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# NBER Reporter

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## Program Report

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## Political Economy

**Alberto F. Alesina\***

The Political Economy Program is new at the NBER, and thus needs an introduction. What is political economics? And, why has the NBER chosen to have a program in it?

The best way to answer is to set back the clock to the mid-1980s. This was a time of great turmoil and transformation in the American economy. President Reagan was in the middle of his “revolution”: there were large deficits, taxes were being cut, and the economy was being deregulated. Continental Europe, in contrast, was entering a long period of sclerosis: some countries in Europe (but not all) had accumulated debt that was rising towards wartime levels. The need for structural reforms and liberalization in Europe was evident, but they were delayed. A dozen European countries were heading towards uncharted territories of monetary, and some sort of political, union. Latin America was in the midst of a huge debt crisis and a “lost decade”, with very high or even hyperinflations, foreign debt defaults, and large budget deficits. Unavoidable policy reforms were delayed, increasing the economic costs and leading to crisis. The

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*\*Alesina directs the NBER's Program on Political Economy and is a professor of economics at Harvard University.*

### Feldstein to Step Down as NBER President in June 2008

Martin Feldstein told the NBER Board of Directors that he will make this his last year as president of the NBER, a position he began in 1977. He will continue as an active NBER Research Associate as well as a professor of economics at Harvard. The NBER Board has established a search committee under the Chairmanship of NBER Director Michael Moskow, a former NBER Board Chairman and retired president of the Federal Reserve Bank of Chicago. The Board plans to elect Professor Feldstein's successor at its meeting in April 2008.

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Soviet Bloc was about to collapse; when it did, it opened a Pandora's box of politico-economic questions.

It was increasingly difficult to fit all of these complexities and varieties of experiences into traditional models of economic policy in which benevolent social planners maximize the utility of a representative individual. Some economists started exploring how political forces affected the choice of policies, paying special attention to distributive conflicts and political institutions, which are absent in representative agent models.

Let's be clear: they had predecessors; they were not building from scratch. The "Public Choice School" of Buchanan, Tullock, and associates had made contributions that cannot be overemphasized, especially in constitutional theory (together with Hayek), and in modeling politicians as self-interested agents. But, it remained on the sideline of mainstream economics, and the responsibilities lie on both sides. The Public Choice School refused to embrace the methodology of the field, which was in great transformation in the mid-1970s with the rational expectations revolution, game theory, and advances in econometrics. Traditional economists did not look outside the box, and ignored, with a hint of intellectual arrogance, the important contribution of Public Choice. There were exceptions: some economists made important contributions that were in a sense ahead of their time, from Becker's model of lobbies, to Nordhaus's political business cycle model, just to name two.

But from the mid-1980s onward, the new (or "renewed") field of political economics became more and more mainstream and established: in fact, it has been one the most rapidly growing and exciting field in economics. Even a cursory look at the NBER Working Paper series from the late-1980s onward reveals that, in a variety of different programs, political economics was more and more present: in macroeconomics, closed and open, from trade to public finance to labor, even in finance. Therefore, it makes sense to have a program that provides a home for those working in the field. However, perhaps to a larger extent than in other areas of research, any work that is broadly defined as political economics will continue to be represented in other programs as well.

The first phase of research in this area is well summarized, systemized, and extended in

three important books by Allan Drazen, Torsten Persson, and co-authors Guido Tabellini, Gene Grossman, and Elhanan Helpman, all conceived and written around the mid- to late-1990s. The research summarized here involves reasonably “traditional” topics: the influence of elections on the choice of economic policy; determinates of electoral outcomes; strategic manipulation of policies (especially fiscal policy); central bank independence; redistributive conflicts in fiscal policy; the political economy of delayed reforms in developing countries and of excessive deficits, lobbying models, fiscal federalism, and political business cycles.

Since the late-1990s, the field has taken on even more challenging topics. For instance: where do institutions come from? What is the origin of certain political institutions? How quickly do institutions change? What is the role of culture in explaining economic outcomes and developments? How does culture evolve? What is the role of ethnic identity in explaining economic conflict, success and failures? What explains why countries stay together or break apart and the size of nations? What is the role of the press in influencing individual political opinions?

The richness and variety of these questions is one of the reasons why the NBER Working Paper list in Political Economics and the Program Meetings in this area covers extremely diverse issues; it is impossible to mention them all, or even to group them in a few sub-sections. What follows is a sample of a few recent papers published by NBER in the Political Economics Program and/or presented in one of the Political Economics Program Meetings.

## Democracy and Development

This is, of course, a hugely important topic. Does development deliver democracy or does a transition to democracy foster development? This question, studied for years by both economists and political scientists, is still hotly debated. In fact, several recent papers have addressed

various aspect of it. Recent results by Persson and Tabellini suggest that previous papers underestimated the positive effects of democracy on growth.<sup>1</sup> Aghion, Alesina, and Trebbi argue that democracy becomes especially useful to growth in more advanced sectors of the economy that need more freedom of innovation and flexibility, so the benefits of democracy are increasing with income per capita.<sup>2</sup> An efficient democracy also needs education and human capital—otherwise, it may not survive, as discussed by Glaeser, Ponzetto, and Shleifer.<sup>3</sup> But others (Acemoglu, Johnson, Robinson, and Yared) question the effects of education and per capita income as determinants of democratic institutions.<sup>4</sup> The difficulty of establishing efficient democracies is emphasized in papers by Acemoglu, Ticchi, and Vindigni; Acemoglu and Robinson; and Besley and Persson.<sup>5</sup> Further, Persson and Tabellini,<sup>6</sup> using a concept of “democratic capital” that captures the solidity of democratic rule, have examined transitions in and out of democracy, and the stability of the latter. Indeed, some regimes are more stable than others and often the fate of dictators and democracies may be influenced by events as unpredictable as successful versus unsuccessful assassination of leaders, a point made by Jones and Olken.<sup>7</sup>

## Culture, Ethnicity, and the Formation of Beliefs

Perhaps at some deep level, cultural traits matter for economic choices and behavior, and they are profoundly different across nationalities. Political economists have just begun to investigate measurements of different cultures and their effects on politico-economic choices. Giuliano and I emphasize how different family structure affects many economic decisions, especially by measuring family ties, namely how tightly integrated families are.<sup>8</sup> Cultural traits may negatively affect incentives to grow, as argued by Tabellini.<sup>9</sup> But where does culture come from? It may come from past experience; for instance Fuchs Schuendeln and I study the effects of Communism on

preferences for state intervention in post-Communist societies.<sup>10</sup> Culture evolves over time through transmission in families, a point made by Tabellini in a paper that examines the evolution of beliefs and trust.<sup>11</sup> Washington studies how children may affect the political beliefs of their parents.<sup>12</sup> Glaeser and Sacerdote study reversal of preferences in response to economic shocks.<sup>13</sup>

Cultural traits often are associated with ethnicity, language, and religion, and they evolve with history. Guiso, Sapienza, and Zingales study how cultural barriers may impede trade; Spolaore and Wacziarg explore how the diffusion of technology is facilitated by closeness, in terms of ethnicity, language, and culture; they find that it is.<sup>14</sup> However, Giuliano, Spilimbergo, and Tonon argue that geographical features may be what really explain ethnic distance.<sup>15</sup> Ethnic conflict may cause policy failures, even state failure and wars, especially if political borders do not well serve ethnic groups and interests, a point investigated by Easterly, Matuszeski, and me.<sup>16</sup> Even within the United States, it is well known that racial and ethnic animosity affect policy choices and social capital. In an experiment based on the relief efforts for Hurricane Katrina, Fong and Luttmer find somewhat unexpected results.<sup>17</sup>

The press and the media are certainly major contributors to the formation of beliefs. In fact, several papers recently have studied what determines media ideological inclinations and their effects. Gentkow and Shapiro study newspapers’ slant; Della Vigna and Kaplan and Oberholzer-Gee and Waldfogel study the effects of television on electoral outcomes in the United States.<sup>18</sup> Olken studies the effect of television on social capital in Indonesia.<sup>19</sup>

## U.S. Elections

Several papers, with new tools and new points of view, have examined an “old” topic in political economics: how to predict U.S. elections and how to evaluate their impact on the economy. Leigh and Wolfers compare different approaches



for predicting elections, and Wolfers and Zitzewitz focus in particular on close elections and their ex-ante unpredictability, a topic investigated in a different context by Chang.<sup>20</sup>

Snowberg studies the effect of elections on policies, using unpredictable elections to isolate “shocks.”<sup>21</sup> Vigdor and Mullainathan and Washington investigate voters’ motivation and rationality.<sup>22</sup> Belonging to a prominent family of politicians implies an electoral advantage, as shown by Dal Bo, Dal Bo, and Snyder who consider the entire history of the U.S. Congress.<sup>23</sup> Snowberg, Wolfers, and Zitzewitz study the effect of elections on policies, disentangling issues of reverse causality.<sup>24</sup>

## Institutions and Policy Outcomes

One of the central themes in political economics has been and continues to be the effect of different political institutions on economic outcomes. Using a theoretical model, Caselli and Gennaioli study how different voting rules and institutional structures make policy reforms more difficult; Ardagna, Trebbi, and I empirically consider a vast sample of countries asking what forces make policy reforms more likely to occur and to be successful.<sup>25</sup> Brander and Drazen ask what determines the occurrence of political business cycles in various institutional settings.<sup>26</sup> Political distortions and deficits are the subjects of Robinson and Torvik, Battaglini and Coate, and a paper by Tabellini and me; Grossman and Helpman study pork barrel policies, the budget process, and trade policy; Rajan and Zingales look at unemployment, and Shoven and Slavos focus on social security.<sup>27</sup> The role of competition in political markets is the subject of Mulligan and Tsui.<sup>28</sup> Trebbi, Aghion, and I also study the effects of electoral rules with an application to U.S. cities.<sup>29</sup>

## Corruption: Measures and Effects

In the last several years the topic of government corruption, especially in

developing and middle-income countries, has been the center of attention for not only academics but also policymakers. Should foreign aid and credit flow to countries run by corrupt governments or should support be stopped? The question is very important and therefore understanding corruption is essential. Often the perception of corruption may be different from reality, a topic tackled by Olken in reference to Indonesia.<sup>30</sup> He shows that perception and reality often differ predictably. Corruption in Indonesia, especially in local government, is also the topic of Henderson and Kuncoro.<sup>31</sup> Olken and Barron study whether corruption in trucking levies in Turkey is consistent with an efficient model of rent extraction: they conclude that it is.<sup>32</sup> Padro I Miquel focuses on rent extraction by rulers in Africa.<sup>33</sup> Ferraz and Finnan focus on local governments in Brazil.<sup>34</sup>

Corruption may have long lasting major consequences. It may interfere with the development of liberal democracies, as pointed out by Di Tella and McCulloch.<sup>35</sup> It may also make it difficult to enforce an embargo against countries, as shown by Della Vigna and La Ferrara.<sup>36</sup>

## Conclusion

This brief and incomplete survey of papers recently issued and discussed in the Political Economic group highlights the wide variety of exciting topics covered in the field. It is impossible to review every paper of the group, especially since this is the first report and there is a “stock” of papers to be highlighted. I should conclude with the observation that the Political Economy group has provided a useful public good for the profession: a paper by Kim, Morse, and Zingales has examined the pattern of citation of economic articles in economics.<sup>37</sup> This is a paper that has made many economists happy and proud, and many disappointed!

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<sup>1</sup> T. Persson and G. Tabellini, “The Growth Effect of Democracy: Is It Heterogeneous and How Can It Be Estimated?” NBER Working Paper No.

13150, June 2007; and T. Persson and G. Tabellini, “Democracy and Development: The Devil in the Details,” NBER Working Paper No. 11993, February 2006.

<sup>2</sup> P. Aghion, A. F. Alesina, and F. Trebbi, “Democracy, Technology, and Growth,” NBER Working Paper No. 13180, June 2007.

<sup>3</sup> E.L. Glaeser, G. Ponzetto, and A. Shleifer, “Why Does Democracy Need Education?” NBER Working Paper No. 12128, April 2006.

<sup>4</sup> D. Acemoglu, S. Johnson, J. A. Robinson, and P. Yared, “From Education to Democracy?” NBER Working Paper No. 11204, March 2005.

<sup>5</sup> D. Acemoglu, D. Ticchi and A. Vindigni, “Emergence and Persistence of Inefficient States,” NBER Working Paper No. 12748, December 2006; D. Acemoglu and J. Robinson, “Persistence of Power, Elites, and Institutions,” paper presented in a POL Program Meeting, 2005; T. Besley and T. Persson, “The Origins of State Capacity: Property Rights, Taxation, and Politics,” NBER Working Paper No. 13028, April 2007. See also D. Acemoglu, “Modeling Inefficient Institutions,” NBER Working Paper No. 11940, January 2006, and, “Politics and Economics in Weak and Strong States,” NBER Working Paper No. 11275, April 2005.

