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Program Report

Development of the American Economy

Claudia Goldin

The NBER Program on the Development of the American Economy (DAE) investigates subjects as diverse as labor and population, national and international finance, industrial organization, and political economy. Its members are linked by their dedication to understanding the process of long-run economic development and growth.

Several years ago the DAE began a research initiative in political economy from which two conference volumes have resulted. In the most recent, *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century*, DAE researchers explore the impact of the 1930s on fiscal and monetary policy, regulation of banks and agriculture, fiscal federalism, union growth, social insurance, and international trade.¹ The DAE will launch a new initiative in urban economic history in Summer 1998.

This report highlights several DAE researchers whose work seeks the historical origins of current economic issues. Joseph P. Ferrie explores immigrant mobility in the 19th century, when the rate of immigrant flow was far greater than today's. Douglas A. Irwin investigate the origins of tariff policy, such as why political parties have switched positions on free trade. Naomi R. Lamoreaux and Kenneth L. Sokoloff research the process of invention beginning in the 19th century. Claudia Goldin and Lawrence F. Katz explore the expansion of U.S. education and find a strong relationship, at the state level, between educational performance today and that reported in the early 20th century. Last, Sukkoo Kim traces the origins of today's industrial regionalization and localization patterns and the role of cities in the economy.

Immigrant Flow in the 19th Century

There have been many periods of high immigration in U.S. history, but the period of greatest inflow, measured as a fraction of the existing population, occurred in the decades just before the Civil War. Ferrie asks how the new arrivals fared as they entered the U.S. economy and how their arrival altered

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the lives of workers already in the United States. By linking the records of more than 2,000 immigrants arriving in New York City between 1840 and 1850 to the manuscripts of the 1850 and 1860 U.S. federal population censuses, Ferrie creates a unique longitudinal dataset that assesses the immigrant experience in the New World.

Ferrie compares immigrant occupations recorded in the passenger ship records with those reported for the same individuals in subsequent U.S. censuses to determine the reasons that some groups rose in occupational status while others did not.² He shows that the immigrants faring best arrived with occupational skills, were literate in their native languages, and settled in rapidly growing communities with high concentrations of immigrants. By combining data from ship records about dates of arrival with wealth data from the 1850 and 1860 U.S. population censuses, Ferrie measures the change over time in the amount of property that immigrants to the United States owned.³ He finds that real estate wealth grew roughly 10 percent for each year of residence in the United States and that immigrant occupation and location are the most important determinants of the rate of accumulation.

Ferrie collected a sample of 4,900 native-born males from the 1850 and 1860 U.S. censuses to examine how natives' wealth and occupational status changed during the 1850s, and it shows that Americans were highly mobile.⁴ For example, 47 percent of American males changed their county of residence between 1850 and 1860, and unskilled workers migrated to the western frontier from urban places in the East, giving credence to an old and often discredited hypothesis that the frontier served as America's "safety valve." On the whole, Ferrie estimates that the geographical dispersion of immigrants among the general U.S. population

was faster and more complete in the 1850s than in the 1970s.⁵ The more rapid spatial assimilation of immigrants in the earlier period, Ferrie finds, was entirely the result of the behavior of the native population. Natives are now less likely than they were in the 1850s to move into cities with immigrant concentrations.

Ferrie's work on immigrants and natives has been brought together in *Yankeys Now: Immigrants in the Antebellum U.S., 1840–1860*, part of the NBER Series on Long-Term Factors in Economic Development.⁶ In this work Ferrie also examines how immigrants affected the occupational attainment of natives in the 1850s and finds that only native-born craft workers in the urban northeast had reduced earnings because of immigration, a finding consistent with the anti-immigrant political agitation of the group.

Early 20th-Century Origins of Tariff Policy

Irwin studies U.S. trade policy in the interwar years, which were marked by the excesses of protectionism and a later shift toward free trade. The Smoot-Hawley Act of 1930, perhaps the most infamous tax regulation in U.S. history, raised import duties to high levels on the eve of the Great Depression. Irwin finds, contrary to most assertions, that Smoot-Hawley accounted for only a small part of the large decline in U.S. trade in the early 1930s, estimating that Smoot-Hawley raised average tariffs about 20 percent, from 40.7 to 47.0 percent, which translates into a 5 percent to 6 percent increase in the relative price of imports and a 4 percent to 8 percent decline in import volume.⁷

In joint work with Randall Kroszner, Irwin investigates the political factors behind the passage of Smoot-Hawley.⁸ By examining the numerous Senate roll call votes on tariff

rates for individual commodities, they find that votes for higher tariffs were not strictly the result of partisan factors but were part of nonpartisan log-rolling (vote trading) among proponents of different economic interests.

Most of the Smoot-Hawley import tariffs were specific rather than *ad valorem* duties. The steep deflation in U.S. prices after 1930 significantly raised the *ad valorem* equivalent of the Smoot-Hawley duties, bringing the average tariff on dutiable imports up to nearly 60 percent by 1932. Irwin examines the role of specific duties in the U.S. tariff code and the impact of import price fluctuations on the *ad valorem* equivalent of those duties.⁹ He finds that a 10 percent increase in import prices decreased tariffs by 6.5 percent during the period from 1865 to 1967. Whereas deflation served to increase average U.S. tariffs in the early 1930s, the substantial U.S. inflation during and after World War II served to erode U.S.-specific duties. Irwin calculates that three quarters of the decline in average U.S. tariffs between 1932 and 1950s—from 60 percent to 10 percent—was attributable to higher import prices. Only a small fraction of the decrease was caused by bilateral and multilateral trade liberalization negotiations (such as the 1948 General Agreement on Tariffs and Trade).

Irwin reports that Congress could have offset the import price inflation-induced reduction in U.S. tariffs, but it chose not to. When the traditionally free-trade Democrats gained control of the legislative and executive branches in 1933, U.S. policy shifted markedly toward trade liberalization. In 1934, the Democrats enacted the Reciprocal Trade Agreements Act (RTAA), which gave greater tariff negotiating power to the president. But because authority over trade policy ultimately resides with Congress, the shift toward trade liberalization

was not secure, Irwin shows, until the traditionally protectionist Republicans could be persuaded to sign on to the RTAA.¹⁰ Republicans rejected the RTAA through the 1930s but began to change their position in the mid-1940s. In joint work with Kroszner, Irwin investigates the reasons for the shift and finds that it came from changes in constituents' economic interests and from alterations in the political economy of trade policy, not from ideological shifts.¹¹ As a result, the postwar period was marked by a broad, bipartisan consensus in favor of trade liberalization, one that has only recently begun to unravel.

Change in Technology in the 19th and 20th Centuries

Lamoreaux and Sokoloff focus on technological change in the 19th and 20th centuries. They find that the New England and Middle Atlantic states took an early lead in patenting and maintained the highest number of patents per capita in the United States throughout the 19th century and into the 20th century. Areas with initially high rates of inventive activity attracted investments in firms and institutions that facilitated the exchange of rights to patented technologies. These intermediaries, in turn, attracted new inventors and encouraged creative individuals to devote greater resources to invention. The result was a self-reinforcing process giving regions with an initial edge in inventive activity the ability to sustain the advantage over time.¹²

Invention is commonly thought to occur within the bounds of firms. But during the late 19th century, firms bought and licensed much of their technology from outside suppliers, so inventors, in turn, extracted returns by selling off or licensing their inventions. Lamoreaux and Sokoloff explore this evolving market for technology. They find that well-devel-

oped markets for technology encouraged specialization in inventive activity. For example, in the case of the glass industry, inventive activity was not related to location of production centers, in that major centers of glass production in the Midwest and Middle Atlantic generated little patenting, whereas others, such as that in southern New England, had disproportionately high patenting rates.¹³

Lamoreaux's and Sokoloff's finding that there was extensive market trade in technology in the late 19th and early 20th centuries casts doubt on the notion that information and contracting problems were responsible for decisions by large firms to finance in-house research and development (R and D). They show that firms, particularly those in high tech industries such as electricity and telecommunications, devoted considerable resources to tracking and assessing technologies originating outside firms. As time went on, various changes induced firms in these industries to develop internal inventive capabilities. But when they did, they faced similar information and contracting costs with managing employee-inventors and securing property rights to their inventions. Lamoreaux and Sokoloff's work shows that in-house R and D was not necessarily less costly and more efficient than market trade in technology.¹⁴

The United States underwent a great expansion in high school education from 1910 to 1940, a period known as the "high school movement." By the mid-20th century, the United States led all nations in the average quantity of education garnered by its youth and in the human capital stock of its labor force, as measured by average years of education. Goldin and Katz address the reasons the United States led in education.¹⁵ They analyze cross-state variation and find that higher income and wealth, less manufacturing activity, greater equality of wealth, and

greater community stability and homogeneity encouraged U.S. youths to complete high school.

In an in-depth study of Iowa using a unique set of data they collected from the 1915 Iowa State Census, Goldin and Katz find that secondary school attendance was greatest in small towns and villages, a finding that is replicated at the national level. Goldin and Katz also use the Iowa data to show that the rate of return to a year of high school in 1915, at the dawn of the high school movement was about 12 percent—a higher rate than the rate of return to a year of college education in the 1980s. The state-level secondary school graduation rates Goldin and Katz compiled for the 1910s and 1920s strongly correlate with current measures of educational performance and with current measures of social capital. Social capital appears to have been the handmaiden of human capital in the past, and, apparently, still functions similarly today.¹⁶

In their work on higher education, they note that the proportion of all (four-year) higher education students in publicly controlled institutions rose from 0.22 in 1897 to 0.68 a century later. Sixty percent of that increase occurred by 1940 when the proportion reached 0.5. Most recently, Goldin and Katz investigate the reasons that public-sector higher education expanded relative to that of the private sector higher education and the reasons that certain states devoted more resources to higher education per state resident than did others.^{17,18} They find that the relative expansion of publicly controlled institutions was related to increased economies of scale and scope in the production of higher education services from 1900 to 1940. State resources devoted to higher education per capita were related to levels of wealth and income, to the presence of business and commercial interests with demands for practical research, to be-

coming a state later rather than earlier, and to a low initial presence of private institutions.

Industrial Regionalization and Localization Patterns

Kim studies regional and urban economics and examines the factors that determine the location of economic activities and why cities exist. He finds that regional specialization in manufacturing in the United States rose substantially from 1860 to 1900, leveled off during the interwar years, and then fell, at times considerably, after the 1930s.¹⁹ His analysis of these trends gives support to explanations based on production scale economies and the Heckscher-Ohlin model, but it is inconsistent with a model based on external economies. He also finds that factor endowments explain a significant amount of the geographic distribution over time of manufacturing activities, as predicted by the standard general equilibrium model of trade.²⁰ More recently, Kim is expanding this exploration of long-run trends in U.S. regional specialization to include more sectors, such as agriculture, wholesale trade, retail trade, and services to explore the evolution of regional incomes.²¹ He finds that differences in regional industrial structures played an important role in causing U.S. regional incomes to diverge and then to converge between the 19th and 20th centuries.

Kim's most recent work on these subjects documents U.S. urban development between 1790 and 1990, characterizing U.S. urban history as containing three distinct periods: a mercantile-port city era (colonial period–1820), an industrial city era (1820–1920), and a service city era (1920–present).²² He presents evidence that regional comparative advantage helps to explain the reasons supporting production special-

ization and how economies in market transactions aid understanding the reasons cities differ in size.

Currently, and in conjunction with other DAE researchers, Kim is contributing to an initiative in urban economic history that will be launched in Summer 1998. The core group includes Kim; Jeremy Atack and Robert A. Margo, whose recent work concerns changing rent gradients in 19th-century New York City²³; Edward Glaeser, who researches current urban issues; Spencer Glendon, whose doctoral dissertation concerns the urban life cycle of growth and decay; Rebecca Menes, who researches urban political machines; and Paul Rhode, who works on the U.S. manufacturing belt. Other DAE researchers with interests in long-term urban and regional development will join their efforts.

