated directly with market makers, and smaller more informative trades are executed anonymously on electronic communications networks. Although both trading processes are active after the close and before the open, the non-anonymous, liquidity-motivated trades are more prevalent after the close, and the anonymous, information-motivated trades are more prevalent before the open.

**Edelen** and **Gervais** model an exchange as a collection of specialists, each a monopolist who makes a market in a subset of the stocks listed on the exchange. They show that specialists can obtain net private

benefits at the expense of the exchange by quoting a privately optimal pricing schedule. Conversely, a coordinated pricing schedule makes all specialists and customers better off. However, coordination requires a system of "monitor jog and punishment," which can break down when information asymmetries between the exchange and the specialist are high. This breakdown can cause the specialist to seek a temporary halt to trading to alleviate unjustified punishment or can cause the exchange to halt trading to prevent the quoting of damaging, privately optimal pricing schedules. To test this theory, Edelen and Gervais use a sample of over 2,000 New York Stock Exchange (NYSE) halts and a proxy for the exchange-specialist information asymmetry. As predicted, they find a dramatic increase in estimated information asymmetry immediately preceding trading halts, which is far larger than the abnormal volatility or volume preceding the halt.

**Christie**, **Corwin**, and **Harris** study the impact of Nasdaq trading halts on prices, transaction costs, and trading activity. These halts, which

stem from impending news, have a median duration of slightly less than one hour and produce a median absolute return of 5.5 percent. The authors find that the period after the halt is associated with unusually high volatility, share volume, and number of trades that are slow to decay. Transaction costs are also extremely high immediately after halts. In particular, inside-quoted spreads more than double after Nasdaq halts, decreasing to normal levels within 40 minutes. Overall, these results suggest that the price discovery process associated with Nasdaq halts may be inefficient.

The existence and enforcement of insider-trading laws in stock markets is a phenomenon of the 1990s. Of the 103 countries that now have stock markets, 87 have insider-trading laws, but in only 38 of them has enforcement — as evidenced by prosecutions — taken place. Before 1990, the respective numbers were 34 and 9. **Bhattacharya** and **Daouk** ask if this matters, because no study has yet documented empirically whether prohibitions against insider trading affect the cost of equity. They find that indeed it is the enforce-

ment, not the existence, of insider-trading laws that matters. The cost of equity in a country (after controlling for risk factors, a liquidity factor, and other shareholder rights) is reduced by about 5 percent if insider-trading laws are enforced, they conclude.

By estimating the location and magnitude of price discovery across three informationally linked stock exchanges, **Harris, McInish**, and **Wood** can detect trades that permanently move the markets. They argue

that after coincident but unequal price changes in synchronous trades, discovery of the new equilibrium price occurs in that trading venue to which other markets error correct. Common factor estimation (Gonzalo and Granger, 1995) summarizes each market's proportion of the price discovery in this error-correction sense. Across the Dow Jones Industrial Average (DJIA) stocks in 1988, the average common factor weight for the NYSE (72 percent) closely

matched its share of the trades. The centralized market was "information dominant." However, by 1992 the proportion of the price discovery attributable to the NYSE had declined precipitously for 27 of the DJIA stocks, averaging only 49.6 percent. The NYSE's share of price discovery recovered substantially by 1995. The authors' tests confirm that these changes in the location of price discovery over time are statistically significant.

## Japan Project Meeting

Members and guests of the NBER's Japan Project met in Cambridge on May 12 and 13. Junzo Hayashi, NBER and University of Tokyo, and Anil K. Kashyap, NBER and University of Chicago, organized the meeting. The formal program for the second day was:

**Elijah Brewer III**, **Hesna Genay**, and **William Curt Hunter**, Federal Reserve Bank of Chicago, and **George G. Kaufman**, Loyola University, "Does the Japanese Stock Market Price Bank Risk? Evidence

from Financial Firm Failures." Discussant: Eric S. Rosengren, Federal Reserve Bank of Boston.

**Ben S. Bernanke**, NBER and Princeton University, "Japanese Monetary Policy: A Case of Self-Induced Paralysis?"

Discussant: Koichi Hamada, Yale University.

**Takao Kato**, Gakushu University, "The Recent Transformation of Participatory Employment Practices in Japan."

Discussant: Lisa M. Lynch, NBER

and Tufts University.