<sup>6</sup> T. Persson and G. Tabellini, “Democratic Capital: The Nexus of Economic and Political Change,” paper presented in a POL Program Meeting, 2006.

<sup>7</sup> B. F. Jones and B. A. Olken, “Hit or Miss? The Effect of Assassinations on Institutions and War,” NBER Working Paper No. 13102, May 2007.

<sup>8</sup> A. F. Alesina and P. Giuliano, “The Power of the Family,” NBER Working Paper No. 13051, April 2007.

<sup>9</sup> G. Tabellini, “Culture and Institutions: Economic Development in the Regions of Europe,” paper presented in a POL Program meeting, 2005.

<sup>10</sup> A. F. Alesina and N. Fuchs Schuendeln, “Goodbye Lenin (or not?): The Effect of Communism on People’s Preferences,” NBER Working Paper No. 11700, October 2005.

<sup>11</sup> G. Tabellini, “Incentives and Social

Norms," paper presented at a POL Program Meeting, 2007.

<sup>12</sup> E. Washington, "Female Socialization: How Daughters Affect Their Legislator Fathers' Voting on Women's Issues," NBER Working Paper No.11924, January 2006.

<sup>13</sup> E. L. Glaser and B. Sacerdote, "Aggregation Reversals and the Social Formation of Beliefs," NBER Working Paper No.13031, April 2007.

<sup>14</sup> L. Guiso, P. Sapienza, and L. Zingales, "Cultural Biases in Economic Exchange," NBER Working Paper No.11005, December 2004; E. Spolaore and R. Wacziarg, "The Diffusion of Development," paper presented in a POL program meeting, 2006.

<sup>15</sup> P. Giuliano, E. Spilimbergo, and G. Tonon, "Genetic, Cultural and Geographical Distance," paper presented in a POL Program meeting, 2006.

<sup>16</sup> A. F. Alesina, W. Easterly, and J. Matuszes, "Artificial States," NBER Working Paper No. 12328, June 2006.

<sup>17</sup> C. M. Fong and E.F.P. Luttmer, "What Determines Giving to Hurricane Katrina Victims? Experimental Evidence on Income, Race, and Fairness," NBER Working Paper No. 13219, July 2007.

<sup>18</sup> M. Gentzkow and J. M. Shapiro, "What Drives Media Slant? Evidence from U.S. Daily Newspapers," NBER Working Paper No.12707, November 2006; S. DellaVigna and E. Kaplan, "The Fox News Effect: Media Bias and Voting," NBER Working Paper No.12169, April 2006; F.Oberholzer-Gee and J. Waldfogel, "Media Markets and Localism: Does Local News en Español Boost Hispanic Voter Turnout?" NBER Working Paper No.12317, June 2006.

<sup>19</sup> B. A. Olken, "Do Television and Radio Destroy Social Capital? Evidence from Indonesian Villages," NBER Working Paper No.12561, October 2006.

<sup>20</sup> A. Leigh and J. Wolfers, "Competing Approaches of Forecasting Elections: Economic Models, Opinion Polling, and Prediction Markets," NBER Working Paper No. 12053, February 2006. R. Chang, "Electoral Uncertainty and the Volatility of International Capital Flows," NBER Working Paper No.12448, August 2006.

<sup>21</sup> E. Snowberg, J. Wolfers, and E. Zitzewitz, "Partisan Impacts on the Economy: Evidence from Prediction Markets and Close Elections," NBER Working Paper No. 12073, March 2006.

<sup>22</sup> S. Mullainathan and E. Washington, "Sticking with Your Vote: Cognitive Dissonance and Voting," NBER Working Paper No. 11910, January 2006.

<sup>23</sup> E. Dal Bó, P. Dal Bó, and J. Snyder, "Political Dynasties," NBER Working Paper No. 13122, May 2007.

<sup>24</sup> E. Snowberg, J. Wolfers, and E. Zitzewitz, "Party Influence in Congress and the Economy," NBER Working Paper No. 12751, December 2006.

<sup>25</sup> F. Caselli and N. Gennaioli, "Economics and Politics of Alternative Institutional Reforms," NBER Working Paper No.12833, January 2007. A.F. Alesina, S. Ardagna, and F. Trebbi, "Who Adjusts and When? On the Political Economy of Reforms," NBER Working Paper No. 12049, February 2006.

<sup>26</sup> A. Brender and A. Drazen, "Why is Economic Policy so Different in Old and New Democracies?" paper presented in a POL program meeting, 2006; "How do Budget Cycles and Economic Growth Affect Reelection Prospects?" NBER Working Paper No.11862, December 2005. See also A. Drazen and M. Eslava, "Pork Barrel Cycles" NBER Working Paper No.12190, May 2006, and "Electoral Manipulation via Expenditure Composition: Theory and Evidence," NBER Working Paper No. 11085, January 2005.

<sup>27</sup> J. A. Robinson, and R. Torvik, "A Political Economy Theory on the Soft Budget Constraint," NBER Working Paper No. 12133, April 2006; M. Battaglini and S. Coate, "A Dynamic Theory of Public Spending, Taxation and Debt," NBER Working Paper No. 12100, March 2006; A.F. Alesina and G. Tabellini, "Why is Fiscal Policy often Procyclical?" NBER Working Paper No. 11600, September 2005; G. M. Grossman and E. Helpman, "Party Discipline and Pork Barrel Politics," NBER Working Paper No. 11396, June 2005; R.Rajan and L. Zingales, "The Persistence on Underemployment: Institutions, Human

Capital, or Constituencies," paper presented at a POL Program Meeting, 2005; J. B.Shoven and S. N. Slavov, "Political Risk Versus Market Risk in Social Security," NBER Working Paper No.12135, April 2006; G. M. Grossman and E. Helpman, "Separation of Powers and the Budget Process," NBER Working Paper No.12332, June 2006, and "A Protectionist Bias in Majoritarian Politics," NBER Working Paper No.11014

<sup>28</sup> C. B. Mulligan and K. K. Tsui, "Political Competitiveness," NBER Working Paper No. 12653, October 2006.

<sup>29</sup> P. Aghion, A.F. Alesina, and F. Trebbi, "Choosing Electoral Rules: Theory and Evidence from U.S. Cities," NBER Working Paper No. 11236, April 2005.

<sup>30</sup> B. A. Olken, "Do Television and Radio Destroy Capital? Evidence from Indonesian Villages," NBER Working Paper No. 12561, October 2006.

<sup>31</sup> J. V. Henderson and A. Kuncoro, "Sick of Local Government Corruption? Vote Islamic," NBER Working Paper No. 12110, March 2006.

<sup>32</sup> B. A. Olken and P. Barron, "The Simple Economics of Extortion: Evidence from Trucking in Aceh," NBER Working Paper No. 13145, June 2007.

<sup>33</sup> G. Padro i Miquel, "The Control of Politicians in Divided Societies: The Politics of Fear," NBER Working Paper No. 12573, October 2006.

<sup>34</sup> C. Ferraz and F. Fynn, "Electoral Accountability and Corruption in Local Governments: Evidence from Audit Reports," paper presented at a POL Program Meeting, 2006.

<sup>35</sup> R. Di Tella and R. McCulloch, "Why Doesn't Capitalism Flow to Poor Countries?" NBER Working Paper No. 13164, June 2007.

<sup>36</sup> S. Della Vigna and E. La Ferrara, "Detecting Illegal Arms Trade," presented at a POL Program Meeting, 2007.

<sup>37</sup> E. H. Kim, A. Morse, and L. Zingales, "What Has Mattered to Economics Since 1970?" NBER Working Paper No. 12526, September 2006.

# The Market for Scientists and Engineers

Richard B. Freeman\*

The job market for scientists and engineers has moved to the forefront of national policy concerns for the first time since the launching of the Sputnik satellite in 1957. Diverse business, education, and science groups have issued Cassandra-style reports on the state of U.S. science and engineering. The most prominent of these, the National Academy of Science's "Rising Above the Gathering Storm" (2006), suggested that the United States risked losing its leadership in science and technology, with dire consequences for the economy and for national security; the report called for increased R and D spending and new policies to attract more young Americans into science and engineering careers. Concurring with these assessments, President Bush in his 2006 State of the Union Address announced the American Competitiveness Initiative to "ensure a continuous supply of highly trained mathematicians, scientists, engineers, technicians, and scientific support."

My recent research on the science-engineering job market has focused on exactly what has generated the widespread worry about the market for scientists and engineers and what changes in the career prospects for scientists and engineers might insure future supplies of such workers.

*\* Freeman directs the NBER's Program of Research on Labor Studies and holds the Herbert Ascherman Chair in Economics at Harvard University. His profile appears later in this issue.*

## What! Me Worry?

Concerns about the science and engineering job market are not rooted in a classic labor market shortage. The earnings of scientists and engineers are not rising rapidly, relative to other highly educated workers. There are no massive job vacancies in academe, business, or government. If rapidly rising pay is the primary signal of a market shortage, then the United States has a shortfall of CEOs, professional athletes, entertainers, and hedge fund managers, not scientific and engineering specialists.

The number of science and engineering workers in this country has increased at an annual rate of 2.7 percent — which far exceeds the rate of growth of the work force. The number of bachelors and masters graduates in the fields has trended upward. The supply of Ph.D.s in science and engineering has roughly stabilized at about 28,000 per year, more than enough to keep the stock of Ph.D. specialists rising.

Why then is the leadership of the country so worried about the market for scientists and engineers? One reason is that the United States is losing its dominance in science and engineering. The U.S. share of the world's science and engineering students and employees in the world is falling. So too is the country's share of R and D, papers and citations in scientific journals, and high tech exports. But with just 5 percent of the world's population, it is impossible for the United States

to maintain the 35 percent to 45 percent share of science and engineering activity that it had at the end of the twentieth century. The rest of the world has invested in higher education and R and D. The European Union has rebuilt and expanded its university system. In 2001 it graduated 50 percent more Ph.D.s in science and engineering than did the United States and it is on track to double the number of U.S. graduates in 2010. China, India, and the ex-Soviet bloc have joined the global economy, greatly increasing the number of young persons choosing science and engineering careers. In response, the multinationals that do much of industrial R and D have begun to locate research facilities in those countries, as well as hiring specialists from the global talent pool for work in the United States. Today and into the foreseeable future, more and more specialists in different countries will be adding to the stock of useful knowledge and will enable the world to make better goods and services. Some will do their work in the United States, but many will not.

As other countries become more competitive in knowledge production and in its application to the economy, the United States will lose its comparative advantage in high tech and see the gains from that trade diminish. Some fear that this will harm U.S. workers. One of the selling points of NAFTA was the promise that trade meant good jobs for Americans and menial jobs for workers in developing countries. The North-South or product life-cycle models of trade and tech-



nology predict such an outcome. These models assume that the United States (other advanced countries) has large supplies of scientists and engineers that give them a monopoly on R and D and new technology. U.S. wages are higher than those of otherwise comparable workers elsewhere because they work with the new technology. The faster the rate of the technological progress relative to the rate of diffusion of technology to developing countries, the higher are wages in the United States.

In a world in which highly populous, low income China and India invest heavily in higher education, this model no longer represents reality. The quantity and quality of scientists and engineers in those locales, and in other low-wage countries, as well as in advanced Europe and Japan, has increased. To the extent that production follows the R and D, the spreading of science and engineering reduces the first mover advantages that U.S. workers once had in production and thus their competitiveness in the global economy.

Another reason for concern relates to national security, since it is the technological superiority of the U.S. military on which the country's defense largely rests. If foreign countries can compete in R and D, they may be able to compete in military technology, as the Soviet Union did years ago.

Competition among countries aside, there is another reason for the concerns about the state of science and engineering in the United States. Because the United States is the lead country on the technological frontier in many industries, the various groups believe that it must keep advancing that frontier to maintain productivity and that U.S. R and D has failed to keep pace. To the extent that the social return to R and D exceeds the private return, particularly for basic science, the country is missing a chance for economic growth.

The long-term level of expenditures on R and D relative to U.S. GDP has stabilized at around 2.6 to 2.7 percent of GDP. Industry has increased its share of spending from about one third in the 1960s to nearly two thirds in 2006. The

concern thus is about the failure of federal funding to keep pace with the growth of the economy. Many complain about a reduced time horizon and narrowing of the focus of R and D when global warming and rising energy prices suggest the need for greater basic research spending.