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Research Summaries

The Economics of School Reform

Caroline M. Hoxby*

Structural reforms for elementary and secondary (K–12) schools are being seriously debated these days. The majority of U.S. states have now enacted at least some form of choice among public schools, for example a charter school program, open enrollment among school districts, or choice within the district. While state legislatures have been much less inclined to enact programs such as vouchers and tax incentives that increase parents' ability to choose private schools, private donors particularly like voucher programs.¹

In addition, there have been major changes in the structure of public school finance in America over the last 30 years. Increasingly, school finance has been centralized at the state level and has been affected strongly by "school finance equalization" (a term that encompasses a variety of methods for redistributing monies from "property-rich" to "property-poor" school districts).²

It is clear why Americans are so interested in structural school reform for K–12 education. On a per-pupil basis, American public education is the most expensive system in the world. Yet, American K–12 students perform only moderately well on international tests of mathematics, science, and language arts achievement. The per-pupil expense for K–12 education has grown by nearly 80 percent (after adjusting for inflation) since 1970, yet student achieve-

ment has been almost flat over the period.³ Since 1970, most states' school finance systems have been revised in order to target more funds to disadvantaged students. As a result, differences in funding have narrowed, but there has been very little narrowing of the differences in the outcomes of students from advantaged and disadvantaged backgrounds.⁴

There are three reasons why economics is valuable for the analysis of school reform. First, econometric methods and evaluation techniques developed over the last decade (especially in labor and public economics) are very useful for analyzing school reforms. Second, many of the puzzles in K–12 schooling are related to financing, and most structural school reforms are loosely based on economic arguments. For instance, school choice is related to the competitive-market metaphor, and school finance equalization is based loosely on progressive taxation of income and wealth. These arguments (and the related policies) need to be made rigorous and subjected to empirical examination.

Third, economists broadly agree that educational systems ought to solve the problem of investment in human capital, which involves some capital market failures and spillovers.⁵ This consensus is important because it facilitates analytic progress. In contrast, popular and legal debates about education often become mired in struggles over whether it is best to maximize enrollment, maximize achievement, maximize the equality of achievement among students, or do something else entirely. In my own work on school reform, I have attempted to bring all three advan-

tages of economics to bear: modern empirical methods, rigorous economic argument, and a consistent focus on solving the human capital investment problem.

Empirical Evidence on School Choice

Analysis of the various reforms should begin with the two basic, traditional forms of school choice in the United States: choice among public school districts and choice between public and private schools. These two existing options give certain parents a substantial degree of choice, and the effects of their choices are useful for predicting the effects of other reforms. Moreover, empirical evidence on how traditional choice affects students is the only way we can learn about the general equilibrium and long-term effects of school choice.

For instance, several studies (including one I am conducting) are currently evaluating charter and voucher schools, using randomized "treatment" and "control" groups of students.⁶ These studies can inform us about the effects of voucher or charter schools only on those students who actually use them. The studies tell us nothing about the effects that a widespread voucher or charter school policy would have on public school attendance or on how public schools would respond to competition. But analysis of the two traditional forms of choice does inform us about these crucial issues. Furthermore, school choice reforms are always layered on top of traditional choice, and households will make different decisions about traditional choices as the reforms are added.

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Evidence on Choice Among Public School Districts

Choice among public school districts occurs when households can pick their residences. To analyze the effects of such choice, I compare metropolitan areas among which there are long-term differences in parents' ability to choose a school district.⁷ Ease of choice depends both on the number of districts in the area and on the evenness with which enrollment is spread over those districts. Choice is easier in a metropolitan area in which parents choose among 20 districts of equal size than in an area where three-quarters of enrollment falls into one of 20 districts, which in turn is easier than in an area with only one school district.

Great variation exists among metropolitan areas in the degree of choice that is available. For instance, Boston has 70 school districts within a 30-minute commute of the downtown area, while the much larger Miami metropolitan area has only one school district (Dade County). These differences are largely a result of history and geography, but a district's enrollment can also reflect its success: an efficient district attracts a disproportionate share of metropolitan area enrollment and gets other districts to consolidate with it. In simple comparisons among metropolitan areas, this introduces a bias against finding that greater choice among districts has positive effects.

To obtain unbiased estimates, I identify geographic and historical factors that increase a metropolitan area's tendency to contain many, small, independent school districts but that are unrelated to contemporary public school quality. For example, I use the fact that metropolitan areas with more streams have more natural barriers and boundaries;

because they increase students' travel time to school, they may cause the lines drawn to define smaller districts. The resulting (IV) estimates based on cross-section data (including rich demographic data on each school) allow me to identify the causal effect of greater availability of public school districts, while controlling for a wide range of background variables and differentiating the effects of choice on self-segregation.

I find that a one standard deviation change in a Herfindahl index of enrollment concentration, which corresponds to a substantial increase of choice among districts (for instance the difference between having 4 and 100 equal-sized districts) causes a statistically significant but small (2 percentile points) improvement in students' reading and math scores.⁸ However, school efficiency improves dramatically, because the same increase in choice causes schools' per-pupil costs to fall by 17 percent. The powerful implications occur because the effects are opposite in sign: an increase in choice improves student achievement even while accomplishing substantial cost savings.

Choice among districts turns out to have little effect on the degree of segregation among students. The reason is that, empirically, the degree of racial, ethnic, and income segregation that a student experiences is related to the degree of choice among schools in a metropolitan area, but not to the degree of choice among districts. In other words, students are just as segregated in metropolitan areas that contain few districts as they are in metropolitan areas that contain many districts. Households sort themselves into neighborhoods inside districts; neighborhoods and schools are small enough relative to districts that district boundaries have little effect on segregation.

This result demonstrates how important it is to compare realistic alternatives. The realistic alternative to a metropolitan area with a high degree of choice among districts is not a metropolitan area in which all schools are perfectly desegregated and every student is exposed to similar peers. The realistic alternative is a metropolitan area with a low degree of choice among districts and a substantial degree of segregation among schools.

In another study that examines how parents exercise choice, I find that parents who have more choice within the public sector favor schools with strict disciplinary and academic atmospheres. They are also more involved in their children's schooling: a single standard deviation increase in the degree of choice causes a 33 percent increase in the probability that a parent visits his child's school in the course of a year.⁹

Choice among public school districts is especially helpful for analyzing charter school and open enrollment reforms because such analyses require that we know: 1) on what bases parents choose among schools; 2) how public schools differentiate themselves, given that they are subject to public scrutiny and public constraints; 3) whether public providers react to competition for students by improving their programs; 4) how the degree of choice among public providers affects parents' willingness to pay for private school alternatives; and 5) how students self-segregate among schools when they can choose but receiving schools cannot discriminate amongst them. The main limitation of using choice among public school districts to understand charter school and open enrollment reforms is that the reforms' financial arrangements typically have different properties than the finance that results from traditional choice.

Empirical Evidence on Choice between Public and Private Schools

I have also studied the effects of the second way in which parents traditionally exercise choice: enrolling their children in private schools.¹⁰ The schooling offered and the tuition charged by private schools in the United States vary tremendously. Approximately 90 percent of private school students attend schools affiliated with religious groups, but these schools have tuitions that range from token (“\$100 or what parents can pay”) to over \$10,000. The remaining 10 percent of private school students attend “independent” schools, which are disproportionately likely to be exclusively college-preparatory, and which charge more than \$5,000 per year in tuition.

More than 65 percent of U.S. private school students attend a school affiliated with the Catholic Church, although these vary from modest parochial elementary schools to elite, college-preparatory schools. The modal private school student in the United States attends a Catholic school that charges a tuition of about \$1,000 dollars (elementary school) or \$2,250 (secondary school) per year.

American private schools typically subsidize tuition with monies from donations or (less often) income from an endowment. The share of schooling cost that is covered by subsidies is larger in schools that serve low-income students, but even the relatively expensive private schools subsidize tuition. For instance, tuition revenue covers between 55 and 75 percent of the costs of the average Catholic school (depending on the type), but tuition revenue also covers only 80 percent of the costs of expensive Friends schools. Private schools that charge highly subsidized tuition in low-income communities frequently must ration school places.

In a paper that attempts to deter-

mine the effects of private school competition on public schools, I compare metropolitan areas with and without substantial private school enrollment. Metropolitan areas have private school attendance rates that vary from, a low of 3 percent to a high of 33 percent of students. (Private school attendance of 10 to 15 percent is typical.) This variation is created by historical accident, the donations available for subsidizing private schools in an area, and the quality of public schools. In particular, low quality public schools raise the demand for private schools. Thus, simple comparisons will confound the effect of greater private school competitiveness with the increased demand for private schools in areas where the public schools are of poor quality.

To obtain unbiased estimates, I use the fact that a denomination's private schools can provide more tuition subsidies if they inherited an endowment (which may be partly in buildings and land) from a population that was historically comprised mainly of the affiliated denomination. I use metropolitan areas' historical religious population densities as instrumental variables that shift the supply of private schools but are not related to idiosyncratic differences in recent public school quality. I also control for a variety of background factors that might be correlated both with the demand for private schools and with public school quality. In particular, I can control for a household's denomination—so that if being Catholic, say, affects a household's demand for public school spending or the achievement of its children, then this effect is not confounded with the effect of greater availability of Catholic schools.

My estimates suggest that if private schools in an area receive sufficient resources to subsidize each student's tuition by 1000 dollars, then the achievement of public school stu-

dents is higher, regardless of whether it is measured by test scores, ultimate educational attainment, or wages. Mathematics and reading scores improve by 8 percentile points; there is an 8 percent increase in the probability of graduating from high school, and a 12 percent increase in the probability of getting a baccalaureate degree; wages (for those who work, later in life at ages 29–37) improve by 12 percent.

My estimates indicate that competition from private schools does not have a significant effect on public school spending per pupil. This is because there are offsetting forces. On the one hand, an increased supply of private schools tends to draw parents into the private sector who might have supported generous public school spending had their children remained in public schools. On the other hand, the students who are drawn into the private school sector would otherwise have had to be educated at public expense.

Like the effects of choice among public school districts, the effects of private school competition on segregation of students are small and statistically insignificant. This is because, first, public schools are already quite segregated along lines of race, ethnicity, parents' income, and students' performance. Second, private school competition typically increases segregation slightly in public schools and decreases segregation slightly in private schools.

Evidence on traditional private school choice is most useful for predicting the effects of vouchers and tax credits. However, policymakers can more easily control the fiscal impact of vouchers and tax credits on public schools than the fiscal impact of traditional private school choice on public schools. The size and funding of the vouchers or tax credits determines their direct fiscal effect. For instance, most vouchers proposed thus far have been consider-

ably smaller than per-pupil spending in the sending public school district—so that every marginal student who uses a voucher to attend private school leaves monies to be spread among the remaining students.

I also find that parents act as though choice among public school districts and choice between public and private schools can be substitutes to some degree.¹¹ A single standard deviation increase in the degree of choice among public school districts lowers the share of children who attend private schools by about 1 percentage point (or, equivalently, by about 10 percent).

Parents also may be willing to substitute different forms of school choice reforms for one another, to some degree. For instance, a charter school program is likely to reduce the demand for voucher and open enrollment programs.

School Reform

Along with increasing empirical evidence, there have been significant advances in recent years in the economic theory of school reform. Specifically, three types of theories have developed, about 1) the allocative efficiency effects, or how students sort themselves among schools, the average level of school funding, and which schools receive funds; 2) the productive efficiency effects, that is, whether schools use funds efficiently or extract rents; and 3) the effects on income inequality, intergenerational income mobility, and macroeconomic growth.

Theoretical analysis of the allocative efficiency consequences of school reform evolves naturally from the literature on local public goods that is associated with Tiebout. In two papers, Nechyba and Epple and Romano have analyzed the implications of vouchers and open enrollment for housing markets, voting on property tax rates, and the allocation

of students among schools.¹² This type of analysis is difficult because it must be completely general equilibrium, and the housing market and politics must both “clear”—that is, a political mechanism for choosing property tax rates must be specified, allowed to function, and allowed to affect the housing market.