**Yasushi Hamao**, University of Southern California, and **Takao Hoshi**, NBER and University of

California, San Diego, "Bank Underwriting of Corporate Bonds: Evidence from Post-1994 Japan." Discussant: Vignay Venkai, Hebrew University.

**Junzo Hayashi**, "Is There a Liquidity Effect in the Japanese Interbank Market?"

Discussant: Craig Furline, Bank of International Settlements.

**Brewer, Genay, Hunter**, and **Kaufman** examine the response in the stock market returns of Japanese commercial banks to the failure of four commercial banks and two securities firms between 1995 and 1998. They find that the stock market in general did respond to new information about the failures, and it did so rationally. Financially weaker banks were more adversely affected than healthier banks by the failure of other banks and financial institutions. This suggests that the Japanese stock market is more efficient, even for banks, than often perceived.

**Bernanke** argues that excessively tight monetary policy is an important factor inhibiting the recovery of the Japanese economy. Although it is true that additional open-market purchases would be of little help in the current zero interest-rate environment, there are several nonstandard approaches for "reflating" the economy that might be worth trying. These include large-scale acquisition of foreign reserves to depreciate the yen.

Using both quantitative data from national surveys and qualitative data from field research, **Kato** provides evidence on how Japanese firms used

participatory employment practices during the economic slowdown of the 1990s and the recent financial crisis. Overall, he finds such practices to be enduring (except for small- to medium-size firms with no union where management seemed to try to weaken the role of employee participation). However, even for large, unionized firms, **Kato** sees a few early signs of trouble, which might eventually result in the breakdown of the participatory system if left untreated. For example, although the number of full-time union officials has been falling as a result of the continued

downsizing of the labor force, the amount of time and effort that union officials need to put into participatory employment practices has not been falling. This uncompensated increase in workload for union officials could lead labor representatives on joint labor management committees to become less prepared and less committed to the interest of the rank and file. Second, top management sometimes finds the participatory system to be detrimental to timely and efficient management and thus tries to streamline it. Overloaded union officials may offer less resistance to this type of management initiative. Finally, the current system tends to produce a gap between top union officials and their general membership in the quantity and quality of information acquired from management. It is conceivable that such a gap could result in the breakdown of the participatory system.

In 1993, the corporate bond market in Japan underwent a major change: the Financial System Reform Act

allowed banks to enter the underwriting business by setting up securities subsidiaries. **Hamao** and **Hoshi** analyze yield differentials between issues underwritten by bank subsidiaries and those underwritten by securities houses. They show that investors discount corporate bonds underwritten by bank-owned subsidiaries because they suspect conflict of interest. Bank-owned subsidiaries, on the other hand, try to avoid this conflict by underwriting bonds intended for institutional investors and bonds issued by firms with weak main-bank ties. While investors' suspicions of conflict of interest may put bank-owned subsidiaries at a disadvantage with respect to incumbent security houses, this study suggests that an aggressive entry strategy on the part of bank-owned subsidiaries has offset the disadvantage so far. In light of the recent repeal of the Glass-Steagall Act, these findings will be of particular interest to observers of the changing nature of the securities business in the United States.

**Hayashi** asks whether there is a liquidity effect in the Japanese inter-bank market for overnight loans. If the reserve requirement is the only reason for banks to hold reserves, then the demand for reserves should be infinitely elastic at the overnight rate that is expected to prevail for the rest of the reserve maintenance period. If, however, reserves are also useful for facilitating transactions between banks, then the demand curve will be downward-sloping as a function of the overnight rate. If the demand curve is downward-sloping, not horizontal, at the observed level of reserves, then there is a liquidity effect. Hayashi's results indicate that the large injection of reserves by the Bank of Japan after the Yamaichi debacle was not enough to eliminate the liquidity effect. The evidence in this paper is consistent with the view that the Bank's desk behaved optimally before and after the Yamaichi debacle.



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### **The Role of Foreign Direct Investment in East Asian Economic Development**

*The Role of Foreign Direct Investment in East Asian Economic Development*, edited by Takatoshi Ito and Anne O. Krueger, is now available from the University of Chicago Press for \$60. This is Volume 9 in the series NBER-East Asia Seminar on Economics.

The papers in this volume focus on the microeconomic determinants and effects of foreign direct investment (FDI), the overall structure of FDI, case studies of individual countries, and placing these findings within the context of current economic theory. The book's introduction, 12 papers, and 24 commentaries are developed from materials presented at a conference in Osaka, Japan, in June 1998.