But the problem with federal spending goes beyond dollar amounts. The U.S. government greatly expanded its R and D spending in two areas in the past decade. Between 1996 and 2002, it doubled spending on the National Institute of Health. And beginning in the 2000s, it has increased spending substantially on nano-technology. The NIH spending might have been expected to create a boom in the job market for bioscientists, but it did not. Most of the research awards went to senior scientists, who hired graduate students and newly minted Ph.D.s from the United States and overseas to work as post-docs in their labs. The chances that young scientists would gain a grant on their own fell to negligible proportions. And, with universities hiring few new tenured faculty members, the chances for post-docs to move into independent research positions dropped as well. With NIH spending no longer increasing, the increased number of post-docs has created a market glut and dissatisfaction among scientists who cannot get research projects funded.

Finally, some of the concern about scientists and engineers has been linked to a huge change in the demographic composition of U.S. supplies. In 1966, 71 percent of Ph.D. graduates were U.S.-born males, 6 percent were U.S. born-females, and 23 percent were foreign born. In 2000, 36 percent of graduates were U.S.-born males, 25 percent were U.S.-born females, and 39 percent were foreign-born. In the 1990s, the United States roughly doubled the foreign-born share of its science and engineering work force. The ability of the United States to attract highly able foreign-born students and immigrant scientists and engineers reflects on the excellence of U.S. higher education and the work environment. But huge increases in supply make these careers less attractive to the native-born.

## The Supply Curve is Positively Sloped

To investigate the role of supply incentives on the decision to invest in a science and engineering doctorate, Tanwin Chan, Hanley Chiang, and I have examined data on the 200,000 or so applicants to the National Science Foundation's highly prestigious Graduate Research Fellowship Award (GRF) from the program's inception in 1952 to 2004. We analyzed the determinants of the number and characteristics of applicants and winners of the GRF. Since the award provides financial support for graduate studies and signals top students that they have the appropriate skills to undertake graduate training, it can affect career decisions to enter science or engineering or to go to other high-level occupations. If the United States wanted to increase the number of citizens doing graduate work in these fields, and if students responded to the incentive of the rewards, then the GRFs would be a valuable policy tool to deal with the concerns

The first important thing that we learned about these awards is that the United States gave approximately the same number—1,000 or so—in the 2000s as it gave in the 1960s, when there were only one third as many Bachelors of Science graduates per year. This meant that science and engineering graduates with bachelors' degrees had a much lower chance of getting an NSF grant than 40–50 years ago—an unintended negative signal to students about the value the country places on scientific and engineering careers.

Our analysis also found huge variation in the dollar value of the awards relative to the level of prices and to the earnings of college graduates over time. In 1999 the NSF decided that the awards had lost economic attractiveness; it doubled their value over the next five years to \$30,000. The supply response of students in terms of the number of applicants was in turn huge, nearly doubling as well.

We estimated supply responses to the number and relative dollar value of NSF awards in various ways. Since we did not know what "alternative" careers the appli-



cants for NSF awards might be considering, or indeed if applicants who do not get an award will go on in science, our favored measure was a simple figure that linked the proportion of grant applicants to Bachelor of Science graduates, to NSF spending on GRFs, and finally to GDP—the relation was remarkably tight. In addition, when the value of the award went up, the NSF got enough top applicants that it was able to choose nominally better candidates (in terms of GRE scores, for instance).

What about the determinants of who wins an NSF award? We examined the field, gender, racial composition, and undergraduate college of GRF applicants and recipients over time. In the early years of the program, the awards went largely to white men in physical sciences and mathematics, but increasingly over time large proportions have gone to students in the biological sciences, social sciences, and engineering, and to women and minorities. Indeed, in 2004 over half of the recipients of the awards went to women. Our analyses showed that GRE scores, grades, and the quality of undergraduate institu-

tions affected the probability of winning an award. We also found that there were many applicants who did not win the awards whose measured skills were only marginally lower than those of the winning applicants. This is consistent with the notion that there is a substantial supply of able students on the margin of science and engineering, if the country were to increase the number of awards.

## Conclusions

Given the attraction of the United States as a place to work for scientists and engineers, the potential that the country will experience a genuine labor market shortage seems remote, barring some dramatic closing of our borders. If the United States increases R and D spending, as recommended by many of the business, education, and government committees, then the demand for scientists and engineers will increase. My research indicates that any increase in demand can be met by increases in the supply of young Americans through improved stipends for graduate students and by continuing to

attract foreign-born students and specialists to the country.

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# The Structure of Social Security and Medicare

John B. Shoven\*

In the past three years, I have co-authored a series of papers on the structure of Social Security and Medicare with Sita Nataraj Slavov and Gopi Shah Goda. These studies were supported by the Social Security Administration in a series of grants to the NBER as part of the SSA Retirement Research Consortium.

Rather than construct yet another Social Security reform proposal, in this series of papers we examine certain features of Social Security (and, in one case, Medicare) that affect saving and labor force participation in the economy. Our view is that a close inspection of Social Security and Medicare reveals a number of features and incentives that are not widely understood. For instance, we find that federal government budget accounting has contributed to the failure of the Social Security Trust Fund to help soften the burden of the retirement of the babyboomers. We also find that the existing Social Security benefit structure is incorrectly characterized as low-risk defined benefit plan. In fact, we find that the social security benefit formulae have changed considerably over time in the United States and changed even more dramatically in Europe. The economic and political risk of traditional pay-as-you-go social security is far greater than widely appreciated.

We highlight a number of features of Social Security that discriminate against people who work long careers and we evaluate a number of policy changes that could remove that discrimination. Finally, we find that Medicare contains a high implicit tax on working beyond age 65 through its policy of Medicare as a sec-

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ond payer. Our analysis indicates that Medicare could change this policy so that people eligible for Medicare would receive it whether they worked for an employer with health coverage or not. Given the long-run fiscal challenges faced by the federal government, it is my opinion that all policies that discourage people from working need to be examined carefully.

The first paper in this series, "Has the Unified Budget Undermined the Federal Government Trust Funds?" (NBER Working Paper No. 10953), was written by Sita Nataraj Slavov and me and published in December 2004. We investigate whether one of the purposes of the 1983 Social Security reform has indeed been accomplished. That reform intentionally set the Social Security payroll tax rate above the level needed to pay current benefits for at least the 30-year period between 1984 and 2014. The intention was to convert the system from an almost pure pay-as-you-go operation to a partially pre-funded system. The plan was that this partial pre-funding would ease the burden on future workers during the retirement of the babyboomers. The babyboomers would pay higher than necessary payroll taxes during their working lives so that the succeeding generations of workers would face lower-than-otherwise payroll tax rates. The military and civil service retirement programs followed suit in the mid-1980s by switching from pay-as-you-go financing to funded systems.

Was the planned intergenerational transfer of resources actually accomplished? The excess income generated by these retirement programs was transferred to the rest of the federal government, which issued bonds in return. The bonds were accumulated in federal trust funds, which in total had approximately \$3 trillion by 2004. However, our paper sug-

gests that the trust fund build-up will not help future generations. The failure of the trust funds to alleviate the burden on future workers appears to be at least partly attributable to the adoption of the Unified Budget in 1970. The Unified Budget includes trust fund receipts as income and trust fund payments as expenditures. The effect is that the surplus trust fund receipts reduce the overall federal government unified deficit or increase the overall unified surplus. The empirical evidence suggests that the money transferred from the trust funds to the rest of the government has led to more government spending and to personal and corporate income tax cuts. We find that every dollar that the trust funds have saved and handed over to the rest of the government has been spent. Therefore, there is no evidence that the government as a whole has increased saving as a result of the trust fund accumulations.

The same paper investigates whether the change in the tax mix (higher payroll taxes and lower individual taxes) has led to more private saving, but we could find no evidence for this effect. We conclude that the intergenerational burden sharing attempted by the Greenspan Commission has not occurred. Since there is no evidence that national saving has been increased by the trust fund accumulations, future generations will not have any additional resources to help them pay for the entitlement benefits of the babyboomers.

The second paper in the series, "Political Risk Versus Market Risk in Social Security" (NBER Working Paper No. 12135) by Slavov and me, was published in April 2006. Pay-as-you-go Social Security is typically characterized as a universal defined benefit pension program. Implicit in this characterization is a sense that the participant's investment in future benefits is somehow guaranteed, or safe

from risk. We argue that there cannot be a universal defined benefit system in the first place. Defined benefit retirement programs involve some entities (employers or insurance companies) insuring the safe benefits of others, the participants or workers. In a defined benefit system, investment risks are transferred from one set of parties to another. In a universal system where everyone participates, there is no outside group on whom to transfer the risk. Whatever risks there are in a universal pension program have to be borne by the participants themselves.

Our paper develops the concept of “political risk” as the possibility that legislatures will be forced to change the tax and benefit provisions of pay-as-you-go social security programs when there are changes in the demographic and macroeconomic variables that support it. Thus there is a “political risk” to participants that might be compared to the “market risk” in a personal accounts retirement program.

We carry out a detailed quantitative analysis of political risk in the U.S. Social Security system, as well as an overview of policy reforms in several European countries that demonstrate political risk more broadly across social security systems. For the United States, we compute the internal rates of return (IRRs) from Social Security for various age groups and income levels, using the existing law in effect each year since 1939. We find considerable variation in IRRs through time for any birth cohort. Participants experienced significant declines in IRRs as a result of adjustments made to restore the system’s solvency in 1983 and 1994. If the system had been brought into actuarial balance in 2005, younger cohorts would have experienced another significant decline in their lifetime IRR. Our review of other countries demonstrates considerable political risk in their social security systems as well. The changes in the law necessitated by actuarial imbalances pass demographic risk on to participants.

Our view is that the choice between unfunded legislated Social Security systems and funded individual accounts should be based on portfolio theory.

Both types of systems have considerable risk, but the nature of the risks is different. Traditional Social Security risk stems from uncertainty about demographics and productivity changes. With individual accounts, the risk stems from the variability of stock and bond returns. Elementary portfolio theory suggests that an efficient portfolio would feature both types of pension programs rather than relying exclusively on one type or the other.

The third paper, written by Gopi Shah Goda (who was a research assistant on the first two papers), Slavov, and myself, is “Removing the Disincentives in Social Security for Long Careers” (NBER Working Paper No. 13110), published in May 2007. We find a number of features in the way that Social Security benefits are computed that discourage long working careers. That is, the effective tax rate for working goes up as someone works for a longer period of time. While the payroll tax rate may stay the same for each additional year of work, the extra benefits earned from the extra year of work decline as the career length increases. We define an implicit net tax rate for Social Security, which measures Social Security contributions (that is, taxes) net of benefits accrued as a percentage of earnings. This implicit tax rate increases in an uneven manner for most workers as their career progresses.

In the paper, we examine the effects of three potential changes in the way that benefits are computed on implicit Social Security tax rates: 1) extending the number of years used in the Social Security formula from 35 to 40; 2) allowing individuals who have worked more than 40 years to be exempt from payroll taxes; and 3) distinguishing between lifetime low-income earners and high-income earners who work short careers. These three changes can be achieved in a benefit- and revenue-neutral manner, and create a pattern of implicit tax rates that are much less distortionary over the life cycle, eliminating the high implicit tax rates faced by many elderly workers. We also examine the effects of these policies on the overall progressivity of Social Security and find

only a small effect. Finally, we examine how these changes would affect women relative to men and what other measures could be adopted to mitigate the differential impact. These possible reform measures would harm women somewhat relative to men, but the difference isn’t enormous. We find, for instance, that if women were given one year of Social Security credit for time raising children or caring for elderly parents, that would more than offset the relative harm of these three policy adjustments.

The fourth paper in the series, by the same three authors, is “A Tax on Work for the Elderly: Medicare as a Secondary Payer” (NBER Working Paper No. 13383). Medicare as a Secondary Payer (MSP) legislation was passed in 1982 and became effective in 1983. It requires employer-sponsored health insurance to be the primary payer for Medicare-eligible workers at firms with 20 or more employees. While the legislation was developed to better target Medicare services to individuals without access to employer-sponsored insurance, MSP creates a significant implicit tax on working beyond age 65. This implicit tax is approximately 15–20 percent at age 65 and increases to 45–70 percent by age 80. Eliminating this implicit tax by making Medicare a primary payer for all Medicare-eligible individuals could significantly increase lifetime labor supply because of the high labor supply elasticities of older workers. The extra income tax receipts from such a policy would likely offset a large percentage of the estimated costs of making Medicare a primary payer.

Taken together, these papers highlight features of Social Security and Medicare that are not widely understood and have important unanticipated economic effects. The first paper basically concludes that the intention of the Greenspan Commission to partially pre-fund Social Security simply didn’t work. The combination of trust fund accounting, the unified federal budget, and executive and congressional behavior is such that the attempt by the federal government to save money simply failed.