From this literature, we learn that the allocative consequences of most school choice reforms are ambiguous. For example, reforms affect mainly the type, not the level of segregation that occurs. If a voucher, charter school, and open enrollment plan all increase school segregation for a particular attribute (such as ability, income, or race), then the same plan decreases residential segregation along that line. Moreover, an increase in school segregation for one attribute (say, ability) might decrease segregation for other attributes (say, income) and affect school funding, in a direction which depends on the spillover function. Only empirical evidence that enables us to weigh magnitudes can help us resolve these ambiguities and allow us to rank types of school choice as solutions to the problem of investment in human capital. Inherent ambiguity might be the reason that both forms of traditional choice have statistically insignificant effects on student segregation and why private school competition has a statistically insignificant effect on public school funding.

Theory illuminating the effect of school reform on productive efficiency is at a much less advanced stage than theory on allocative efficiency. Yet, whether schools are using funds efficiently is an increasingly important question, especially because the quandaries of K–12 education, described in the opening paragraphs, appear to be problems of productivity rather than of allocation. That is, the United States already supports a high average level of

school spending (either as a share of income or compared to other advanced economies), and the states have increased their aid to districts that serve disadvantaged children almost continually over the last 30 years.

Fortunately, the effects of school reform on productive efficiency are relatively straightforward compared to the effects on allocative efficiency. Productive *inefficiencies* are made possible largely by mobility costs and similar barriers that lead to a group in a school district of incumbent residents from whom rent can be extracted. While it is difficult to predict how a school reform will affect people's choice of residence, where students attend school, and how people vote on property taxes (for all the general equilibrium reasons described earlier); it is usually quite easy to characterize how a school reform affects mobility costs. One of my papers which uses a principal-agent framework shows, for example, that an increased degree of traditional choice among public school districts, combined with conventional American local school finance, reduces the rent that a school district's bureaucrats can extract from residents.¹³ The logic behind this is that house prices in a metropolitan area with many similar school districts competing for residents provide a lot of information about school quality. Because local school budgets depend on local house prices (through the property tax), the information about school quality that is embodied in house prices is used to reward school bureaucrats through the size of their budgets.

Extending the argument to school reforms, including charter schools, vouchers, and open enrollment programs, is not difficult. All of these programs substantially lower mobility costs among schools because they detach school choices from residen-

tial choices, and the largest mobility costs are associated with residential moves. School choice programs also provide direct links between parent choices and school finances, as opposed to the indirect link through the housing market.

Appropriate financial arrangements are crucial for school reforms. The ideal financial arrangements provide consistent and politically stable rewards for successful schools—the rewards must be generous enough to encourage expansion of successful schools and contraction of unsuccessful schools. Many actual school reforms have financial arrangements that are poorly designed. Indeed, some open enrollment plans' financial arrangements encourage perverse behavior, such as fiscal free-riding: that is, purposely locating a school in a district with low property taxes which borders on a district with high property taxes and generous school spending, and then using an open enrollment plan to free-ride on taxpayers in the high property tax district. In the long run, fiscal free-riding blunts everyone's incentives to support public school funding.

Recent work by Benabou and Boldrin also links school reform to macroeconomic growth, the distribution of income, and intergenerational income mobility.¹⁴ They suggest that the structure of school choice and school finance both influence allocation—that is, the sorting of students among schools and the level and distribution of school spending. These allocative outcomes have consequences for the nation's overall level of human capital, for whether investments in human capital are distributed efficiently among people or on the basis of some arbitrary factor like parents' income, and for the level of human capital spillovers generated by a given level of financial investment in human capital. Unfortunately, this macroeconomic literature

shares the difficulties of the microeconomic literature on allocative consequences of school reform: the consequences are ambiguous because school choice changes the kind, not the level, of segregation. The macroeconomic literature also has yet to absorb fully the fact that households do not distribute themselves in a perfectly desegregated way, even when there is no school choice and there is centralized finance. Indeed, quantitatively important, macroeconomic consequences of school reform are not likely to occur through changes in allocative efficiency and are more likely to occur through changes in productive efficiency.

I have investigated the relationship between income inequality and school funding using Census and administrative data at the level of the school district.¹⁵ For Massachusetts, Illinois, and California at decade intervals from 1900 to 1990, I find that inequality in school funding fluctuates with changes in inequality of national income. Decades of increasing income inequality, such as the 1930s and 1980s, exhibited increases in school funding inequality (which were somewhat smaller than the increase in income inequality). Decades of decreasing income inequality, such as the 1940s and 1950s, showed decreasing inequality in school funding. I find no evidence of the reverse relationship—that is, that inequality in school funding for a generation translates into greater income inequality for that generation as adults. The fact that there is no evidence for this relationship does not imply that it does not exist. Rather, it suggests that the allocative consequences of the changes in school finance that have occurred over the twentieth century are small when compared to the powerful effect of the income distribution on the school spending distribution.

Related Points: Fiscal Independence, Teachers' Unions, and Higher Education

Up to this point, I have only mentioned in passing the financial implications of school choice, and I have mainly discussed school districts as though they were always fiscally independent. In fact, as I show in two recent papers, this is far from true.¹⁶ In 1950, the typical American school district raised more than 65 percent of its funds from a local tax base. By 1990, the typical district raised just under 40 percent of its revenue this way. Moreover, state aid increasingly has switched from being effectively "lump sum" (so far as school districts are concerned) to being a marginal tax on school districts' locally raised revenue.

In my work on school finance equalization, I use the states' school finance formulas to calculate the marginal tax price of local school spending for each school district in the United States in 1972, 1982, and 1992. I show that many school finance equalization schemes create marginal taxes on the raising of local revenue for schools, and that there generally has been a substantial decrease in the degree to which districts are fiscally independent. One consequence of this is that districts are taxed systematically on any increases they make in productive efficiency. In other words, a state that reduces its districts' financial independence (especially at the margin) also reduces the districts' incentives for productive efficiency, even if choice among public school districts is easy. For instance, I find that in California, where (since the Serrano II decision) districts have almost no financial independence, the positive effects of choice on student achievement and cost savings are reduced by more than half (making them statistically insignificant).¹⁷

How does a school district become more efficient in an environment with more school choice? I attempt to answer this question in part in a study of teacher unionization.¹⁸ I use panel data on over 90 percent of American public school districts in 1972, 1982, and 1992 in order to see what happened to teacher salaries, the pupil-teacher ratio, school spending, and student achievement when teachers unionized. I find that unionization generally reduces school efficiency, but does so by a smaller amount when the school faces competition from other public school districts and private schools. For example, unionization makes teachers' salaries rise less if the school district is in a metropolitan area with more choice among public school—whether or not student achievement is held constant—than if it is not.

I have also found it revealing to compare the structure of U.S. higher education to that of K-12 education. In a recent article on federal education policy, I discuss whether American colleges have high international stature and success with a wide range of students partly *because* they face a far more competitive market structure than elementary and secondary schools.¹⁹ College students are increasingly mobile and active "choosers" of their schools, and they carry their funds with them when they switch colleges. A much larger share of colleges than K-12 schools are private, nonprofit institutions. Also, most American colleges (including public colleges) are highly financially independent, so they must attract students in order to remain solvent. Still, colleges are not only successful with students from elite backgrounds: Breneman demonstrates that some colleges, especially community colleges, are inexpensive and successful providers of remedial schooling for students who need basic secondary school skills, such as writing, reading, and algebra.²⁰

Conclusion

We still do not have an "economics of school reform," but we are making steady progress on the empirical and theoretical analysis of school choice policies and school finance policies. By making loose economic arguments rigorous and bringing empirical evidence to bear, we have uncovered at least some important stylized facts, for instance, that the consequences of segregation on school reforms are more ambiguous than initially thought, and that the productivity consequences are clearer and probably of greater quantitative importance. Also, we are increasingly thinking jointly about school choice and school finance because financial incentives are the key to the way that school choice actually works. The structure of school choice and school finance are crucial to how individuals solve their human capital investment problems and how much a society increases its human capital over time. The implications for income inequality and macroeconomic growth are likely to keep economists interested for some time to come.

[Note: Most of Hoxby's papers cited here are available through her Web site, which can be reached through NBER's Web site (www.nber.org).]

¹ A.M. Tucker and W.F. Lauber, *School Choice Programs: What's Happening in the States*. Washington, D.C.: The Heritage Foundation Press, 1995. Also see J. Allen, *School Choice Programs: What's Happening in the States*. Washington, DC: The Heritage Foundation Press, 1992.

² C.M. Hoxby, "Is There An Equity-Efficiency Trade-Off in Local School Finance?" NBER Working Paper No. 5265, September 1995. See also S. Peltzman, "The Political Economy of the Decline of American Public Education," *Journal of Law and Economics*, (Winter/Spring 1993), 36(1-2), pp. 331-70.

³ C.M. Hoxby, "Are Efficiency and Equity in School Finance Substitutes or Complements?" *Journal of Economic Perspectives*,

(Fall 1996), 10(4), pp. 51-72. See also E. Hanushek and S. Rivkin, "Understanding the 20th Century Explosion in U.S. School Costs," mimeo, University of Rochester and Amherst College, 1994.

⁴ C.M. Hoxby, "Not All School Finance Equalizations Are Created Equal," mimeo, Harvard University, 1995. See also W. Evans, S. Murray, and R. Schwab, "Schoolhouses, Courthouses, and Statehouses After Serrano," *Journal of Policy Analysis and Management*, (January 1997), 16(1), pp. 10-37.

⁵ I certainly argue that there should be a consensus in C.M. Hoxby (*Journal of Economic Perspectives*, 1996—see n. 3). This is also the standard suggested by R. Benabou and by Raquel Fernandez and Richard D. Rogerson. See R. Benabou, "Heterogeneity, Stratification, and Growth: Macroeconomic Implications of Community Structure and School Finance," *American Economic Review*, (June 1996), 86(3), pp. 584-609.

⁶ See, for instance, J. Greene, W. Howell, and P. Peterson, "An Evaluation of the Cleveland Scholarship Program," *Harvard University Program in Education Policy and Governance Occasional Paper*, 1997.

⁷ C.M. Hoxby, "Does Competition Among Public Schools Benefit Students and Taxpayers," NBER Working Paper No. 4979, December 1994.

⁸ In practice, the most reliable measure of the ease of choice is a Herfindahl index based on districts' enrollment shares. The Herfindahl index incorporates both the number of districts and the evenness of districts' enrollment shares. A Herfindahl index based on enrollment shares is computed as follows. Suppose a metropolitan area has J school districts, which we index by $j=1, \dots, J$. Suppose each school district has a share, s_j , of total metropolitan area enrollment. Then, the index is:

$$\sum_{j=1}^J s_j^2$$

When there is no choice in a metropolitan area because there is only one public school district, the index is equal to 1. As more districts are added, and as enrollment is spread more evenly over those districts, the index gets closer to 0.

⁹ C.M. Hoxby, "When Parents Can Choose, What Do They Choose? The Effects of School Choice on Curriculum and Atmosphere," in *When Schools Make a Difference*, S. Mayer and P. Peterson, eds., Washington, DC: The Brookings Institution Press, 1998.

¹⁰ C.M. Hoxby, "Do Private Schools Provide Competition for Public Schools?" NBER Working Paper No. 4978, December 1994. See also C. M. Hoxby, "The Effects of Private School Vouchers on Schools and Students," in *Holding Schools Accountable*, H. Ladd, ed., Washington, DC: The Brookings Institution Press, 1996.

¹¹ C.M. Hoxby, "Do Private Schools Provide Competition for Public Schools?"

¹² D. Epple and R. Romano, "Public School Choice and Finance Policies, Neighborhood Formation, and the Distribution of Educational Benefits," mimeo, Carnegie-Mellon University and University of Florida, 1995. See also T.J. Nechyba, "Public School Finance in a General Equilibrium Tiebout World: Equalization Programs, Peer Effects, and Vouchers," NBER Working Paper No. 5642, June 1996.