Both Ito and Krueger are NBER Research Associates in the Program on International Finance and Macroeconomics. Ito is also a professor in the Institute of Economic Research at Hitotsubashi University and currently on leave and serving as Deputy Vice Minister for International Affairs in Japan's Ministry of Finance. Krueger is the Herald L. and Caroline L. Ritch Professor of Economics, a senior fellow of the Hoover Institution, and director of the Center for Research on Economic Development and Policy Reform at Stanford University.

### **Capital Flows and the Emerging Economies: Theory, Evidence, and Controversies**

*Capital Flows and the Emerging Economies: Theory, Evidence, and Controversies*, edited by Sebastian Edwards, is available from the University of Chicago Press for \$50. This book treats the large movements of capital that triggered the international currency crisis of 1998 and focuses particularly on the emerging economies of East Asia, Latin America, and Eastern Europe.

This NBER conference volume includes an introduction, nine papers, and eight commentaries divided into three sections: "Capital Flows to Developing Countries: Theoretical Aspects," "Cross-Country Evidence," and "Capital Flows to Latin America, Asia, and Eastern Europe."

Edwards is a Research Associate in the NBER's Programs on International Finance and Macroeconomics and International Trade and Invest-

ment. He is also the Henry Ford II Professor of International Economics at the Anderson Graduate School of Management, University of California, Los Angeles.

### **The Impact of International Trade on Wages**

*The Impact of International Trade on Wages*, edited by Robert C. Feenstra, is available from the University of Chicago Press for \$62.

Since the early 1980s, the U.S. economy has experienced a growing wage differential between low- and high-skill workers. Has international trade and labor market globalization devalued low-skill jobs? Has technological change increased the returns to high-skill jobs? This NBER Conference Report brings together new ideas and data sources to suggest other possibilities and to assess the specific impact of international trade on U.S. wages. It offers a thorough appraisal of the changes in the wage distribution, examining the continued effects of technology and globalization on the labor market.

The volume's editor, Robert C. Feenstra, is Director of the NBER's Program on International Trade and Investment and a professor of economics at the University of California, Davis.

## Currency Crisis

*Currency Crises*, edited by Paul Krugman, will be available in August from the University of Chicago Press for \$47.

Currency crises occur when investors flee a currency in large numbers out of concern that it might be devalued (further), thereby fueling precisely the devaluation that they feared. Although there has been considerable experience recently with currency crises — including, for example, the Latin American debt crisis of the 1980s, the speculations on European currencies in the early 1990s, and the ensuing Mexican, South American, and Asian crises — many questions about their causes and effects remain to be answered. This volume, the result of a conference held in Cambridge in February 1998, investigates three such issues: What drives currency crises? How do we model government behavior? And, what are the actual consequences of these crises to the real economy?

Krugman is a Research Associate in the NBER's Programs on International Finance and Macroeconomics and International Trade and Investment and a professor of economics at Princeton University.

## Concentrated Corporate Ownership

*Concentrated Corporate Ownership*, edited by Randall K. Morck, is available from the University of Chicago Press for \$62.

In most countries, ownership of corporations is concentrated in the hands of a few major stockholders, while U.S. and U.K. firms generally are widely held. This interdisciplinary volume, based on a conference held in June 1998, contributes to the current debate about the problems and opportunities associated with concentrated corporate ownership. There are 11 papers and discussions in the volume. It is divided into three parts: "The Origins of Ownership Structure," "The Law and Concentrated Corporate Ownership," and "Economic Effects of Concentrated Corporate Ownership."

Morck is the Stephen A. Jarislowsky Distinguished Professor of Finance in the School of Business at the University of Alberta. He has published extensively on corporate governance.

## Administrative Aspects of Investment-Based Social Security Reform

*Administrative Aspects of Investment-Based Social Security Reform*, edited by John B. Shoven, will be available in August from the University of Chicago Press for \$38.

This NBER conference volume presents the first comprehensive analysis of the detailed issues involved in administering a system of private accounts as part of Social Security. Exploring the range of options, the contributors agree that the administrative costs of individual accounts could be significant, but that the implementation of a prudently designed system could lower those costs substantially.

The volume's editor, John B. Shoven, is an NBER Research Associate in the Programs on Aging and Public Economics and the Charles R. Schwab Professor of Economics at Stanford University.



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