The second paper concludes that we don't have a defined benefit Social Security system; that there is no risk transfer that would be required; and that existing Social Security systems in both the United States and Europe are actually quite risky for participants. The third paper finds that the U.S. Social Security system discourages long careers by disproportionately taxing work by those who have already worked for a long time. It

analyzes three policies that could be introduced to level the playing field in terms of how people with different career lengths are treated.

Finally, the fourth paper finds that Medicare also can discourage work by the elderly, by requiring them to cover their health insurance costs via their employer if the employer offers such coverage to the rest of its workforce. Replacing Medicare as a Secondary Payer with Medicare as

a Primary Payer would improve work incentives for many people over 65 and would actually cost the government very little in terms of the overall federal budget. In my opinion, it is worth considering these and other measures to restructure Social Security and Medicare to stop discouraging people from working long careers.

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## NBER Profile: *Jean Paul Chavas*

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Jean Paul Chavas was elected to the NBER's Board of Directors in September to represent the American Agricultural Economics Association (AAEA). He is a Professor in the Department of Agricultural and Applied Economics at the University of Wisconsin, Madison.

Born in France, where he received his undergraduate degrees, Chavas holds an M.S. and Ph.D. from the University of Missouri, Columbia. Prior to joining the faculty of the University of Wisconsin in 1982, he taught at Texas A&M University.

He was at the University of Maryland in College Park in 2003–4. In addition to his teaching and research, he has served as a consultant on USAID projects in Tunisia and Burkina Faso.

Chavas's research interests are production economics, risk, quantitative methods, and welfare analysis. He has received a number of awards in recent years for Outstanding Research, and was elected a Fellow of the AAEA in 1994. He enjoys traveling.



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## NBER Profile: *Richard B. Freeman*

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Richard B. Freeman directs the Labor Studies Program at the National Bureau of Economic Research. He also holds the Herbert Ascherman Chair in Economics at Harvard University, serves as Faculty Director of the Labor and Worklife Program at the Harvard Law School, and directs (with Daniel Goroff) the NBER/Sloan Science Engineering Workforce Project. In addition, Freeman is visiting professor at the London School of Economics (LSE) and the Senior Research Fellow in Labour Markets at LSE's Centre for Economic Performance.

Freeman received his Bachelor's degree from Dartmouth College and his Ph.D. from Harvard University. He is a Fellow of the American Academy of Arts and Sciences, of the American Association of Advancement of Science and of Sigma Xi, and has served on five panels of the National Academy of Sciences, including the Committee on National Needs for Biomedical and Behavioral Scientists. He received the Mincer Lifetime Achievement Prize from the Society of Labor Economics in 2006; he was awarded the IZA Prize in Labor Economics in 2007.

Freeman has published over 300 arti-

cles on a wide range of topics including: the job market for scientists and engineers; the growth and decline of unions; the effects of immigration and trade on inequality; restructuring European welfare states; Chinese labor markets; transitional economies; youth labor market problems; crime; self-organizing non-unions in the labor market; employee involvement programs; and income distribution and equity in the marketplace. He also has written or edited more than 35 books, several of which have been translated into French, Spanish, Chinese, and Japanese. His most recent book is *America Works: The Exceptional Labor Market* (2007). He is currently working on ways to give American workers greater voice and higher rewards in economic life.

Freeman, who splits his time between Brookline, MA and London, England, is married to Alida Castillo. They have a teen-aged son, Morgan, and a daughter, Rhyanna (aka "Spikey"). He was last "Profiled" in the NBER Reporter in 1989, and claims that he looks just as he did in 1989 "due to a magic potion I found known as excitement about labor research."



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## NBER Profile: *Mark Grinblatt*

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Mark Grinblatt was elected to the NBER's Board of Directors at its fall 2007 meeting. Grinblatt, who holds the J. Clayburn LaForce Endowed Chair in Management at UCLA, represents that university on the NBER's Board. He held a Research Associate position in NBER's Program on Asset Pricing prior to being appointed to the board.

Grinblatt received his M.A., M.Phil., and Ph.D. from Yale University and his undergraduate degree from the University

of Michigan. His research and teaching interests focus on financial economics. He is a former president of the Western Finance Association and currently serves on the boards of the American Finance Association and Salomon Swapco, Inc.

His spouse, Rena, is a Professor of Psychology at UCLA. They have two children. He enjoys skiing, mountain biking, and any activity that lets him spend time with his family.

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## NBER Profile: *John B. Shoven*

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John B. Shoven is a Research Associate in the NBER's Programs on Aging, Public Economics, and Economic Fluctuations and Growth. He is also the Charles R. Schwab Professor of Economics at Stanford University and the Wallace R. Hawley Director of Stanford's Institute for Economic Policy Research. He previously served as the Dean of Humanities and Sciences at Stanford.

Shoven received his B.A. in Physics from the University of California, San Diego in 1969 and his Ph.D. in economics from Yale University in 1973. His research interests include: economic demography, Social Security and private pensions; Medicare and health insurance; corporate finance (dividend behavior, mergers and acquisitions, share repurchase); stock and bond returns; mutual funds; federal, personal, and corporate income taxation; and applied general equilibrium analysis. He is currently studying the work incentives embedded in Social Security and Medicare benefit rules, asset allocation and asset location theory, and the long-run future of pension fund saving, including public policy towards pensions. His most recent NBER

Working Paper introduces alternatives to the usual years-since-birth measure of age. The alternatives are based on mortality risk, or the chance of dying within one year.

Shoven is a Fellow of the Econometrics Society and the American Academy of Arts and Sciences. In 2000 he and his co-author, Sylvester Schieber, received the Paul A. Samuelson Certificate of Excellence for their book *The Real Deal: The History and Future of Social Security*. He has written a forthcoming book (WWNorton, April 2008) with George Shultz titled *Putting Our House In Order: A Guide to Social Security and Health Care Reform*. Shoven is Chairman of the Board of Cadence Design Systems, the leading company in the field of electronic design automation. He is also on the board of Exponent and American Century Funds. He is an avid Stanford sports fanatic. In fact, the information screen on his car displays "Beat Cal" every time the car is started. At least in football, recent outcomes have been unfavorable. He also enjoys traveling with his wife, Katie, and his son, Jimmy, who is a senior at Santa Clara University.



## Conferences

### China's Growing Role in World Trade

An NBER conference on “China's Growing Role in World Trade” took place in Chatham, MA on August 3 and 4. NBER Research Associates Robert C. Feenstra, who directs the Bureau's Program of Research on International Trade and Investment, and Shang-Jin Wei of NBER and Columbia University, who recently was on leave at the IMF, organized this meeting. The following papers were discussed:

“The Rising Sophistication of China's Exports: Assessing the Roles of Processing Trade, Foreign Invested Firms, Human Capital and Government Policies”

Authors: **Zhi Wang**, International Trade Commission, and **Shang-Jin Wei**  
Discussant: Galina Hale, Federal Reserve Bank of San Francisco

“An Anatomy of China's Export Growth”  
Authors: **Mary Amity**, Federal Reserve Bank of New York, and **Caroline Freund**, IMF

Discussant: Bin Xu, China Europe International Business School

“China's Local Comparative Advantage”  
Authors: **Haiyan Deng**, The Conference Board, and **James Harrigan**, Federal Reserve Bank of New York and NBER  
Discussant: Chong Xiang, Purdue University

“China and the Manufacturing Exports of Other Developing Countries”

Authors: **Gordon H. Hanson**, University of California, San Diego and NBER, and **Raymond Robertson**, Macalester College  
Discussant: Irene Brambilla, Yale University and NBER

“China's Exports and Employment”

Authors: **Robert C. Feenstra**, and **Chang Hong**, IMF  
Discussant: Michael Dooley, University of California, Santa Cruz and NBER

“Exporting Deflation? Chinese Exports and Japanese Prices”

Authors: **Christian Broda**, University of Chicago and NBER, and **David E. Weinstein**, Columbia University and NBER

Discussant: Joshua Aizenman, University of California, Santa Cruz and NBER

“China's Current Account and Exchange Rate”

Authors: **Yin-Wong Cheung**, University of California, Santa Cruz; **Menzie D. Chinn**, University of Wisconsin and NBER; and **Eiji Fujii**, University of Tsukuba

Discussant: Jeffrey A. Frankel, Harvard University and NBER

“China's WTO Entry: Antidumping, Safeguards, and Dispute Settlement”

Author: **Chad P. Bown**, Brandeis University  
Discussant: Thomas J. Prusa, Rutgers University and NBER

“China's Experience Under the Multifiber Arrangement (MFA) and the Agreement on Textile and Clothing (ATC)”

Authors: **Irene Brambilla** and **Peter K. Schott**, Yale University and NBER, and **Amit Khandelwal**, Yale University  
Discussant: Joseph Francois, Johannes Kepler University Linz

“Agricultural Trade Reform and Rural

Prosperity: Lessons from China”

Authors: **Jikun Huang** and **Yu Liu**, Center for Chinese Agricultural Policy; **Will Martin**, World Bank; and **Scott Rozelle**, Stanford University  
Discussant: Kym Anderson, University of Adelaide

“Trade Growth, Production Fragmentation, and Chinas Environment”

Authors: **Judith M. Dean**, International Trade Commission, and **Mary E. Lovely**, Syracuse University  
Discussant: Arik Levinson, Georgetown University and NBER

“Facts and Fallacies about U.S. FDI in China”

Authors: **Lee Branstetter**, Carnegie Mellon University and NBER, and **C. Fritz Foley**, Harvard University and NBER

Discussant: Stephen Yeaple, University of Pennsylvania and NBER

“Please Pass the Catch-up: The Relative Performance of Chinese and Foreign Firms in Chinese Exports, 1997–2005”

Authors: **Bruce A. Blonigen**, University of Oregon and NBER, and **Alyson C. Ma**, University of San Diego  
Discussant: Raymond Robertson

“China's Outward FDI: Past and Future”

Authors: **Leonard K. Cheng**, Hong Kong University of Science and Technology, and **Zihui Ma**, Renmin University of China  
Discussant: Nicholas Lardy, Peterson Institute for International Economics

As China becomes a major world exporter, its product sophistication — measured by increased similarity between the product structure of its exports and those of the developed countries — has increased rapidly, as has the volume of



its exports. This has generated anxiety in developed countries because the competitive pressure increasingly may be felt outside labor-intensive industries. Using product-level data on exports from different cities within China, **Wang and Wei** investigate the roles of processing trade, foreign invested firms, and government promotional policies—in the form of tax-favored high-tech development zones and export processing zones—in raising the country's export sophistication.

Decomposing China's real export growth, of over 500 percent since 1992, reveals a number of interesting findings. First, China's export structure changed dramatically, with growing export shares in electronics and machinery and a decline in agriculture and apparel. Second, despite the shift into these more sophisticated products, the skill content of China's manufacturing exports remained unchanged, once processing trade is excluded. Third, export growth was accompanied by increasing specialization and was accounted for mainly by high export growth of existing products (the intensive margin) rather than by new varieties (the extensive margin). Fourth, consistent with an increased world supply of existing varieties, **Amiti and Freund** find that China's export prices to the United States fell by an average of 1.6 percent per year between 1997 and 2005, while export prices of these products from the rest of the world to the United States increased by 0.7 percent annually over the same period.

China's trade pattern is influenced not just by its overall comparative advantage in labor intensive goods but also by geography. **Deng and Harrigan** show theoretically that, since trade costs are proportional to weight rather than value, relative distance affects local comparative advantage as well as the overall volume of trade. Their model predicts that China has a comparative advantage in heavy goods in nearby markets, and lighter goods in more distant markets. This theory motivates a simple empirical prediction: within a product, China's export unit values should be increasing in distance. Deng and Harrigan find some evidence for this effect in their empirical analysis on product-level Chinese

exports in 2006, although the effect is small.

**Hanson and Robertson** examine the impact of China's growth on developing countries that specialize in manufacturing. Over 2000–5, manufacturing accounted for 32 percent of China's GDP and 89 percent of its merchandise exports, making it more specialized in the sector than any other large developing economy. Using the gravity model of trade, the authors decompose bilateral trade into the components associated with demand conditions in importing countries, supply conditions in exporting countries, and bilateral trade costs. They identify ten developing economies for which manufacturing represents more than 75 percent of merchandise exports (Hungary, Malaysia, Mexico, Pakistan, the Philippines, Poland, Romania, Sri Lanka, Thailand, and Turkey), all of which in theory are countries most exposed to the adverse consequences of China's export growth. The results suggest that if China's export supply capacity had been constant from 1996–2003, then the demand for exports would have been 0.6 percent to 1.4 percent higher in the ten countries studied. Thus, even for the developing countries most specialized in export manufacturing, China's expansion has represented only a modest negative shock.