¹³ C.M. Hoxby, "Tiebout and a Theory of the Local Public Goods Producer," NBER Working Paper No. 5265, September 1995 (revised 1997).

¹⁴ See the reference to R. Benabou, *American Economic Review*, 1996, in n. 5. See also M. Boldrin, "Public Education and Capital Accumulation," *Economic Theory Workshop Discussion Paper No. 1017*, 1993.

¹⁵ C.M. Hoxby, "How Much Does School Spending Depend on Family Income? The Historical Origins of the Current School Finance Dilemma," *American Economic Review, Papers and Proceedings*, 88(2), May 1998.

¹⁶ See C.M. Hoxby, *Journal of Economic Perspectives*, 1996, and, "Not All School Finance Equalizations Are Created Equal," 1995.

¹⁷ C.M. Hoxby, "Does Competition Among Public Schools Benefit Students and Taxpayers?"

¹⁸ C.M. Hoxby, "How Teachers' Unions Affect Education Production," *Quarterly Journal of Economics*, (August 1996), 111(3), pp. 671-718.

¹⁹ C.M. Hoxby, "Where Should Federal Education Initiatives Be Directed? K-12 Education versus Higher Education," in *Financing College Tuition: Government Priorities and Social Priorities*, M. Koster, ed., Washington, DC: American Enterprise Institute Press, 1998.

²⁰ D. Breneman, "The Extent and Cost of Remediation in Higher Education," in *Brookings Papers in Education Policy*, D. Ravitch ed., Washington, DC: The Brookings Institution Press, 1997.

Developments in Pensions

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The share of the world's population over age 60 will triple between 1990 and 2030, exceeding 30 percent among developed countries by then. This massive demographic shift will force insolvency on many of the large unfunded public social security programs that evolved after World War II.

Are funded pension plans necessary for retirement system reform? This is one subject I explore in my research on pensions in developed and developing countries. In each case, I ask how pensions function, what effects they have on work and saving, and how pensions help public and private stakeholders to share the risks of old age. Ultimately, I am interested in how to design pension plans to increase their efficiency and

insulate them from a range of political and financial challenges.

Retirement Saving Adequacy in the United States

The U.S. situation brings some of these problems into focus very clearly. Our Old Age, Survivors, and Disability Insurance (OASDI) program under Social Security faces an unfunded obligation of approximately \$9 trillion. Fixing this shortfall would require either benefit cuts of about 25 percent or tax increases of approximately the same magnitude.¹ Such a massive change in the system portends ill for prospective retirees in the baby boom generation as well as current retirees. In a recent study using the Health and Retirement Survey (HRS), James Moore and I found that most Americans have saved too little to preserve their current consumption standards in retirement. This nationally representative and longitudinal study of respondents aged 51 to 61 in 1992 and their spouses describes multiple sources of household wealth and determinants

of old-age poverty for a group who are on the verge of retirement.

The HRS inquires about respondents' net housing and financial wealth describes employer-provided plans enabling us to calculate pension wealth and links data from the survey expected Social Security benefits derived from earnings records gathered from Social Security files.² We use the Social Security Administration's "intermediate" economic and demographic assumptions, and conclude that median total household wealth (that is, net financial wealth plus net housing equity, pension wealth, and Social Security wealth) for this group is approximately \$350,000. Pension benefits, net home equity, and net financial wealth each contribute about one fifth of the total, and anticipated Social Security benefits make up the remaining two fifths.

Is this enough money to retire on? Obviously the answer depends on one's benchmark; in our work, we ask how much additional saving would be required in order to retire at a specified age and to smooth consumption in retirement. Our analysis

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has three steps: 1) projecting HRS respondents' current assets to retirement; 2) determining what consumption level would be feasible with those assets; and 3) iteratively solving for the additional saving needed to achieve consumption smoothing after retirement. We find that the median older HRS household faces a saving shortfall of 16 percent per year, if its members continue to opt for early retirement.³ This represents saving needed in addition to "automatic" asset appreciation, pension growth, and increases in social security benefits. We believe this shortfall is a matter of some concern, and would be twice as high for those with very low assets.

The distributional pattern of results is also of some interest, because we find that the correlation between older workers' income and wealth levels is only 0.4. Thus, many households at the top of the income distribution are falling far below their savings targets and will be required to curtail consumption in retirement. This shortfall is worrisome, although we also show that delaying retirement to age 65 can cut the required additional saving in half. This result might partially explain why labor force attachment rates of older American men have risen slightly in recent years.

Private and Public Pension Plan Structures

These saving shortfalls are probably underestimates, inasmuch as we assume that Social Security and pension benefits will be paid at their current promised levels. But political and fiscal pressures threaten retirement income promises from a number of different directions. For example, one issue is how pension systems are designed and governed, as we show in a series of papers on public pension plans.⁴ These systems

pay retirement benefits to state and local government employees including teachers, uniformed officers, and other civil servants. In many ways, these pension systems represent success stories, because they have more than 16 million participants and more than \$1 trillion in assets. But public pension plans often are criticized because they do not always follow funding rules, and the retirement benefits they pay exceed those in the corporate sector. For instance, low seniority public sector retirees receive benefits about 50 percent higher than their private sector counterparts, and high seniority workers have a replacement rate that is one half to two thirds greater. On the other hand, it must be recalled that many public sector employees (about one quarter) are not covered by Social Security.

We also show that public pension plans are managed differently from private plans, mainly because corporate pensions must meet fiduciary standards codified in the Employee Retirement Income Security Act (ERISA), while public plans are subject to regulations that are less stringent and less uniform. As a result, public plan governance is fraught with political pressures. In practice, funding and actuarial assumptions may be selected in accordance with fiscal stress, and investments are frequently subject to nonfinancial criteria.⁵ In general, political appointees and *ex officio* board members dominate decision making, with a sizable minority of directors representing plan participants. Perhaps because of this different governance structure, public pension plans are more likely to direct investments toward in-state projects, a practice associated with diminished rates of investment return. Despite these concerns, we conclude that public plans are relatively well funded, and their asset allocation patterns have changed dramatically over time: currently, more

than 40 percent of public plan assets are held in stock, up from 3 percent in 1960.

Related to pension plan design and performance is the issue of administrative expenses, an important topic that has been studied little. My research shows that public pension plans operate at only 65 percent of potential efficiency, mainly because many small plans fail to take advantage of scale economies. Also, defined benefit plans appear to be more expensive to administer in the United States than defined contribution plans. For all of these reasons, costs associated with alternative pension plan designs should garner more attention, given current interest in building up retirement assets and the worldwide shift from defined benefit to defined contribution pensions.⁶

My work also addresses two other issues in the national and international debate over pension reform, both of which concern proposals to replace Social Security with a national (and usually mandatory) defined contribution pension system. First there is the "money's worth" concept, which we argue should not be used in comparing retirement system net benefit flows under an underfunded defined benefit system with those of a fully funded defined contribution pension system.⁷ Specifically, money's worth estimates do not incorporate all the relevant costs of "transition" to an unfunded system; frequently they do not adjust appropriately for either aggregate or idiosyncratic risk (both of which would rise under privatization); and they do not account for changes in household behavior as a result of a large reform of the national system.

Second, there is the issue of the payout or decumulation phase of the pension system. In one project, we explore the market for retirement annuities: insurance products that offer protection against the risk of outliving one's savings.⁸ These annu-

ities are of utmost importance when retirees are responsible for deciding how much of their assets to spend versus draw down over the retirement period. Inasmuch as U.S. pension growth is mainly in the defined contribution [and especially the 401(k)] field, more and more retirees can access their total pension amount rather than are required to annuitize their benefits. Of course, some retirees will still purchase annuities, particularly those who anticipate living longer than average. This produces adverse selection, which the data suggest is powerful. On the other hand, we also find that over time the net annuity payout (that is, the expected present discounted value of benefits minus the initial cost of the annuity) has risen, suggesting that adverse selection might be less of a concern than in the past. This result bears on the policy debate regarding the role of individual choice and self-reliance in retirement planning.

A Shift in Focus?

Several developments will influence future retirement accumulation and decumulation patterns. First, the worldwide interest in defined contribution pensions will continue, because this type of plan facilitates job change and pension portability and allows workers to choose how much to save and how to allocate their retirement portfolios. Second, expenses associated with different plan designs will influence the level of and returns on pension saving. In particular, defined contribution pen-

sions appear relatively less costly to administer than defined benefit pensions, and this makes them more interesting to both corporate and public employers seeking to stretch retirement dollars. Finally, the relative importance of Social Security income in retiree incomes will change as taxes and benefits are altered to bring the insolvent system into balance.

These changes will have substantial spillover effects on workers' saving and retirement asset decumulation patterns. Clearly, workers and their families will have to learn to save more if they are to meet retirement accumulation targets. Along the way they will have to acquire greater financial sophistication in order to better understand the risks they face in their pension portfolios. And although many benefits will flow from increased personal responsibility imposed by these changes, experts acknowledge that defined contribution pensions lack some of the group risk pooling mechanisms that the conventional defined benefit plan offers. For instance, retirees in a defined contribution environment are more exposed to longevity risk when they lack access to (or fail to purchase) annuities. Defined benefit plans traditionally are also more redistributive than defined contribution pensions are.

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³ See O.S. Mitchell, and J.F. Moore, "Retirement Wealth Accumulation and Decumulation: New Developments and Outstanding Opportunities," NBER Working Paper No. 6178, September 1997; and "Projected Retirement Wealth and Saving Adequacy in the Health and Retirement Study," NBER Working Paper No. 6240, October 1997.

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International Capital Flows: Sustainability, Sudden Reversals, and Market Failures

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The Mexican peso debacle and, most recently, the balance-of-payments crises in Thailand, Malaysia, the Philippines, and Indonesia show how changes in the direction of capital flows after a period of large current account deficits can force the adoption of drastic adjustment measures designed to reduce external imbalances and meet external obligations. Much of my recent research has focused on the issue of balance of payments dynamics with potential capital flow reversals. I have also investigated the related topic of market failures associated with international capital flows and their implications for capital accumulation and capital income tax policies. This summary briefly reviews my work in these two areas. First I describe my research on external sustainability [1993] and my joint work with Gian-Maria Milesi-Ferretti [1996a,b and 1997]. Then I summarize my research on the composition of international capital flows between portfolio debt investment, portfolio equity investment, and foreign direct investment (FDI) under asymmetric information between the owners-managers of the corporation and other portfolio stakeholders, and between the domestic and portfolio stakeholders [Razin, Sadka, and Yuen, 1996 and 1997]. The information-based framework, which gives rise to inadequate domestic savings and foreign underinvestment, has important implications for the domestic accumu-

lation of capital and for international taxation.

Capital Flows Reversals

Three related questions often are asked about an economy's external balances: Is a debtor country solvent? Is the current account deficit excessive? Are current account imbalances sustainable?

An economy is solvent if the present value of present and future trade surpluses is equal to the country's external indebtedness. The question of whether particular current account deficits are excessive could be answered in the context of the consumption smoothing model of the current account, which yields predictions for the intertemporal equilibrium path of external balances, based on the assumption of perfect capital mobility. This has been demonstrated by Reuven Glick and Kenneth Rogoff¹ as well as myself, working independently² and with Leonardo Lieder- man.³ When foreign investors are uncertain about a country's willingness to meet its debt obligations, or about its ability to do so in the face of external or domestic shocks, there are constraints on the sustainability of current account imbalances in addition to those imposed by pure intertemporal solvency.