**Dooley et al** (2003, 2004a,b,c) argue that China seeks to raise urban employment by 10–12 million persons per year because of export growth. In fact, total employment increased by 7.5 to 8 million per year over 1997–2005. **Feenstra and Hong** estimate that export growth over 1997–2002 contributed at most 2.5 million jobs per year, with most of the employment gains coming from non-traded goods like construction. Exports grew much faster over the 2000–5 period, which could explain in principal the entire increase in employment. However, the growth in domestic demand led to *three-times* more employment gains that *died* exports over 2000–5, while productivity growth subtracted the same amount from employment. The authors conclude that exports have become increasingly important in stimulating employment in China, but that the same gains could be obtained

from growth in domestic demand, especially for tradable goods, which has been stagnant until at least 2002.

**Broda and Weinstein** highlight the importance of using the same methodology across price indexes when making economic comparisons between them. Using the CPI methodology, they find that the Import Price Index in Japan showed 20 percent inflation over 1992–2002 as contrasted to the negative 9 percent inflation measured using the official import methodology. This undermines statements that suggest a very strong component of import prices on the overall CPI deflation in Japan. The authors also show that Japan's proximity to China has meant that Japanese trade patterns have changed dramatically over the past 15 years. The United States is no longer Japan's primary trading partner, as Japan trades far more with China than with the United States. Much of the growth in Chinese exports can be traced to rapid quality per unit price improvements. However, these very substantial changes in quality and expansion of China in new markets do not appear to have produced much of an impact on aggregate Japanese prices. In short, China does not seem to be exporting deflation to Japan.

**Cheung, Chinn, and Fujii** ask whether the Chinese exchange rate is misaligned and how Chinese trade flows respond to the exchange rate and to economic activity. They find first that the currency (CNY) is substantially below the value predicted by their cross-country estimates. The economic magnitude of the mis-alignment is substantial—on the order of 50 percent in log terms. However, the misalignment is typically not statistically significant, in the sense of being more than two standard errors away from the conditional mean. Next, they find that Chinese multilateral trade flows respond to relative prices—as represented by a trade weighted exchange rate—but that that relationship is not always precisely estimated. In addition, the direction of the effects is sometimes different from what is expected a priori. For instance, Chinese ordinary imports actually rise in response to a yuan depreciation; however, Chinese exports appear to respond to yuan depreciation in the



expected manner, as long as a supply variable is included. In that sense, Chinese trade is not exceptional. Furthermore, Chinese trade with the United States appears to behave in a standard manner—especially after the expansion in the Chinese manufacturing capital stock is accounted for. Thus, the China-U.S. trade balance should respond to real exchange rate and relative income movements in the anticipated manner. However, in neither the case of multilateral nor bilateral trade flows should one expect quantitatively large effects arising from exchange rate changes. And, of course, these results are not informative with regard to the question of how a change in the CNY/USD exchange rate would affect the overall U.S. trade deficit. Finally, the authors highlight the fact that considerable uncertainty surrounds both their estimates of CNY misalignment and the responsiveness of trade flows to movements in exchange rates and output levels. In particular, the results for trade elasticities are sensitive to econometric specification, accounting for supply effects, and for the inclusion of time trends.

**Bown** assesses China's integration into the global trading system by examining areas of international political-economic "friction" associated with its increased trade. He uses a number of newly constructed datasets to examine the tensions associated with China's rapidly increasing trade and the trade policy commitments that it and its trading partners have undertaken as part of its 2001 WTO accession. Examining data on WTO members' use of antidumping, and their discriminatory treatment of Chinese firms prior to and following accession, he concludes that the application of antidumping against China has become more discriminatory since 2001. Furthermore, regression evidence rules out the theory that pre-accession discrimination is associated with foreign targeting of high import-tariff Chinese products as a WTO accession negotiation strategy. Bown also shows that WTO members are discriminating against China's exports by substituting the use of new import-restricting "China-safeguard" policy instruments. He goes on to examine data on China's antidumping use—it

is now the WTO's fifth most frequent user of antidumping—by targeted sectors and countries. He also provides evidence of a positive relationship between the size of the accession-year tariff liberalization and the subsequent resort to antidumping protection after accession. Finally, he examines China's experience in managing frictions associated with its growing role in world trade through formal WTO dispute settlement proceedings.

**Brambilla, Khandelwal, and Schott** analyze China's experience under U.S. apparel and textile quotas. They use a unique new database that tracks U.S. trading partners' performance under the quota regimes established by the global Multifiber Arrangement (1974 to 1995) and subsequent Agreement on Textiles and Clothing (1995 to 2005). They find that China was relatively more constrained under these regimes than other countries and that, as quotas were lifted, China's exports grew disproportionately.

Tariffs on agricultural products fell sharply in China both prior to, and as a consequence of, China's accession to the WTO. **Huang** and his co-authors examine the nature of agricultural trade reform in China since 1981, and find that protection was quite strongly negative for most commodities, particularly for exported goods, at the beginning of the reforms. Since then, the taxation of agriculture has declined sharply, with the abolition of production quotas and procurement pricing, and reductions in trade distortions for both imported and exported goods. Rural well-being has improved, partly because of these reforms, and because of strengthening of markets, public investment in infrastructure, research and development, health and education, and reductions in barriers to mobility of labor out of agriculture. Much remains to be done to improve rural incomes and reduce rural poverty.

Using official Chinese environmental data on air and water pollution from the State Environmental Protection Agency and highly disaggregated trade data from China Customs, **Dean** and **Lovely** present evidence that the pollution intensity of Chinese exports fell dramatically between 1995 and 2004. They then explore the pos-

sibility that trade fragmentation and foreign investment have played a role. Using the framework provided by Copeland and Taylor (1994, 2003), they develop a reduced-form model of the pollution intensity of trade, incorporating standard determinants of a country's production mix, such as factor proportions, income per capita, and trade policy. They explicitly incorporate the degree to which Chinese exports are fragmented, building on the work of Feenstra and Hanson (1996). They then use this model to test the effect of increased fragmentation on the time trends they observe in the pollution intensity of trade. The evidence supports the view that increased foreign investment and production fragmentation have contributed positively to the decline in the pollution intensity of China's trade, as has accession to the WTO. Growth in China's per capita real income is also associated with the trend toward cleaner trade.

Despite the rapid expansion of U.S.-China trade ties, the increase in U.S. FDI in China, and the expanding amount of economic research exploring these developments, a number of misconceptions distort the popular understanding of U.S. multinationals in China. **Branstetter** and **Foley** seek to correct four common misunderstandings by providing a statistical portrait of several aspects of U.S. affiliate activity in the country and placing this activity in its appropriate economic context.

Foreign-invested enterprises (FIEs) account for well over half of all Chinese exports and this share continues to grow. While the substantial presence of FIEs has contributed greatly to the recent export-led growth of China, an important objective of the Chinese government is to ultimately obtain foreign technologies and develop their own technological capabilities domestically. **Blonigen** and **Ma** use detailed data on Chinese exports by sector and type of enterprise to examine the extent to which domestic enterprises are "keeping up" or even "catching up" to FIEs in the volume, composition and quality of their exports. They also use a newly-created dataset on Chinese policies encouraging or restricting FIEs across sectors to examine the extent to which such policies can

affect the evolving composition of Chinese exports.

**Cheng** and **Ma** provide a systematic analysis of the size and composition of China's outward FDI in 2003–5. Despite the attention given to China's recent outward FDI and the prospect that it will continue to surge upward, its investment flows and stocks were smaller than those of some small industrial economies and some emerging developing economies as of 2005. The bulk of China's FDI was made up of firms owned by or associated with different levels of governments, including its largest multinational companies. By the end of 2005, business services accounted for the largest share of China's outward FDI stock (28.9 percent), followed by wholesale and retail, mining and

petroleum, transportation and storage, and manufacturing. The true breakdown of the destination of China's FDI was basically unknown because a predominant share of its FDI in recently years was done in the world's tax havens. The empirical analysis reveals that the host economies' GDP had a positive impact, whereas their respective distances from China had a negative impact, on attracting FDI from China. Their per capita GDP had no impact on FDI flows but had a negative impact on FDI stocks. Cultural proximity was a positive factor in attracting China's FDI to the host economies that speak the Chinese language. China's future FDI outflows based on its own past experience, international experience, and Japan and South Korea's experience with FDI outflows are fore-

cast; the baseline forecasts based on the experience of many FDI source economies indicate that China's aggregate FDI outflow will reach US\$20 billion around 2008, US\$30 billion in the early 2010s, and US\$50 billion by 2015. In more optimistic forecasts based on the experience of Japan and South Korea, the first two thresholds will be reached one year earlier and the third threshold will be reached five years earlier.

These conference proceedings will be published by the University of Chicago Press in an NBER Conference Volume. Its availability will be announced in the *NBER Reporter*. The papers are also available at "Books in Progress" on the NBER's website.

## Twentieth Anniversary Tokyo Conference

The NBER, TCER (Tokyo Center for Economic Research), and CEPR (Centre for Economic Policy Research, in London) jointly sponsored a twentieth anniversary conference on financial globalization in Tokyo on September 4 and 5. Organizers Takeo Hoshi of the University of California, San Diego and NBER, and Takatoshi Ito, of the University of Tokyo, TCER, CEPR, and NBER, chose these papers for discussion:

**Nicolas Coeurdacier** and **Philippe Martin**, University of Paris I and CEPR, "The Geography of Asset Trade and the Euro: Insiders and Outsiders"  
Discussant: Ryuzo Miyao, Kobe University and TCER

**Mark M. Spiegel**, Federal Reserve Bank of San Francisco, "Monetary and

Financial Integration: Evidence from the EMU"

Discussant: Linda Goldberg, Federal Reserve Bank of New York and NBER

**Barry Eichengreen**, University of California, Berkeley, CEPR, and NBER, and **Sudarat Ananchotikul**, University of California, Berkeley, "Corporate Governance Reform in Emerging Markets: How Much, Why, and with What Effects?"  
Discussant: Takeo Hoshi

**Philip R. Lane**, Trinity College Dublin and CEPR, and **Gian Maria Milesi-Ferretti**, IMF and CEPR, "Where Did All the Borrowing Go? A Forensic Analysis of the U.S. External Position"  
Discussant: Shinji Takagi, Osaka University and TCER

**Sebastian Edwards**, University of California, Los Angeles and NBER, "Financial Globalization, Sequencing of Reforms, and Macroeconomic Vulnerability: A Latin American View"  
Discussant: Masahiro Kawai, ADBI and TCER

**Koichi Hamada**, Yale University, and **Yasushi Okada**, ESRI, "Two Decades after the Plaza Accord: A Package of Mixed Blessings"  
Discussant: Mitsuhiro Fukao, Keio University and TCER

**Toshitaka Sekine**, Bank of Japan and TCER, "Another Look at Global Disinflation"  
Discussant: Tsutomu Watanabe, Hitotsubashi University and TCER

**Coeurdacier** and **Martin** analyze the determinants of cross-border asset trade using cross-country data and a Swedish dataset. They focus on the impact of the

euro for the determinants of trade in bonds, equity, and banking assets. With the help of a theoretical model, they disentangle the different effects that the euro may have

on cross-border asset holdings for both euro zone countries and countries outside of the euro zone. They find that the euro implies a unilateral financial liberalization,

which makes it cheaper for all countries to buy euro zone assets. For bonds and equity holdings, this translates into approximately 14 percent and 17 percent lower transaction costs. Using the Swedish data, they find that this effect of the euro is larger for flows than for stocks. Also, there is a preferential financial liberalization, which on top of the previous effect lowers transaction costs inside the euro zone by approximately 17 percent and 10 percent for bonds and equity respectively. Third, a diversion effect exists because of the fact that lower transaction costs inside the euro zone entail euro countries to purchase less equity from outside the euro zone. The empirical analysis also suggests that the elasticity of substitution between bonds inside the euro zone is three times higher than between bonds denominated in different currencies.

**Spiegel** examines the impact of European Monetary Union (EMU) accession on bilateral international commercial bank lending patterns. Using a difference-in-differences methodology, he demonstrates that accession to the EMU was accompanied by a change in Portuguese and Greek borrowing in favor of borrowing from their EMU partner nations. This extends the evidence in the literature that overall international borrowing is facilitated by the creation of a monetary union, and raises the possibility of financial diversion.

In the ten years since the Asian crisis, considerable progress has been made in strengthening the financial infrastructure in emerging markets. Still, some observers are critical that progress has not been faster. **Eichengreen** and his co-author consider why—and with what effects—using corporate governance reform as a case study. Their results confirm that corporate governance improves with economic development. But, in addition, they point to specific circumstances that appear to facilitate the development of strong corporate governance practice. Corporate governance appears to improve with the stability and development of the political system, as if governments that expect to remain in power are readier to sink the costs of reforms that only pay off down the road, and that investors are better able to effec-

tively communicate their interest in corporate governance reform in countries with well-developed political systems. There is also some evidence that countries where foreign investors are more prominent push for improvements in corporate governance. Finally, there is some evidence that corporate governance is stronger in countries with a common law tradition, where shareholders are likely to be more active and better able to represent their interests. Using these same political variables as instruments for corporate governance, the results suggest that corporate governance quality has a positive impact on private bond market capitalization, stock market capitalization, the number of listed companies, and the turnover ratio on the stock market—but not, plausibly, for public bond market capitalization. The results thus support the notion that corporate governance reform can make a difference for financial development.

The deterioration in the U.S. net external position in recent years has been much smaller than the extensive net borrowing associated with large current account deficits would have suggested. **Lane** and his co-author examine the sources of discrepancies between net borrowing and accumulation of net liabilities for the U.S. economy over the past 25 years. In particular, they highlight and quantify the role played by net capital gains on the U.S. external portfolio and “residual adjustments” in explaining this discrepancy. Finally, they discuss whether these residual adjustments are likely to be originating from measurement errors in external assets and liabilities, financial flows, or capital gains, and explore the implications of these conjectures for the U.S. financial account and external position.

**Edwards** uses a large cross-country dataset and panel probit analysis to investigate whether an increase in the degree of openness—both financial openness and trade openness—affects the probability of external crises. Although the analysis is motivated by Latin America’s experiences, the dataset covers countries from every region in the world. He is particularly interested in investigating the way in which the interaction between trade and financial

openness affect these probabilities. He also focuses on current account and fiscal imbalances, contagion, international reserves holdings, and the exchange rate regime as possible determinants of external crises. The results indicate that relaxing capital controls increases the likelihood of a country experiencing a sudden stop. Moreover, the results suggest that “financial liberalization first” strategies increase the degree of vulnerability to external crises. This is particularly the case if this strategy is pursued with pegged exchange rates and if it results in large current account imbalances.

The Plaza Accord in 1985, and a series of subsequent attempts by major industrial countries to coordinate exchange rates, marked a dramatic era in the history of interventions into exchange rate markets under flexible exchange rates. The good news was that, at least at the beginning, it succeeded in changing the direction of exchange rates and apparently in moderating the current account imbalances of major participants, like Japan and United States. The bad news was that it could not stop real exchange rates from tumbling too far in an extreme direction. In their paper, **Hamada** and **Okada** first demonstrate theoretically that under a floating regime the benefit from exchange rate coordination is very limited, and that joint attempts at coordination in fact imposed on the advanced economies an unnecessary, additional constraint to maintain their current account balances. Then the authors trace the effects of exchange rate coordination on the macroeconomic performance of the Japanese economy. The reaction to the contraction attributable to the higher yen after the Plaza Accord was a combination of expansionary monetary and fiscal policies, and this reaction continued too long. When the Bank of Japan undertook corrective measures to curb asset bubbles, it adopted a precipitous contraction of the money supply, which most probably was one of the main reasons for massive asset deflation. This paper presents a macroeconomic overview of how the Japanese economy was exposed to the fluctuation of the yen real exchange rate and how it finally recovered from its heavy burden of overvaluation of the exchange rate.



**Sekine** highlights the relative price adjustments that were taking place in the global economy as one important source of the lower level of inflation rates observed in recent decades. Using a markup model, he shows that substantial effects come

from declines in wage costs and import prices relative to consumer prices. Out of a 5-percentage-point decline in the inflation rates in eight OECD countries between 1970–89 and 1990–2006, Sekine says that more than 1.5 percentage points can be

explained by global shocks to these two relative prices, while monetary policy shocks account for another one percentage point.

It is anticipated that these papers will be published in the *Journal of the Japanese and International Economies*.

## Entrepreneurship: Strategy and Structure

An NBER Conference on “Entrepreneurship: Strategy and Structure,” organized by Thomas Hellmann, University of British Columbia, and Scott Stern, NBER and Northwestern University, took place on September 14 and 15. The agenda for the meeting was:

**Hongbin Cai**, University of California, Los Angeles; **Yasuyuki Todo**, University of Tokyo; and **Li-An**

**Zhou**, Peking University, “Impacts of Multinational Enterprises on Indigenous Entrepreneurship and Innovation: Evidence from a Chinese Science Park”  
Discussant: Rebecca Henderson, MIT and NBER

**Anand Nandkumar** and **Ashish Arora**, Carnegie Mellon University, “Entry, Commercialization Strategies, and Performance: The Case of the Information Security Industry”  
Discussant: Jean De Bettignies, Queen’s University

**Joshua S. Gans**, University of Melbourne, “Start-Up Commercialization Strategy and Innovative Dynamics”

Discussant: Yael Hochberg, Northwestern University

**Boris Groysberg**, **Ashish Nanda**, and **M. Julia Prats**, Harvard University, “Does Individual Performance Affect Entrepreneurial Mobility? Empirical Evidence from the Financial Analysis Market”  
Discussant: Ajay Agrawal, University of Toronto and NBER

**Vladimir Atanasov**, The College of William and Mary; **Vladimir Ivanov**, University of Kansas; and **Kate Litvak**, University of Texas at Austin, “The Impact of Litigation on Venture Capitalist Reputation”  
Discussant: Ramana Nanda, Harvard University

Panel on “The Strategy and Structure of Entrepreneurship”:  
**Timothy Bresnahan**, Stanford University and NBER; **Ben Jones**, Northwestern University and NBER; and **Josh Lerner**, Harvard University and NBER

**Marco Da Rin** and **Maria Fabiana Penas**, Tilburg University, “The Effect

of Venture Capital on Innovation Strategies”

Discussant: David Hsu, University of Pennsylvania

**Iain M. Cockburn** and **Megan J. MacGarvie**, Boston University and NBER, “Patents, Thickets and Early Stage Firms: Evidence from the Software Industry”  
Discussant: William Kerr, Harvard University

**Andres Almazan** and **Sheridan Titman**, University of Texas at Austin; and **Javier Suarez**, CEMFI, “Firms’ Stakeholders and the Costs of Transparency”  
Discussant: Kose John, New York University

**Timothy Simcoe**, University of Toronto; **Maryann Feldman**, University of Georgia; and **Stuart Graham**, Georgia Institute of Technology, “Competing on Standards? Entrepreneurship, Intellectual Property, and the Platform Paradox”  
Discussant: Shane Greenstein, Northwestern University and NBER

Using a unique firm-level dataset from China’s “Silicon Valley,” **Cai** and his co-authors investigate how multinational enterprises (MNEs) affect local entrepreneurship and R and D activities upon entry. They find that R and D activities of MNEs in an industry stimulate entry of domestic firms into the same industry and enhance R and D activities of newly enter-

ing domestic firms. By contrast, MNEs’ production activities, or domestic firms’ R and D activities, do not have such an effect. Since MNEs are technologically more advanced than domestic firms, these findings are consistent with a knowledge diffusion hypothesis: that diffusion of MNEs’ advanced knowledge to potential indigenous entrepreneurs through MNEs’ R and

D stimulates entry of domestic firms.

**Nandkumar** and **Arora** study how the existence of a functioning market for technology conditions the entry strategy of different types of entrants, and the relative advantage of incumbent firms as compared to startups. The researchers find that markets for technology both facilitate entry of firms that lack proprietary tech-



nology and increase vertical specialization. However, these markets also increase the relative advantage of downstream capabilities, which is reflected in the relatively improved performance of incumbent firms as compared to startups. Moreover, the authors find that firms founded by serious hobbyists and tinkerers, whom they call hackers, perform markedly better than other startups. This perhaps reflects the non-manufacturing setting of this study, as well as the distinctive nature of software technology.

**Gans** endogenizes a start-up's choice between competitive and cooperative commercialization in a dynamic environment. He demonstrates that, depending upon firms' dynamic capabilities, there may or may not be gains to trade between incumbents and start-ups in a cumulative innovation environment; that is, start-ups may not be adequately compensated for losses in future innovative potential. Because of this, there is no clear relationship between observed inter-industry innovation and commercialization choice, unless dynamic capabilities of firms are taken into account. In addition, the analysis demonstrates subtle and novel insights into the relationship between dynamic capabilities and rates of innovation.

**Groysberg** and his co-authors' analysis relies on a panel dataset of research analysts in investment banks over 1988-96 and reveals that star analysts are more likely than non-star analysts to become entrepreneurs. Furthermore, the researchers find that ventures started by star analysts have a higher probability of survival than ventures established by non-star analysts. Extending traditional theories of entrepreneurship and labor mobility, their results also suggest that drivers of turnover vary by destination: that is, turnover to entrepreneurship versus other turnover. In contrast to turnover to entrepreneurship, star analysts are less likely to move to other firms than non-star analysts.

Venture capital (VC) contracts give VCs enormous power over entrepreneurs and early equity investors of portfolio companies. A large literature examines how these contractual terms protect VCs against misbehavior by entrepreneurs. But what

constrains misbehavior by VCs? **Atanasov** and his co-authors provide the first systematic analysis of legal and non-legal mechanisms that penalize VC misbehavior, even when such misbehavior is permitted by the contract. They hand-collect a sample of over 177 lawsuits involving venture capitalists. The three most common types of VC-related litigation are: 1) lawsuits filed by entrepreneurs, which most often allege freezeout and transfer of control away from founders; 2) lawsuits filed by early equity investors in startup companies; and 3) lawsuits filed by VCs. The researchers first estimate an empirical model of the propensity of VCs to get involved in litigation as a function of VC characteristics. Then they match each venture firm that was involved in litigation to an otherwise similar venture firm that was not involved in litigation. They find that less reputable VCs are more likely to participate in litigation, as are VCs focusing on early-stage investments and VCs with larger deal flow. More reputable VCs are more likely to get involved in lawsuits involving control transfers and freeze-outs, but not dilution and asset transfers. Suits against more reputable VCs usually involve allegations of more severe misconduct (direct expropriation of founders rather than, for example, securities class action). Next the authors analyze the relationship between different types of lawsuits and VC fundraising and deal flow. Although plaintiffs lose most VC-related lawsuits, litigation does not go unnoticed: in subsequent years, the involved VCs raise significantly less capital than their peers and invest in fewer deals. The biggest losers are VCs who were defendants in a lawsuit and lost, and especially VCs who were alleged to have expropriated founders. The researchers find no strong relationship between litigation and the quality of future deals.

**Da Rin** and **Fabiana Penas** examine a unique dataset of Dutch companies, some of whom have received venture financing. The dataset contains details about companies' innovation strategies. The authors find that companies backed by venture capitalists develop more assertive innovation strategies, based on protection of intellectual property (IP) rights, on the

creation of strong "absorptive capacity", and on in-house skills. The researchers also document that venture backed companies do not seem to increase their level of innovation cooperation with third parties.

The impact of stronger intellectual property rights in the software industry is controversial. One means by which patents can affect technical change, industry dynamics, and ultimately welfare, is through their role in stimulating or stifling entry by new ventures. Patents can block entry, or raise entrants' costs in variety of ways, while at the same time they may stimulate entry by improving the bargaining position of entrants vis-à-vis incumbents, and supporting a "market for technology" that enables new ventures to license their way into the market, or realize value through trade in their intangible assets. Much of the impact of these effects may work through the capital markets, and **Cockburn** and **MacGarvie** find evidence that the extraordinary growth in patenting of software has had a significant impact on the financing of software companies. Start-up software companies operating in markets characterized by denser patent thickets see their initial acquisition of VC funding delayed relative to firms in markets less affected by patents. Once funding is acquired, firms that eventually go public or are acquired take longer to do so for a given amount of investment. And, firms in "thicketed" markets are less likely to go public. However, these effects are mitigated for firms that themselves are able to obtain patents: these ventures acquired funding earlier and were more likely generate a "liquidity event" for early stage investors by going public.

**Almazan** and his co-authors develop a model of a firm whose production process requires it to start and nurture a relationship with its stakeholders. Because there are spillover benefits associated with being associated with a "winner," the perceptions of its stakeholders and potential stakeholders can be key to the firm's success. This analysis indicates that while transparency (that is, disseminating information about a firm's quality) may improve the allocation of resources, a firm may have a higher ex-ante value if information about its qual-

ity is not prematurely revealed. The costs associated with transparency arise in this model when some, but not all, stakeholders of a firm benefit from having a relationship with a high quality firm, and these costs are higher when firms can initiate non-contractible innovative investments that enhance the value of their stakeholder relationships. Stakeholder effects of transparency are especially important for younger firms with less established track records (for example, start-ups).