In the context of a cross-country episodic analysis, Milesi-Ferretti and I [1996a,b] consider potential indicators of sustainability and examine their performance in signaling external crises.^{4,5} The episodes fall into three broad categories of outcomes: 1) those in which sustained current account imbalances did not trigger sharp policy reversals; 2) those in which external and/or domestic factors caused a sharp policy reversal, but without external crises; and 3) those in which persistent current

account imbalances were followed by an external crisis, resulting in debt rescheduling, renegotiations or a massive bailout. We characterize these different experiences in terms of such factors as the macroeconomic policy stance, the economy's structural characteristics, and external shocks. Our aim was to determine whether (and identify which of) the sustainability indicators help to discriminate among the three groups of country episodes, in particular, between countries that did or did not experience external crises. In order to interpret the contribution of these indicators to explaining sustainability, it was important to ascertain whether differences in the intensity of external shocks were not the predominant reason for the range of country experiences. We find that various indicators of sustainability help us to discriminate among the three possible outcomes, including: the ratio of exports to GDP (a measure of trade openness), the degree of real exchange rate misalignment, and the level of national savings.

Milesi-Ferretti and I interpret the role of trade openness as follows: In order to service and reduce external indebtedness, a country needs to rely on the production of exports as a source of foreign exchange. Clearly, a country with a large exports sector can service external debts more easily, because debt service will absorb a smaller fraction of its total export proceeds. In order to generate the foreign exchange required to service external debt in case of an interruption in capital flows, a country needs to engineer a resource shift towards the exports sector. Since this shift cannot occur instantly, sharp import compression may become necessary, with adverse consequences on domestic industries that rely on

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imported inputs. This import compression may be more costly in a relatively closed economy, because it is more likely to entail cuts of "essential" imported inputs. Although the evidence from the sample of episodes does not suggest that large fiscal imbalances *ex ante* imply that current account deficits are unsustainable, in most of the episodes an *ex post* improvement in the current account balance, after a prolonged period of deficits, was associated with a fiscal consolidation.

My 1997 work with Milesi-Ferretti more systematically looks at the determinants and consequences of reversals in current account imbalances. Using a sample of 86 developing countries over the period 1971–92, we ask: What triggers sharp reductions in current account deficits? And what factors explain the costliness of such reductions?⁶ A sharp reversal in external imbalances can originate in a change in macroeconomic policy stance undertaken by the country in question—for example, the implementation of a stabilization plan—or it can be forced upon the country by external developments, such as a sudden reversal in international capital flows that forces the country to reduce its external imbalances.

In our sample of low- and middle-income countries, reversal events have to satisfy two requirements: First, an average reduction in the current account deficit of at least 3 percentage points of GDP over a three-year period. This requirement captures the idea that a reversal is characterized by a large and sustained reduction in current account imbalances. Second, the maximum current account deficit after the reversal must be no larger than the minimum deficit in the three years preceding the reversal. This requirement should insure that we capture only reductions of sustained current account deficits, rather than reversals

of a temporary nature.

Our probit analysis identifies a number of "robust" predictors of reversals in current account imbalances: 1) Current Account Deficit. Not surprisingly, reversals are more likely in countries with large current account deficits. This result is consistent with solvency and willingness to lend arguments; 2) Openness. Reversals are less likely in more open economies. This result is consistent with our previous work⁷ and with theories of current account sustainability that emphasize how more open economies have fewer difficulties in servicing external liabilities, and less incentive to renege on external debt, thereby making a turnaround in capital flows less likely; 3) Reserves. Countries with lower reserves (as a fraction of imports) are more likely to experience a reversal. This result is consistent with a "reserves adequacy" approach and, on the capital account side, with a willingness-to-lend argument. The ratio of reserves to M2, which Calvo and others have identified as a key predictor of recent balance-of-payments crises, does not appear to signal reversals ahead of time in our sample. It is negatively correlated with our event measure, but is "dominated," in terms of statistical significance, by the reserves-to-imports ratio; 4) Investment. For a given size of the current account deficit, a high share of savings and investment increases the likelihood of a reversal. High investment and savings can increase future exports and output growth, thereby contributing to narrowing current account imbalances; 5) Concessional Debt. As expected, the higher the share of concessional debt in total debt, the less likely is a current account reversal. There can be two reasons for this: concessional debt flows are less likely to be reversed; and, they are likely to be higher in countries that have more difficulty reducing their external imbalances

and servicing their external obligations; 6) Terms of Trade Before the Reversal. Reversals are more likely in countries with diminished terms of trade. One interpretation is that countries that have suffered terms-of-trade deterioration are more likely to experience a reversal of capital flows, and therefore may be forced to adjust. We also find that reversals are more likely in years in which the terms of trade improve; 7) Public Deficit. The lower the public sector deficit, the higher is the probability of a reversal. This result, somewhat difficult to interpret, can be caused by the effects of fiscal consolidation on the current account.

Pecking Order of International Capital Flows

Even though financial markets today show a high degree of integration, with large amounts of capital flowing across international borders to take advantage of rates of return and the benefits of risk diversification, the world capital market is still far from the textbook story of perfect capital mobility. International capital immobility has been explained not only by capital controls, but also by informational problems associated with international investments. Because of adverse selection and moral hazard problems, real rates of return across countries are not equal. Applying capital market regulations and better rules of disclosure to information about domestic firm profitability alleviates some of these problems of asymmetric information, but such rules and regulations are not adequate in most developing countries. Adverse selection problems give rise to a pecking order among types of international capital flows: foreign portfolio debt investment (FPDI); foreign portfolio equity investment (FPEI); and FDI. This ranking originates from the "home

court advantage" that domestic savers have over their foreign counterparts, and is somewhat similar to the pecking order hypothesis of corporate finance.

In corporate finance, the hypothesis maintains that firms prefer internal finance (retained earnings) to external finance. In the international capital market, FDI comes first, FPGI second, and FPEI third. My 1997 analysis with Sadka and Yuen considers three tax instruments, which together can level the playing field and restore efficiency: a tax on the capital income of nonresidents, a tax on capital income of residents; and a corporate income tax.⁸

Typically, though, there is also significant asymmetry in information between the managing stockholders (owner-managers) and other portfolio equity- and debt-holders. This asymmetry of information causes severe market failures, which can be devastating in the case of equity-financed capital investment. We show

that the equity market may collapse to a "lemon" market, as in Akerlof,⁹ and that little financing is provided for capital investment. We show that in this case, FDI has an essential role in restoring the function of the capital market and the financing of capital investment. However, such financing is still not fully efficient, because it leads to foreign overinvestment and domestic undersavings. A corrective tax package, with a tax on the capital income of nonresidents and a subsidy to corporate income, will restore efficiency. Non-uniform taxation of capital income from various sources is crucial for the efficiency of the international capital market in the presence of information-based market failures.

¹ G. Akerlof, "The Market for 'Lemons': Qualitative Uncertainty and the Market Mechanism," *Quarterly Journal of Economics*, 89, (1970) pp. 488-500.

² R. Glick and K. Rogoff, "Global versus Country-Specific Productivity Shocks and the Current Account," *Journal of Money*

and Finance, 35 (February 1995), pp. 159-92.

³ L. Leiderman and A. Razin, "Determinants of External Imbalances: The Role of Taxes, Government Spending, and Productivity," *Journal of the Japanese and International Economics*, 5 (December 1991), pp. 421-50.

⁴ G. Milesi-Ferretti, and A. Razin, "Sustainability of Persistent Current Account Deficits," NBER Reprint No. 2100, December 1996. [1996a]

⁵ "Current Account Sustainability: Selected East Asian and Latin American Experiences," NBER Reprint No. 2111, March 1997. [1996b]

⁶ "Sharp Reductions in Current Account Deficits: An Empirical Analysis," NBER Working Paper No. 6310, December 1997.

⁷ A. Razin, "The Dynamic-Optimizing Approach to the Current Account: Theory and Evidence," NBER Reprint No. 1984, July 1995. [1993]

⁸ A. Razin, E. Sadka, and C. Yuen, "Tax Principles and Capital Inflows: Is it Efficient to Tax Nonresident Income?" NBER Reprint No. 5513, March 1996. [1996]

⁹ "An Information-Based Model of FDI and Capital Flows," forthcoming as an NBER Working Paper. [1997]

Institutions for Managing Risks to Living Standards

Robert J. Shiller*

Do our existing institutions for investment, hedging, and insurance

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allow individuals to manage risks to their living standards effectively? How effectively can people manage risks to the various components of U.S. household wealth? Figure 1 shows a breakdown of U.S. national wealth in 1996 (\$114 trillion), which here includes human capital, or the present value of labor income, which

usually is ignored in wealth computations. Human capital accounts for 73.7 percent of estimated national wealth; financial assets account for 16.2 percent; real estate accounts for 7.9 percent; and consumer durables account for 2.2 percent.¹

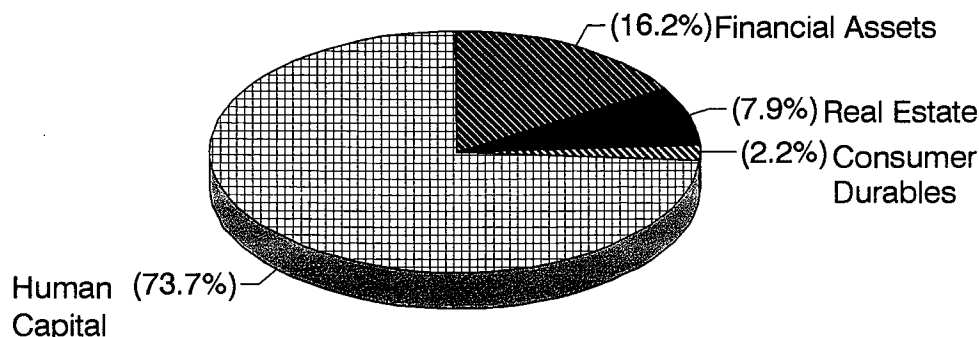


Figure 1. Breakdown of estimated \$114 trillion U.S. national wealth into components. Source: Author's calculations using national income, stock market, and Board of Governors of the Federal Reserve System *Balance Sheets for the U.S. Economy*.

Of these major components, only financial assets—16.2 percent of the total—have well-developed liquid markets that allow ready hedging and diversification. There are no hedging or diversification vehicles for human capital. For real estate, particularly single family homes, there are no large liquid markets: One cannot hedge the risk in one's own home and cannot invest easily in a truly diversified world-wide real estate portfolio.

Can one use existing financial markets to hedge risks to total wealth? Hedging income risks seems to entail shorting one's own country's stock markets in massive amounts, as Baxter and Jermann argue.² But we have no assurance that there will be a positive covariance between financial asset returns and returns on claims on aggregate incomes. Bottazi, Pesenti, and van Wincoop estimate that the covariance has been small and negative for U.S. aggregates.³ In terms of managing real estate risk, note that existing financial assets tied to real estate—real estate investment trusts and securitized mortgages—are not representative of overall real estate price risk and do not provide a vehicle for hedging of local real estate price risk. To hedge risks, it is much better to write risk management contracts directly in terms of the risks to be hedged.

Macro Markets

In my 1993 book *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*, I argue that markets could be set up for long-term claims on aggregate incomes.⁴ These could be privately managed futures, options, or swaps markets for national incomes, or they could be markets for government national income-denominated bonds. Although such markets are unknown today, they could become extremely important. Given the relative impor-

tance of nonfinancial components of national wealth, they could someday be much larger and more important than existing financial markets.

These markets are important because of the uncertainty that people face with regard to risks to national income. Based on data for 49 countries, Stefano Athanasoulis, Eric van Wincoop, and I estimated that there is an 89.4 percent probability that the unweighted average real per capita GDP of the seven best performing countries relative to that of the seven worst performing countries will triple in 35 years.⁵ Thus, we can expect to see substantial winners and losers in terms of national income, and the livelihoods of individuals in these countries will be very different, depending on the fortunes of their country.

To reduce the effects of such risks, the social security trust funds of each country could invest in national income-denominated debt of foreign countries and could borrow by issuing its own such debt. Social security benefits then could be indexed to world income, allowing optimal risk management for retirement income.⁶ Private pensions of course could do the same kind of hedging, if such debt or analogous markets existed. All of these options depend on creating national income-denominated national debt or on other forms of long-term claims on incomes, wages, or salaries.

Indexing national debt owed to foreigners to national income would prevent countries from falling into difficult situations if their economic growth were not as high as expected. Instead, foreign investors would bear some of the national income risk as part of a diversified portfolio. Such risksharing might be very important for countries with high foreign debt and uncertain national incomes.

Markets for long-term claims on each country's income might not need to be set up initially, since

countries that correlate well could be grouped together and their securities traded together, much like index funds today trade groups of stocks. A small number of markets for swaps between major groups of countries also might be very useful.⁷ A market for a perpetual claim on the income of the entire world, the biggest market of all, also might be advantageous.⁸

Potential problems do exist in setting up these markets for claims on aggregate incomes. One problem is that countries might misrepresent their national income statistics. This could be minimized by internationalizing or privatizing the function of constructing national incomes. National income statistics as currently constituted may not be ideal for the settlement of contracts; there might be alternative definitions used that handle demographic changes somewhat better.⁹ The "moral hazard" problem—that people will not work hard if they know their incomes are insured—is probably not severe, because the macro markets will be settled on aggregate, rather than individual, incomes.

Real Estate Risk Management

Figure 1 shows that real estate wealth constitutes a small but substantial fraction (7.9 percent), of estimated total wealth. However, real estate is an important part of wealth for individuals late in the life cycle. Venti and Wise report that in 1991 the median level of housing equity held by U.S. families whose heads were 65 to 69 years old was \$50,000, about half their median social security wealth, and far more than their median employer-pension wealth (\$16,017) and their median personal financial assets (\$7,428).¹⁰ Thus, fluctuations in real estate prices have a real impact on the livelihoods of many people.

Although it is possible today to

insure real estate against fire and other catastrophes, hedging against real estate price declines generally is not possible. People could hedge their local real estate risks if futures and options markets were created, based on contracts settled in cash on regional real estate price indexes.¹¹ For example, futures markets for both residential and commercial real estate in each major metropolitan area could be devised, allowing people in each area to take short positions in the futures market corresponding to their area, thereby hedging their risk. Efforts in the United Kingdom to start futures markets for U.K. real estate were undertaken by the London Futures and Options Exchange in 1991 and by Barclay de Zoete Wedd in 1996, but there have been no attempts yet in the United States or in other countries. The announcement in January 1998 of new real estate futures contracts by the Chicago Board of Trade is not really about real estate price futures: These futures will be listed on the Dow Jones index of real estate investment trusts.

With or without real estate futures, options, or swaps markets, retail institutions could help owners of real estate to manage their risks better, and we see beginnings of some such new institutions, including the Home Equity Conversion Mortgage (HECM) program sponsored by the Federal Housing Administration. However, the HECM and similar programs are not designed with only risksharing in mind. Other programs could do a better job of protecting homeowners against price fluctuations. For example, limited partnerships could enable individual homeowners to purchase a fraction of their home, with the remainder sold to investors.¹² Alternatively, insurance companies or mortgage lenders could attach index-settled home equity insurance policies to their contracts with homeowners.¹³

Any such new retail institutions for

real estate risk management must be designed carefully, though. Concerns should include the homeowner's strategic selling of the house or cancellation of the policy, moral hazard risk, and risk of poor maintenance of the house. Still, it may be possible to design new institutions that reduce real estate owners' risk substantially.¹⁴

Inflation Indexation

Some of the risks to the components of wealth are attributable to inflation-induced shifts in the real values of nominal payments that are specified in contracts. Total nominal contracts are more important than financial assets in national wealth (as shown in Figure 1) because they exclude most inside debts, and because interpersonal contracts have no net value in national wealth. Of course, nominal assets are important for many individuals, especially for the elderly. Although inflation might appear to be vanquished at the moment, we can never be sure that it will stay down in future years, so the risk of inflation remains. Indexed debt protects people against the risk of inflation by tying debt payments to inflation.¹⁵

In January 1997, for the first time in U.S. history, the U.S. Treasury, following the example of many other countries, introduced indexed federal government debt: the Treasury Inflation Protection Securities program (TIPS). TIPS represents a significant financial innovation, but even though public acceptance has been described as encouraging relative to expectations, the public actually has purchased very little of these new securities, amounting to roughly 0.5 percent of the U.S. federal debt. Other countries' experiences indicate that the public is often only marginally interested in purchasing indexed debt, even in times of high inflation.

My study of public acceptance of indexation in the United States and

Turkey (a country with high inflation) demonstrates many reasons for public apathy toward indexation. They include lack of appreciation of inflation uncertainty, lack of understanding of the nature of redistributions caused by unexpected inflation, and simple difficulties in understanding the math involved in indexation formulas.¹⁶

Public acceptance of indexation might be enhanced if the government (or an international agency) creates a new unit of measurement of value that itself is indexed and encourages its widespread use. The government (or agency) need only define an indexed unit of account, like the *unidad de fomento* introduced in Chile in 1967. To promote the use of this unit in setting prices and defining payments, the government could publish regularly an exchange rate between the unit and the currency and initiate its use by denominating indexed debt, tax brackets, and the like in these units. If people then chose to quote prices and payments in terms of the units rather than the currency, they automatically would be indexing them to inflation. Indexed units of account are a realistic way to encourage widespread indexation, and they are virtually costless to create.

The exchange rate between the indexed unit of account and the currency might be defined so that the unit has desirable properties in terms of its real value.¹⁷ The real value of a unit can be made constant by tying the unit to the consumer price index, or the value of the unit can track labor income. When the government defines indexed units of account, it could consider their effects on money illusion and price rigidity; for example, wage units might be biased downward relative to wage income in order to control for certain inflationary pressures. Properly designed indexed units of account might not only encourage better risk manage-

ment, but also might diminish the price stickiness that is, by some accounts, an important source of macroeconomic instability.¹⁸

Outlook for Institutional Change

Important changes in our institutions usually are adopted only in times of national crisis. For risk management purposes, this is unfortunate, because people must always purchase insurance before, not after, a risk is realized. The issuance of indexed government debt in the U.S. in 1997 during a period of low inflation is a remarkable example of adopting an important financial innovation without waiting for a crisis. Although the public acceptance of the indexed government debt in the United States has been somewhat disappointing so far, there is still a good chance that eventually it be widely accepted. In the future, we must consider carefully what other new institutions are feasible, offer real advantages, and can be started effectively, if only on a small scale initially. Once new institutions are introduced, we might expect that their public use can then grow gradually over time.

¹ Total national wealth in 1996 was estimated by dividing seasonally adjusted national income in 1997-III by the difference between a discount rate (the geometric average annual return on the Standard and Poor's Index, 1946-1996, or 11.9 percent) and an expected growth rate for national income (the geometric

average annual growth rate of per capita national income from 1946 to 1996 or 6.0 percent). Of course, there is considerable margin for error in the resulting estimated U.S. national wealth of \$114 trillion; there is no way to produce an accurate value for a claim on national income when such claims are not, and have never been, traded. The values for financial assets (net of household and nonprofit financial liabilities), real estate (structures and land), and consumer durables (including equipment owned by nonprofit organizations) are taken from the balance sheet of households and nonprofit organizations, "Balance Sheets for the U.S. Economy, Board of Governors of the Federal Reserve System," 1997. The value of human capital is the residual estimated national wealth minus these components.

² M. Baxter and U. Jermann, "The International Diversification Puzzle is Worse than You Think," *American Economic Review*, 87, 1997, pp. 170-80.

³ L. Bottazzi, P. Pesenti, and E. Van Wincoop, "Wages, Profits, and the International Portfolio Puzzle," *European Economic Review*, 40 (2), 1996, pp. 219-54.

⁴ R.J. Shiller, *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*. Oxford, England: Oxford University Press, 1993.

⁵ S. Athanasoulis, R.J. Shiller, and E. Van Wincoop, "Macro Markets and Financial Security," unpublished paper, Iowa State University, 1998.

⁶ See R.J. Shiller, "Social Security and Intergenerational and International Risk Sharing," paper to be presented at the Carnegie-Rochester Conference, April 1998.

⁷ See R.J. Shiller and S. Athanasoulis, "World Income Components: Measuring and Exploiting International Risk Sharing Opportunities" NBER Working Paper No. 5095, April 1995.

⁸ See S. Athanasoulis and R.J. Shiller, "The Significance of the Market Portfolio," NBER Technical Working Paper No. 205, February 1997.

⁹ See R.J. Shiller and R. Schneider, "Labor Income Indices Designed for Use in Settlement of Risk-Management Contracts," NBER Working Paper No. 5254, September 1995, and forthcoming in *Review of Income and Wealth*, 1998.

¹⁰ S.F. Venti and D.A. Wise, "The Wealth of Cohorts: Retirement Saving and the Changing Assets of Older Americans," NBER Working Paper No. 5609, June 1996.

¹¹ See K.E. Case, R.J. Shiller, and A.N. Weiss, "Index-Based Futures and Option Markets in Real Estate," *Journal of Portfolio Management*, 1993.

¹² See A. Caplin, S. Chan, C. Freeman and J. Tracy, *Housing Market Partnerships*, Cambridge, MA: MIT Press, 1997.

¹³ See R.J. Shiller and A.N. Weiss, "Home Equity Insurance," NBER Working Paper No. 4830, August 1994.

¹⁴ See R.J. Shiller and A.N. Weiss, "The Role of Real Estate Price Indices in Home Equity Conversion," paper presented at the AREUEA Meetings, Chicago, January 1998.

¹⁵ See J.Y. Campbell and R.J. Shiller, "A Scorecard for Indexed Government Debt," NBER Macroeconomics Annual, Cambridge, MA: MIT Press, 1996.

¹⁶ See R.J. Shiller, "Public Resistance to Indexation: A Puzzle," in *Brookings Papers on Economic Activity*, 1, 1997, pp. 159-228.

¹⁷ See R.J. Shiller, "Indexed Units of Account: Theory and Assessment of Historical Experience," NBER Working Paper No. 6356, January 1998.

¹⁸ See R.J. Shiller, "Designing Indexed Units of Account," paper presented at the American Economic Association meeting January 1998.



NBER Profile: *Caroline M. Hoxby*

Caroline M. Hoxby, the Morris Kahn Associate Professor of Economics at Harvard University, has been an NBER Faculty Research Fellow since 1994. She is a member of the NBER's Programs in Public Economics, Labor Studies, and on Children. Hoxby received her A.B. in Economics from Harvard in 1988, an M.Phil. in Economics from the University of Oxford in 1990, and a Ph.D. in Economics from MIT in 1994.

Economics as it is related to education has consistently interested Hoxby. Apart from issues of school reform, she has written on the effects of class size on student achievement, school finance, and the effects of immigrants on affirmative action in American college education. Her

recent research includes papers on the industrial organization of the market for higher education in the United States. This research is supported by a grant from the Mellon Foundation through the NBER. She is also currently working on a nation-wide charter school evaluation project funded by the NICHD. She was a Bunting Institute Fellow in 1996-7 and will be a John M. Olin Fellow during the upcoming school year.

Hoxby lives in the Boston area with her husband, Blair. When they can tear themselves away from scholarly pursuits, they enjoy literature, fine art, traveling, and working on their house and garden.



NBER Profile: *Olivia S. Mitchell*



Olivia S. Mitchell is a Research Associate in the NBER's Programs on Aging and on Labor Studies and is the International Foundation of Employee Benefit Plans Professor of Insurance and Risk Management at the Wharton School of the University of Pennsylvania. She received a B.A. in economics from Harvard and an M.A. and Ph.D. degrees in economics from the University of Wisconsin at Madison.

Mitchell is interested in insurance and risk management within the research areas of public finance and labor economics. She is currently doing research on U.S. and international pension reform efforts, and is completing studies on social security and the links among wealth, health, and retirement. Mitchell recently co-chaired the Technical Panel on Trends in Income and Retirement

Saving for the Social Security Advisory Council. She is also a member of the Steering Committee of the AHEAD/Health and Retirement Studies at the University of Michigan, and serves on the Board of Directors of the National Academy of Social Insurance. She consults with numerous private and public organizations including the World Bank, the Inter-American Development Bank, the U.S. Departments of Labor and Health and Human Services, the Federal Reserve Board, and various private organizations.