**Simcoe** and his co-authors examine

the strategic choices of entrepreneurial firms that contribute innovation to technology platforms in standard setting organizations (SSOs). Entrepreneurs, lacking complementary assets, have incentives to aggressively pursue their intellectual property rights. Using data on patents disclosed at 14 SSOs over a 25-year period, the researchers examine the litigation of disclosed patents as well as firm-level trends in disclosure. The evidence suggests that entrepreneurs who disclose patents pursue a more aggressive IP strategy than their

larger more vertically integrated counterparts. Patents assigned to entrepreneurial firms are 6 percentage points more likely to be litigated than those assigned to large public companies. Small firms appear more likely to litigate after patents are disclosed to an SSO.

These papers will be published in a special issue of the *Journal of Economics and Management Strategy*. They are also available at “Books in Progress” on the NBER’s website.

## Tax Policy and the Economy

The NBER’s Twenty-second Annual Conference on Tax Policy and the Economy, organized by James M. Poterba of NBER and MIT, took place in Washington, DC on September 27. These papers were discussed:

**Stephen T. Parente** and **Roger Feldman**, University of Minnesota, “Do HSA Choices Interact with Retirement Savings Decisions?”

**Susan M. Dynarski**, Harvard University and NBER, and **Judith E. Scott-Clayton**, Harvard University, “Weighing the Costs and Benefits of Complexity in Student Aid”

**Gene Amromin**, Federal Reserve Bank of Chicago, “Precautionary Savings Motives and the Tax Efficiency of Household Portfolios: An Empirical Analysis”

**James M. Poterba**; **Steven Venti**, Dartmouth College and NBER; and **David A. Wise**, Harvard University and NBER, “New Estimates of the Future Path of 401(k) Assets”

**Charles E. McLure, Jr.**, Stanford University and NBER, “Harmonizing Corporate Income Taxes in the European Community: Rationale and Implications”

**Parente** and **Feldman** collected data on employees’ health plan choices and retirement savings decisions from a large employer with a nearly 16,000-person workforce that offered traditional health plans and health savings accounts (HSAs) in 2006. The researchers also recorded employees’ retirement contributions for the current and prior years along with their health plan choices. They examined first whether employees make joint choices about a traditional health plan versus an HSA and participation in an optional retirement plan, and second, conditional on participation, the amount of the employee’s contribution to the optional plan. Using health insurance claims and other human resources data to create control variables of income, job type, age, gender, number of dependents, and health status of the household, the authors find that those who elected an HSA were more

likely to participate in a retirement savings account, and once invested, that HSA policyholders may be more likely to supplement retirement assets.

A growing body of empirical evidence shows that financial aid can increase college enrollments. Puzzlingly, there is little compelling evidence of the effectiveness of Pell Grants and Stafford Loans, the primary federal student aid programs. Complexity and uncertainty in the aid system may be the culprit. The perspectives of classical and behavioral economics suggest that complexity in the aid system at the very least imposes substantial transaction costs and at worst discourages the target population from applying for student aid. While the bounds on the costs of complexity are wide, **Dynarski** and **Scott-Clayton** show that its benefits are miniscule. Detailed data from federal student aid applications show that a radically sim-

plified aid process can reproduce the current distribution of aid using a fraction of the information now collected.

Theoretical portfolio models with taxable and tax-deferred savings require savers to locate higher-tax assets such as bonds in their tax-deferred retirement accounts (TDAs) while keeping low-tax assets (equities) in taxable accounts. Yet, observed portfolio allocations are often not tax-efficient. **Amromin** empirically evaluates one of the explanations for this puzzle that rests on the simultaneous presence of uninsurable labor income risk and limited accessibility of TDA assets. Together, these elements lead some borrowing-constrained households to forgo tax-efficiency in favor of allocations that provide more liquidity in bad income states—an outcome labeled as “precautionary portfolio choice.” The analysis of household-level portfolio data from the Survey of Consumer

Finances suggests that both the choice of whether to hold a tax-efficient portfolio and the degree of portfolio tax-inefficiency are related to the presence and severity of precautionary motives.

The future paths of 401(k) contributions and withdrawals, and the associated path of asset accumulation, affect federal income tax revenues and the preparation of future retirees for their retirement years. Over the past two and a half decades there has been a fundamental change in saving for retirement in the United States, with a rapid shift from employer-managed defined benefit pensions to defined contribution saving plans that are largely controlled by employees. In this paper, **Poterba, Venti, and Wise** project the future growth of assets in self-directed personal retirement plans at age 65 for cohorts attaining age 65 between now and 2040. They also project the ratio of 401(k) assets at age 65 to prior

earnings, and the ratio of 401(k) account balances to GDP. Their projections suggest that cohorts that attain age 65 in future decades will have accumulated more retirement saving (in real dollars) than current retirement-age cohorts.

The Member States of the European Community have systems of taxing corporate income that are more appropriate for nations than for members of an economic union. **McLure** describes the problems of the present system, which is based on separate accounting and arm's length pricing, the advantages of one based on consolidation and formula apportionment, such as those employed by the U.S. states and Canadian provinces, the likely characteristics of such a system, and the complications caused by income flows to and from the EC, and the implications of harmonization, for both EC Member States and non-EC nations and for mul-

tinational corporations. It seems virtually certain that a harmonized EC system (like that of Canada) would exhibit far more uniformity than state corporate income taxes in the United States and, like some state taxes (but unlike the Canadian system), would involve consolidation of the activities of corporations characterized by high levels of common ownership and control. Finally, McLure speculates on the prospects for harmonization, given a) that adoption of tax measures applicable to all Member States requires the unanimous approval of all EC Member States, but b) as few as eight Member States could harmonize their taxes, through "enhanced cooperation."

These papers will be published by the MIT Press as *Tax Policy and the Economy, Volume 22*. They are also available at "Books in Progress" on the NBER's website.

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## NBER News

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### Twenty-eighth NBER Summer Institute Held in 2007

In the summer of 2007, the NBER held its twenty-eighth annual Summer Institute. More than 1600 economists from universities and organizations throughout the world attended. The

papers presented at dozens of different sessions during the four-week Summer Institute covered a wide variety of topics. A complete agenda and many of the papers presented at the various sessions

are available on the NBER's web site by clicking Summer Institute 2007 on our conference page, [www.nber.org/confer](http://www.nber.org/confer)

## Program and Working Group Meetings

### The Economics of Crime

The NBER's Working Group on the Economics of Crime held its fall workshop in Cambridge on September 14. The group's Directors, who also organized the meeting program, are: Philip J. Cook, Duke University; Jens Ludwig, University of Chicago; and Justin McCrary, University of Michigan. These papers were discussed:

**Benjamin A. Olken**, Harvard University and NBER, and **Patrick Barron**, World Bank, "The Simple Economics of Extortion: Evidence from Trucking in Aceh" (NBER Working Paper No. 13145)  
Discussants: Justin Wolfers, University of Pennsylvania and NBER, and David Abrams, University of Chicago Law School

**Mark Duggan**, University of Maryland

and NBER; **Randi Hjalmarsson**, University of Maryland; and **Brian A. Jacob**, University of Michigan and NBER, "The Effect of Gun Shows on Gun Violence, Gun Suicides, and Accidental Gun Deaths"  
Discussants: Ilyana Kuziemko, Princeton University and NBER, and David Hemenway, Harvard University

**Jonah E. Rockoff**, Columbia University and NBER, and **JJ Prescott**, University of Michigan, "Do Sex Offender Registration and Notification Laws Affect Criminal Behavior?"  
Discussants: Anne Piehl, Rutgers University and NBER, and Justin McCrary

**Rucker Johnson** and **Steven Raphael**, University of California at Berkeley, "How Much Crime Reduction Does the

Marginal Prisoner Buy?"  
Discussants: Thomas Miles, University of Chicago Law School, and Radha Iyengar, Harvard University

**Manolis Galenianos**, Pennsylvania State University; **Rosalia Liccardo Pacula**, RAND and NBER; and **Nicola Persico**, New York University and NBER, "A Search-Theoretic Model of the Retail Market for Illicit Drugs"  
Discussants: Dan Silverman, University of Michigan, and Jeffrey A. Miron, Harvard University and NBER

**Steven D. Levitt**, University of Chicago and NBER, and **Sudhir A. Venkatesh**, Columbia University, "The Economics of Street Prostitution"  
Discussants: Peter Reuter, University of Maryland, and Lawrence Katz, Harvard University and NBER

**Olken** and **Barron** test whether the behavior of corrupt officials is consistent with standard industrial organization theory. They designed a study in which surveyors accompanied truck drivers on 304 trips along their regular routes in two Indonesian provinces and they directly observed over 6,000 illegal payments to traffic police, military officers, and attendants at weigh stations. Using plausibly exogenous changes in the number of police and military checkpoints, they show that market structure affects the level of illegal payments, finding evidence consistent with double-marginalization and hold-up along a chain of vertical monopolies. Furthermore, they document that the illegal nature of these payments does not prevent corrupt officials from extracting additional revenue using complex pricing schemes, including third-degree price discrimination and a menu of two-part tariffs. Their findings illustrate the importance of consider-

ing the market structure for bribes when designing anti-corruption policy.

Thousands of gun shows take place in the United States each year. Gun control advocates argue that because sales at gun shows are much less regulated than other sales, such shows make it easier for potential criminals to obtain a gun. Similarly, one might be concerned that gun shows would exacerbate suicide rates by providing individuals considering suicide with a more lethal means of ending their lives. On the other hand, proponents argue that gun shows are innocuous because potential criminals can acquire guns quite easily through other black market sales or theft. **Duggan** and his co-authors use data from *Gun and Knife Show Calendar* combined with vital statistics data to examine the effect of gun shows. Their results provide little evidence to suggest that gun shows lead to any substantial increase in homicides. However, they do find some evidence that gun shows are associated

with an increase in gun suicides, which is only partially offset by decreases in other methods of suicide.

Sex offenders have been the targets of some of the most far reaching and innovative crime legislation in the United States over the last twenty years. Unlike most criminal laws, which attempt to reduce illegal activity by explicitly increasing expected punishment levels for *all* potential offenders, recent sex offender legislation focuses on reducing "same crime" recidivism of those already convicted of sex offenses. Two primary examples are registration and notification laws. Registration laws require that convicted sex offenders provide valid contact information to law enforcement authorities, while notification laws require that sex offender information be released to members of the public who are likely to be targeted if a sex offender recidivates (for example, neighbors and former victims). Using detailed information on the



variable timing and scope of state law, **Rockoff** and **Prescott** study how this type of legislation has affected the overall frequency of sex offenses, the incidence or mix of sex offenses across victims, and the response of police to reported crimes. In line with a simple model of criminal behavior, they find that registration laws reduce crime frequency by providing local law enforcement with information on local sex offenders, and that active community notification laws deter crime, most likely by raising the expected punishment to individuals not currently registered. Importantly, they also find some evidence that notification laws may *increase* repeat offenses committed by registered offenders, perhaps by making non-criminal activity relatively less attractive.

**Johnson** and **Raphael** present new evidence on the effect of aggregate changes in incarceration on changes in crime, accounting for the potential simultaneous relationship between incarceration and crime. Their principal innovation is to develop an instrument for future changes in incarceration rates, based on the theoretically predicted dynamic adjustment path of the aggregate incarceration rate in response to a shock (from whatever source) to prison entrance-or-exit transition probabilities. Given that incarceration rates adjust to permanent changes in behavior with a dynamic lag (because only a fraction of offenders are apprehended in any one period), one can identify varia-

tion in incarceration that is not contaminated by contemporaneous changes in criminal behavior. The authors isolate this variation and use it to tease out the causal effect of incarceration on crime. Using state level data for the United States covering the period from 1978 to 2004, they find that crime-prison elasticities are considerably larger than those implied by OLS estimates. For the entire time period, average crime-prison effects have implied elasticities of between -0.06 and -0.11 for violent crime and between -0.15 and -0.21 for property crime. They also present the results for two sub-periods of their panel: 1978 to 1990 and 1991 to 2004. Their IV estimates for the earlier period suggest much larger crime-prison effects, consistent with elasticity estimates presented in Levitt (1996), who analyzes a similar time period with an entirely different identification strategy. For the latter period, however, the effects of changes in prison on crime are much smaller. These results indicate that recent increases in incarceration have generated much less bang-per-buck in terms of crime reduction.

**Galenianos** and her co-authors develop a search-theoretic model of the retail market for illegal drugs. The model produces testable implications regarding the effect of interdiction and enforcement on: 1) the distribution of purity offered in equilibrium; and 2) the duration of the relationships between buyers and sellers. Their model is consistent with

evidence from two datasets taken from the System to Retrieve Information from Drug Evidence and the Arrestee Drug Abuse Monitoring Program.