Mitchell lived overseas for many years in Latin America, Europe, and Asia. Whenever possible, she enjoys scuba diving and eclipse-viewing with her husband, Gene Dykes, a computer programmer, and their two daughters, Erica and Hilary.

NBER Profile: Assaf Razin

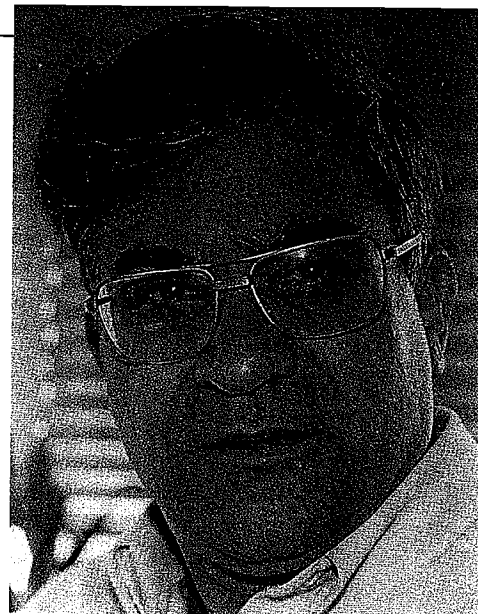
Assaf Razin is an NBER Research Associate in the Programs in International Finance and Macroeconomics and in International Trade and Investment and is the Mario Henrique Simonsen Professor of Public Economics at Tel Aviv University. He also has been a visiting professor at Harvard University, the University of Chicago, Yale University, Princeton University, the University of Pennsylvania, Northwestern University, and the University of Minnesota. He currently teaches courses on international finance, international trade, and public finance.

Razin received his M.S. from the Hebrew University of Jerusalem and his Ph.D. from the University of Chicago. He has served as the chief economic advisor to the government

of Israel, as the deputy rector and dean at Tel Aviv University, and as a consultant to the International Monetary Fund and the World Bank.

Razin's research examines the determinants of external crises, international capital flows and taxation, and international migration and growth. His work has been published in numerous professional journals and he has co-authored several volumes in international economics. He is also a Fellow of the Econometric Society.

Razin's wife, Shula, is an administrative secretary at the Sackler School of Medicine at Tel Aviv University. They have a son, Ronny, a graduate student in economics at Princeton University, and a daughter, Einat, a legal secretary in Tel Aviv.



NBER Profile: Robert J. Shiller



Robert J. Shiller is a Research Associate in the NBER's Programs on Asset Pricing and Economic Fluctuations and Growth and the Stanley B. Resor Professor of Economics at Yale University's Cowles Foundation. Shiller has also taught at the University of Minnesota and the University of Pennsylvania. He holds a B.A. from the University of Michigan and a Ph.D. from MIT.

With NBER Research Associate Richard H. Thaler and George Akerlof, Shiller has been organizing a series of workshops on behavioral economics, for example, in the fields of finance and macroeconomics. (These workshops have been dis-

cussed in the *NBER Reporter*.) In 1996 he won the first Paul A. Samuelson Award from TIAA-CREF for *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*. His 1989 book, *Market Volatility* was a study of the ultimate reasons for fluctuations in the stock market, real estate, and other prices.

Shiller's wife, Virginia, is a lecturer at the Yale Child Study Center and a psychologist with a private practice. They have two sons, Benjamin, 16, and Derek, 12. Shiller enjoys reading science, history, and world literature and going on wilderness outings with his sons.

Conferences

International Capital Flows

On October 17 and 18, 1997 leading academics, policymakers, and business people gathered in Woodstock, Vermont to discuss the growing importance of international capital flows to the world economy. For this conference, organized by NBER President Martin Feldstein, also of Harvard University, a number of academics prepared background papers, while the policymakers and business people presented their views on recent developments related to the nature and scope of international capital flows. The conference coincided with major developments in the Asian financial crisis, providing further stimulus to this meeting of academics and practitioners. The eight sessions were organized around the nature of capital flows in different parts of the world, the varying character of these flows, and the macroeconomic and regulatory challenges presented by these flows.

In the first session on capital flows to Latin America, **Francisco Gil Diaz**, Deputy Governor of the Bank of Mexico, reviewed the experience of Mexico since its financial crisis of late 1994, and suggested that the management of that crisis provided lessons for other crises that develop. He pointed to a number of factors that preceded both the Mexican crisis and the Asian crises, for example, including: rapid private credit expansion of limited quality; financial sector weakness with limited supervision; rapidly increasing asset prices; and the shortening of the liability structure. Gil Diaz emphasized the link between the exchange rate regime and the character of the flows both before and after the crisis: prior to the crisis, Mexico maintained a

quasi-fixed exchange rate regime with bands that behaved like a fixed exchange rate regime, he asserted. But the discipline of a currency board was lacking, and massive short-term flows were attracted. Finally, Gil Diaz noted that the fiscal adjustments and benevolent international economic environment were also crucial to the resolution of the Mexican crisis.

Arminio Fraga of Soros Capital Management then reviewed the experience of a variety of Latin American countries and arrived at several conclusions about what conditions provided for market opportunities for speculators. First, Fraga noted that rapid increases in short-term debt and financial sector weakness were the most important indicators of market opportunities. Along with these factors, the persistence of governments in following unsustainable policies, the willingness of investors to believe governments after initial successes, and the absence of derivative markets all contributed to the precipitous and sudden nature of market breaks. Finally, Fraga commented that capital controls were often more harmful than helpful for countries as they lulled governments into complacency and created rent-seeking opportunities.

In the session on capital flows to Eastern Europe and the former Soviet Union, **Jiri Weigl** of the Czech Republic detailed how that country initially succeeded in managing capital flows during the economic transition and then suffered a crisis in early 1997. Weigl considered the fixed exchange rate regime an important element in the initial success enjoyed by the Czech Republic. By 1993, however, real appreciation along with an

overheating economy required an expansion of the bands for the exchange rate, as abandonment of the fixed regime or fiscal adjustments were not feasible. The combination of a continued fixed rate regime, high degrees of convertibility, and increasing current account deficits precipitated a crisis in early 1997 that led to the abandonment of the bands and fiscal adjustment. Weigl noted that while the fixed rate regime was crucial to the early part of the economic success of the Czech Republic, the combination of a high degree of convertibility and the refusal to switch to flexible rates ultimately made the fixed regime a liability.

Michael Blumenthal, former U.S. Treasury Secretary and recently chairman of the U.S.-Russia Investment Fund, provided his perspective as an investor in Russia. Blumenthal emphasized the significant accomplishments since liberalization, including improved fiscal discipline, the reduced threat of hyperinflation, and the pace of privatization. The unresolved problems, however, still make the business environment difficult. In particular, the spread of corruption, the inefficacy of contracts, the rampant evasion of taxes, and gangsterism all are a part of daily business life. As a consequence, the substantial rewards available to investors are commensurate with substantial risks.

Moeen Qureshi, formerly Senior Executive Vice President of Operations of the World Bank and now Chairman of the Emerging Markets Partnership, **Masaru Yoshitomi** of the Long Term Credit Bank Research Institute of Japan, and **Zhang Shengman**, China's Executive Director at the World Bank, all discussed capital

flows to Asia. With the exception of Thailand's, the recent wave of Asian crises, Qureshi argued, were not entirely a result of poor macroeconomic policies or financial sector irregularities but rather of contagion and political mismanagement. In emphasizing the shifting expectations that give rise to currency crises and potential tensions with domestic policies, Qureshi also downplayed the efficacy of fully flexible exchange rates in preventing crises.

Yoshitomi saw three primary drivers to the financial crises in Asia. First, the desire of the East Asian tigers to keep their exports competitive led them to a fixed exchange rate policy. Second, he emphasized the moral hazard problems inherent in the prudent regulation of banks. Finally, Yoshitomi commented on the bubbles of real estate markets as an important common denominator in these crises.

Zhang commented specifically on the Chinese experience in avoiding a crisis despite rapid capital inflows including sizable foreign direct investment (FDI). He suggested that China had avoided a crisis through a domestic monetary contraction, allowing a modest real appreciation, along with fiscal moderation which insulated the domestic financial sector from these inflows, and through targeted incentives for attracting long-term flows. Zhang also noted that a variety of challenges remain, including achieving full convertibility of the currency and diversifying the sources and destination of the FDI.

The changing role of banks in intermediating capital flows was discussed by **Mervyn King**, the Chief Economist and Deputy Governor of the Bank of England, and **Robert Mendoza**, Vice Chairman of J.P. Morgan. **King** emphasized that effective regulation must combine supervision of individual institutions with an analysis of the risk exposure of the banking system and of the finan-

cial system as a whole. Additionally, he noted that the moral hazard problem associated with the role of lender of last resort may distort the prices of risky capital flows in a harmful way. Finally, **King** noted that increased transparency and more efficient settlement procedures were important steps in reducing the moral hazard problem, as they reduced the scope for governmental intervention.

While conceding that markets overshoot and may demonstrate contagion, **Mendoza** emphasized the virtues of integrated capital markets in disciplining politicians whose policy choices would otherwise be unsustainable. Similarly, he praised the expansion of derivative instruments in allowing for the distribution and pricing of risks more accurately. Finally, **Mendoza** suggested that universal banks were continuing to reinvent themselves and would succeed by emphasizing intellectual capital and the ability to segment and distribute risks efficiently.

The role of equity flows and of FDI were discussed in the next two sessions by **Stephen Friedman**, Senior Chairman of Goldman, Sachs & Co., **George Hatsopolous**, the Chairman and President of Thermo-Electron, and **Carl Hahn**, former Chief Executive of Volkswagen. **Friedman** emphasized that, much as direct investment had associated benefits of technology transfer and managerial know-how, portfolio investment was associated with increased pressure for transparency, better financial infrastructure, and more effective corporate governance. Additionally, the ability to benchmark performance across borders and the creation of strong domestic equity markets facilitate superior firm-level performance.

Hatsopolous emphasized another virtue of equity flows. Thermo-Electron's financing strategy has been to raise equity in Europe and Asia in order to reduce the cost of capital the company faces, as these foreign

investors have had longer horizons and valued safety more than U.S. investors. He also noted that Thermo-Electron's investments abroad had changed from being driven by the desire to build market footholds to the desire to exploit productivity innovations from the U.S. by acquiring foreign companies. As a result, Thermo-Electron was increasingly acquiring new companies abroad rather than incrementally growing existing subsidiaries.

Hahn detailed the activities of Volkswagen in Brazil, the Czech Republic, and China as an illustration of the global sourcing and design procedures that constitute a multinational today. He emphasized the virtues of early entry and the importance of the local managerial talent in succeeding in diverse markets.

Andrew Crockett of BIS and **David Mullins** of Long-Term Capital Management discussed the risks to lenders and borrowers in international capital markets. **Crockett** emphasized the typical phases of crisis episodes and the failure of financial markets to react gradually to worsening situations resulting in harmful discontinuities. He traced these discontinuities to the misperceptions of investors of the risks in international markets, the consequent mispricing of risks, and the failure to adopt sufficient precautions in response to these risks.

Mullins noted that markets have provided for some destabilizing episodes, but he argued that retreating from market solutions through capital controls or widening of the governmental or international safety net was not the solution. Instead, **Mullins** suggested that a deepening of the emerging capital markets with a particular emphasis on derivative instruments might prevent the mispricing of risks which were the source of a number of the problems facing governments and investors.

Stanley Fischer, the Chief Econ-

omist of the International Monetary Fund, and **William McDonough**, the President of the Federal Reserve Bank of New York, discussed the relationships between international capital flows and exchange rate crises. Regarding the possibility of more active warning announcements by the IMF, **Fischer** noted that there are many potential crises which are avoided through appropriate actions. Drawing unnecessary attention to such situations may exacerbate these situations. And, in the case of the Asian crisis, a variety of warnings were ignored by the lending com-

munity. He also noted that certain capital controls and some forms of fixed exchange rates were still important policy tools for developing economies. Finally, Fischer stressed the moral hazard dimensions of these financial crises and the steps being considered by the IMF to contain the adverse consequences of these incentives.