Combining transaction-level data on street prostitutes with ethnographic observation and official police force data, **Levitt** and his co-author analyze the economics of prostitution in Chicago. Prostitution, because it is a market, is much more geographically concentrated than other criminal activity. Street prostitutes earn roughly \$25–\$30 per hour, roughly four times their hourly wage in other activities, but this higher wage represents relatively meager compensation for the significant risk they bear. Prostitution activities are organized very differently across neighborhoods. Where pimps are active, prostitutes appear to do better, with pimps both providing protection and paying efficiency wages. Condoms are used only one-fourth of the time and the price premium for unprotected sex is small. The supply of prostitutes is relatively elastic, as evidenced by the supply response to a Fourth of July demand shock. Although prostitution is technically illegal, prostitutes' and johns' punishments are minimal. A prostitute is more likely to have sex with a police officer than to get officially arrested by one. The authors estimate that there are 4,400 street prostitutes active in Chicago in an average week.

## Entrepreneurship Working Group

The NBER's Working Group on Entrepreneurship met in Cambridge on October 6. Director Josh Lerner of Harvard Business School organized this program:

**Edward L. Glaeser**, Harvard University and NBER, "Entrepreneurship and the City"

Discussant: Jeff Furman, Boston University and NBER

**Umit Ozmel**, Columbia University;

**David T. Robinson**, Duke University;

and **Toby Stuart**, Harvard University, "Strategic Alliances, Venture Capital, and the Going Public Decision"

Discussant: Sean Nicholson, Cornell University and NBER

**Ola Bengtsson**, Cornell University, and **John R. M. Hand**, University of North Carolina, "CEO Compensation in Private Venture-Backed Companies"

Discussant: Paul Oyer, Stanford University and NBER

**Thomas B. Astebro**, University of Toronto, and **Peter Thompson**, Florida International University, "Entrepreneurs: Jack of All Trades or Hobos?"

Discussant: Per Stromberg, University of Chicago and NBER

**Marcos A. Mollica**, BlackRock Inc., and **Luigi Zingales**, University of Chicago and NBER, "The Impact of Venture Capital on Innovation and on the Creation of New Business"

Discussant: Manju Puri, Duke University and NBER

**David H. Hsu**, University of Pennsylvania, and **Rosemarie H. Ziedonis**, University of Michigan, "Patents as Quality Signals for Entrepreneurial Ventures"

Discussant: Iain Cockburn, Boston University and NBER

Why do levels of entrepreneurship differ across America's cities? **Glaeser** presents basic facts on two measures of entrepreneurship: the self-employment rate and the number of small firms. Both of these measures are correlated with urban success, suggesting that more entrepreneurial cities are more successful. There is considerable variation in the self-employment rate across metropolitan areas, but about half of this heterogeneity can be explained by demographic and industrial variation. Self-employment is particularly associated with abundant, older citizens and with the presence of input suppliers. Conversely, small firm size and employment growth attributable to unaffiliated new establishments is associated most strongly with the presence of an appropriate labor force. **Glaeser** also finds support for the Chinitz (1961) hypothesis that entrepreneurship is linked to a large number of small firms in supplying industries. Finally, there is a strong connection between area-level education and entrepreneurship.

**Ozmel**, **Robinson**, and **Stuart** study the tradeoffs that young, private biotechnology firms face in the private equity market when they choose between raising capital from VCs or raising capital from strategic alliance partners. Increased alliance activity makes future alliances more likely, but future VC activity less likely. In contrast, VC activity makes both future alliance and future

VC activity more likely. Both types of private capital raise the hazard of going public, and indeed alliances often play a larger role than VC activity in the IPO process. Acquisition as an alternative to IPO is made more likely by increased VC activity, but the link between acquisition probabilities and alliance activity is less clear cut. These results highlight both the importance of alliance partners in resolving asymmetric information problems in the capital acquisition process and the potential conflict of interest between different sources of private equity.

**Bengtsson** and **Hand** study CEO compensation in private venture-backed companies. They examine a previously unexplored survey-based employee compensation dataset collected by VentureOne that covers 1,585 U.S. companies in the period 2002–6. They show that CEO compensation is tied to company performance. Not only do CEOs hold relatively large equity ownership stakes, but their cash compensation is linked to both operating growth and fundraising success. These results suggest that even for venture-backed companies that are already subject to a range of strong governance mechanisms, executive compensation contracts are structured to minimize agency problems. The researchers also find that there are large differences in compensation between founder CEOs and non-founder CEOs.

Human capital investment theory suggests that entrepreneurs should be generalists, while those who work for others should be specialists; it also predicts higher incomes for entrepreneurs with generalist skills. An alternative view predicts that those with greater taste for variety are more likely to become entrepreneurs and that entrepreneurs will see their incomes decrease with greater skill variety. **Astebro** and **Thompson** use data from a survey of 830 independent inventors and 300 individuals from the general population to confirm that inventor-entrepreneurs typically have a more varied labor market experience. However, the more varied their experience, the lower their household income. These results support the interpretation that both choice of entrepreneurship and investment in generalist skills are driven by a taste for variety.

**Mollica** and **Zingales** exploit the cross-section, cross-industry, and time-series variability of venture capital (VC) investments in the United States to study the impact of VC activity on innovation and the creation of new businesses. As a measure of the quality of research in a certain area, they use the number of citations of academic papers produced by faculty in the area. As an instrument for the size of VC investments, they use the size of state pension fund's assets. Even with these controls, they find that VC investments have a significant positive effect

on the production of patents and the creation of new businesses. A single standard deviation increase in the VC investment per capita generates an increase in the number of patents of between 4 and 15 percent. An increase of 10 percent in the volume of VC investment increases the total number of new business by 2.5 percent.

**Hsu** and **Ziedonis** examine the patenting and venture financing activities of 370 semiconductor startups that received more

than 800 rounds of funding from 1980 through 2005. They find a significant effect of patents on investor estimates of start-up firm value, with a doubling in patent application stock associated with a 24 percent boost in funding-round valuations beyond what would otherwise be expected. They also find that the signaling value of patents is greater in earlier financing rounds and when funds are secured from prominent investors. Finally, their results suggest that hav-

ing larger patent application stocks increases both the likelihood of sourcing initial capital from a prominent venture capitalist and of achieving liquidity through an initial public offering. They find little evidence, however, for the role of start-up affiliations with prominent partners once patenting activities are taken into account. These findings highlight the important interplay between external resource providers and the patent signaling strategies of entrepreneurial ventures.

## China Working Group Meets

The NBER's Working Group on China, directed by NBER Research Associate Shang-Jin Wei of Columbia Business School, met in Cambridge on October 12. The program was:

**Galina Hale**, Federal Reserve Bank of San Francisco, and **Cheryl Long**, Colgate University, "Labor Market Imperfections and the Effects of FDI Presence in China" Discussant: Wei Li, University of Virginia

**Julan Du**, Chinese University of Hong Kong, and **Chenggang Xu**, London School of Economics, "Regional Competition and Regulatory Decentralization: The Case of China"

Discussant: Paul Wachtel, New York University

**Joseph P. H. Fan**, Chinese University of Hong Kong; **Jun Huang**, Shanghai University of Finance and Economics; **Randall Morck**, University of Alberta and NBER; and **Bernard Yeung**, New York University, "Institutional Determinants of Vertical Integration: Evidence from China" Discussant: Zhiwu Chen, Yale University

**James Harrigan**, Federal Reserve Bank of New York and NBER, and **Geoffrey Barrows**, Federal Reserve Bank of New York, "Testing the Theory of Trade Policy: Evidence from the Abrupt End of the

Multifibre Arrangement" Discussant: Amit Khandewal, Columbia University

Panel Discussion on China's Transformation, Finance, and Growth: **Loren Brandt** and **Xiaodong Zhu**, University of Toronto, "Accounting for Growth and Structural Transformation in China, 1978–2004" **Dwight Perkins**, Harvard University, and **Thomas Rawski**, University of Pittsburgh, "Forecasting Growth over the Next Two Decades"

**Hale** and **Long** study the relevance of labor market competition effects in the presence of FDI. They develop a theoretical model to specify the implications of such effects and then apply it to China where some firms face restrictions on the wages they can pay. The results of their empirical analysis of firm-level data are consistent with the model's predictions and suggest that foreign firms compete with domestic firms for skilled labor. Specifically, these researchers find that when FDI presence is higher, average wages of engineers and managers in private domestic firms are higher, while the average quality of engineers in state-owned enterprises facing wage constraints is lower. In addition to providing the first piece

of direct evidence of FDI-related competition effects on the host country's labor market, these findings highlight the relevance of labor market institutions in determining FDI spillovers.

Chinese regulatory decentralization has evolved since regulation was first introduced in the transition process. The quota system is an important instrument in China's regulatory regimes; the stock issuance quota system for regulating public offerings in securities markets is a major example of it. **Du** and **Xu** argue that under certain conditions quotas can generate proper incentives to induce regional governments to cooperate in implementing regulations nationwide. They provide four types of evidence that regulatory

decentralization in China's financial market has created incentives for regional competition and for decentralized information collection in stock issuance. They also discuss the weaknesses and limitations of Chinese regulatory decentralization.

Using Chinese data, **Fan** and his co-authors find that vertical integration is importantly affected by institutional factors—it is more common in Chinese regions with weaker property rights protection, poorer local government quality, and stricter local regulation of market trades (which hampers market forces). Moreover, companies led by insiders with political connections are more likely to be vertically integrated. Vertical integration is negatively associated with share

value if the top corporate insider is politically connected, but is positively associated with share value if the firm is independently audited.

Quota restrictions on U.S. imports of apparel and textiles under the multifibre arrangement (MFA) ended abruptly in January 2005. This change in policy was

large, predetermined, and fully anticipated, making it an ideal natural experiment for testing the theory of trade policy. **Harrigan** and **Barrows** focus on simple and robust theory predictions about the effects of binding quotas, and also compute nonparametric estimates of the cost of the MFA. They find that prices of quota constrained categories

from China fell by 38 percent in 2005, while prices in unconstrained categories from China and from other countries changed little. They also find substantial quality downgrading in imports from China in previously constrained categories, as predicted by theory. The annual cost of the MFA to U.S. consumers was about \$100 per household.

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## Bureau Books

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### Fiscal Policy and Management in East Asia

*Fiscal Policy and Management in East Asia*, edited by Takatoshi Ito and Andrew K. Rose, is now available from the University of Chicago Press for \$99.00. This is Volume 16 in the NBER-East Asia Seminar on Economics (EASE) series.

Managing fiscal policy — the revenues and spending of an individual nation — is one of the most challenging tasks facing governments. Wealthy countries are constrained by complex regulation and tax-

ation policies, while developing nations often face high inflation and taxes. In this NBER conference volume, a group of academic economists and policy experts examine the problems and challenges facing public finance in East Asian developing countries, and in the United States and Japan. *Fiscal Policy and Management in East Asia* explores the inefficient tax systems of many developing countries, the relationship between public and private

sector economic behavior, and the pressing issue of future obligations that governments have undertaken to provide pensions and health care for their citizens.

Ito and Rose are NBER Research Associates in the Program on International Finance and Macroeconomics. Ito is also a professor of economics at the University of Tokyo. Rose is a professor of economics at The Haas School of Business, University of California, Berkeley.

### Social Security Programs and Retirement around the World

*Social Security Programs and Retirement around the World: Fiscal Implications of Reform*, edited by Jonathan Gruber and David A. Wise, is available from the University of Chicago Press for \$85.00.

Social security systems, both in the United States and in most other developed countries with aging populations, are under strain. As improvements in health care and changes in life style enable retirees to live longer than ever before, the stress on national budgets will increase substantially. In *Social Security Programs and Retirement*

*around the World*, experts in many countries examine the consequences of reforming retirement benefits in a dozen nations.

Drawing on the work of a group of internationally noted economists, this volume describes how social security programs provide strong incentives for workers to leave the labor force by retiring and taking the benefits to which they are entitled. But by penalizing work, social security systems magnify the increased financial burden caused by aging populations, thus contributing to the insolvency of the system. This NBER conference volume

is a model of comparative analysis that evaluates the effects of illustrative policies for countries facing the impending rapid growth of social security benefits. Its insights will help inform one of the most pressing debates in our society.

Gruber is a Research Associate in, and Wise is the Director of, the NBER's Program on the Economics of Aging. Gruber is also a Professor of Economics at MIT, and Wise is the John F. Stambaugh Professor of Political Economy at Harvard's John F. Kennedy School of Government.



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