McDonough elaborated on the differences among countries within a region that must be recognized for an understanding of exchange rates crises. He emphasized the different outcomes between France and the

United Kingdom in 1992 and Hong Kong's relative success during the Asian crisis. More generally, McDonough emphasized the necessity of combining sound macroeconomic policies with a strengthening of the banking system and a deepening of local capital markets.

Mihir Desai of Harvard University, who attended the conference as "rapporteur," prepared the text of this article. A volume of the conference proceedings will be published by the University of Chicago Press. Its availability will be announced in a future issue of the *NBER Reporter*.

International Taxation

On November 14 and 15, 1997, the NBER held a "Conference on International Taxation" in Cambridge. The conference papers report the results of research developed as part of the larger NBER project on International Capital Flows sponsored by the Center for International Political Economy. Organized by James R. Hines, Jr. of NBER and the University of Michigan, the two-day gathering included the following presentations:

Rosanne Altshuler, NBER and Rutgers University, and **Harry Grubert** and **T. Scott Newlon**, U.S. Department of the Treasury, "Has U.S. Investment Abroad Become More Sensitive to Tax Rates?"

Discussant: Jack Mintz, University of Toronto

Deborah L. Swenson, NBER and University of California, Davis, "Transaction Type and the Effect

of Taxes on the Distribution of Foreign Direct Investment in the U.S."

Discussant: William Randolph, U.S. Department of the Treasury
Julie Collins, **Douglas Shackelford**, and **John R.M. Hand**, University of North Carolina, "Valuing Deferral: The Effect of Permanently Reinvested Foreign Earnings on Stock Prices"

Discussant: Kevin A. Hassett, American Enterprise Institute
James R. Hines, Jr., and **Adam B. Jaffe**, NBER and Brandeis University, "International Taxation and the Location of Inventive Activity"

Discussant: Austan Goolsbee, NBER and University of Chicago

Jason Cummins, New York University, "Taxation and the Growth of U.S. Multinational Corporations"

Discussant: Samuel S. Kortum, NBER and Boston University

Shang-Jin Wei, NBER and Harvard University, "Incentives to International Direct Investment"

Discussant: Bernard Yeung, University of Michigan

Kimberly Clausing, Reed College, "The Impact of Transfer Pricing on Intrafirm Trade"

Discussant: Deen Kelmsley, Columbia University

Harry Grubert, "Tax Planning by Companies and Tax Competition by Governments: Is There Evidence of Changes in Behavior?"

Discussant: Joel B. Slemrod, NBER and University of Michigan

James R. Hines, Jr., "Tax Sparring and Direct Investment in Developing Countries"

Discussant: Timothy Goodspeed, Hunter College

Altshuler, Grubert, and Newlon use data from the U.S. Treasury corporate tax files for 1984 and 1992 to address two related questions concerning U.S. multinational corporations' investment decisions. First,

how sensitive to differences in tax rates across countries are decisions about investment location? Second, have investment location choices become more sensitive to differences in host country tax rates? The authors

relate real capital held in manufacturing affiliates of U.S. firms in 58 countries to tax rate variables and countries' measures of nontax characteristics. Using these two years of data allows them to control for un-

measured country fixed effects. For investment abroad, they find large estimated tax elasticities of real capital to aftertax rates of return of about 1.5 in 1984 and of close to 3 in 1992. This increase suggests that the allocation of real capital abroad might have grown more sensitive to differences in host country taxes. These results are consistent with the increase in international mobility of capital and globalization of production.

Swenson analyzes a set of foreign investment transactions completed between 1984 and 1994 to determine how U.S. state taxes influence the interstate distribution of foreign investment. The unique element of the transactions data is that it identifies the types of investments that were undertaken by foreign investors; transactions are identified as new plants, plant expansions, mergers and acquisitions, joint ventures, and equity increases. The results indicate there are large differences in the tax responsiveness of these different transaction types. New plants and plant expansions appear to be deterred by high state taxes, while there is a positive correlation between high state taxes and the probability that a foreign investor chooses to perform an acquisition in a state. Including controls for transaction type affects the attribution of tax effects that would otherwise be interpreted as country- or investor- type (residential versus territorial) effects. In other words, the results demonstrate that aggregation of investment data might lead to false inferences with respect to tax effects.

Collins, Shackelford, and Hand investigate the U.S. capital market's valuation of the international tax savings available to U.S. companies that operate in low tax rate foreign jurisdictions and reinvest their foreign earned income earned outside the United States. If a U.S. multinational on average faces foreign tax rates lower than the U.S. statutory rate (that is, if the company is in an

excess limit position), then the imposition of any residual U.S. tax (and foreign withholding taxes) generally is deferred until the foreign income taxed at this lower rate is repatriated to the United States. In order to avoid recognizing this deferred tax liability in financial statement income, management must designate the foreign earnings as permanently reinvested (PRE) and disclose in supplementary footnotes the estimated unrecognized deferred tax liability (TAX). The authors describe the magnitudes, and assess the capital market's valuation, of disclosed PRE and TAX. They examine 340 publicly-traded U.S. companies that disclose PRE in their fiscal 1993 financial statements. Of their sample, 60 firms (18 percent) seem to be in an excess limit position and to report positive TAX. The remaining firms seem to be in excess credit positions and they indicate that: TAX is zero, insignificant, or substantially offset by foreign tax credits; TAX is "not practicable to estimate"; or, they provide no TAX information. For excess limit companies, the equity market capitalizes the positive deferred tax liability associated with PRE in current stock prices.

Hines and Jaffe consider the effect of tax rules on the distribution of inventive activity between the United States and foreign countries. They analyze the effects of U.S. tax changes, particularly those introduced in 1981 and 1986, on the international patenting pattern of a panel of U.S. multinational firms affected by those changes. As a result of the specifics of U.S. tax law, American firms differ in the extent to which tax changes affect the aftertax cost of undertaking research and development (R and D) in the United States. The evidence indicates that firms for which the aftertax cost of performing R and D in the United States rose most rapidly exhibit the fastest growth of foreign patenting in subsequent years. This pattern suggests that higher

aftertax costs of R and D encourage firms to reallocate research resources to substitute foreign locations.

Capital income tax policy affects investment by the parent and affiliates of multinational corporations (MNCs). In a vintage capital model, in which technical advances are embodied in new capital, investment will translate directly into productivity gains. **Cummins** finds that: 1) growth in parent and affiliate capital are the most important sources of growth, with foreign direct investment contributing more to a firm's growth than the sum of the contributions of parent and affiliate employment, and materials; 2) productivity has boomed since 1992, as a result of productivity growth in MNCs with Canadian affiliates; and 3) the investment elasticity of productivity growth is large and the adjustment costs of investment are small, suggesting that changes in the aftertax price of capital result in robust investment that translates directly into productivity gains.

Wei reports on a sample of bilateral direct investment from 14 source countries to 45 host countries. He finds that taxes, capital controls, and corruption all have negative, statistically significant, and quantitatively large effects on foreign investment. Moreover, there is no robust support in the data for the "grease payment" argument that corruption may help to attract foreign investment by reducing firms' tax burden and the irritation of capital controls.

Using data on the operations of U.S. parent firms and their foreign affiliates between 1982 and 1994, **Clausing** examines the extent to which tax-minimizing behavior influences intrafirm trade. Her results indicate that taxes have a substantial influence on intrafirm trade flows between U.S. parent firms and their affiliates abroad; the United States has less favorable intrafirm trade balances with low tax countries. Taxes also have an influence on intrafirm

trade flows between different foreign affiliates of U.S. firms.

Has "globalization" changed the behavior of companies and governments? **Grubert** examines both firm-level data and country averages for 1984 and 1992 and finds some signs of change. Companies with low initial overall foreign tax rates obtained larger than average decreases in effective tax rates from 1984 to 1992 in the countries in which they were located. This suggests either that governments competed for them because they are more mobile or that the companies exploited their tax planning skills. Effective tax rates did fall substantially in the 60-country sample, although there was not much convergence. The smaller countries, which would probably be most affected by increased capital mobility, did cut their tax rates more. On the other hand, the pattern of companies' allocation of debt and income in response to local tax rates was virtually unchanged from 1984 to 1992. Finance affiliates, which are usually regarded as highly mobile, did not obtain larger reductions in tax rates as compared to manufacturing firms. Effective tax rates did not fall more in homogeneous regions with low trade barriers, such as the European

Economic Community where tax competition might be expected to be most intense. The relatively mixed picture suggests either that globalization has not been as powerful as claimed or that governments have been able to respond to attempts to erode their tax bases.

Hines analyzes the effect of "tax sparing" on the location and performance of direct investment by American and Japanese firms. Tax sparing is the practice of reducing home country taxation of foreign investment income in response to host country tax reductions. When a home country operates a worldwide residence-based tax system that permits its firms to claim foreign tax credits, tax sparing may entail allowing firms to claim foreign tax credits for taxes that would have been paid, in the absence of special abatements, on income from investments in certain countries. As foreign tax credits are then based on something other than taxes actually paid, any special tax breaks offered by host country governments enhance the aftertax profitability of foreign investors and are not simply offset by higher home-country taxes. Japanese firms are permitted to claim foreign tax credits for taxes that would normally be paid to

certain, generally low-income, countries with tax treaties with Japan. Countries with such treaty provisions can reduce their taxation of Japanese firms without reducing the foreign tax credits available to such firms. The United States refuses to grant tax sparing credits. The evidence indicates that Japanese firms locate considerably higher fractions of their foreign investment in countries with whom Japan has tax sparing arrangements than do American firms. This difference appears both in patterns of aggregate foreign direct investment and in industry-level data on equity capital investments. In addition, Japanese firms pay foreign taxes at much lower rates than those faced by their American counterparts in countries with whom Japan has tax sparing agreements. These differences suggest that tax sparing has an important effect on the willingness of foreign governments to offer tax concessions and, partly as a consequence, on the level and location of foreign direct investment.

The conference proceedings will be published as an NBER volume by the University of Chicago Press. Its availability will be announced in a future issue of the *NBER Reporter*.



Tenth Annual Inter-American Seminar on Economics

The NBER held its Tenth Annual Inter-American Seminar on Economics in Santiago, Chile on November 21 and 22, 1997. Organizers Sebastian Edwards, NBER and University of California, Los Angeles, and Harald Beyer, Centro de Estudios Públicos, chose the following papers for discussion:

Harald Beyer, Patricia Rojas, and **Rodrigo Vergara**, Centro de Estudios Públicos, "Trade Liberalization and Wage Inequality in Chile"

Eduardo M. Engel, NBER and Universidad de Chile, and **Alex Galetovic** and **Claudio Raddatz**, Universidad de Chile, "Taxes and Income Distribution in Chile: Some Unpleasant Redistributivist Arithmetic"

Discussants: José de Gregorio and Osvaldo Larranaga, Universidad de Chile

Ana Flávia Machado, Minas Gerais Federal University, and **Ricardo**

Paes de Barros and **Rosane Silva Pinto de Mendonça**, Instituto de Pesquisa Econômica Aplicada, "Inequality Among the Poor: Occupational Strategies and Gender Differences"

Leonardo Gasparini, Universidad de la Plata, "Measuring Unfairness in the Distribution of a Good: An Analytical Framework and an Application for Education and Health in Argentina"

Discussants: Dante Contreras, Universidad de Chile and Cristian Aedo, ILADES

Raquel Bernal and **Mauricio Cardenas**, FEDESARROLLO, and **Jairo Nunez** and **Fabio Sanchez**, National Planning Department of Colombia, "Unemployment, Inflation, and Income Distribution in Colombia"

Nora Lustig and **Miguel Székely**, "Hidden Trends in Poverty and Inequality in Mexico"

Discussants: Francisco Rosende, Universidad Católica, and Ricardo Paredes, Universidad de Chile

Jeffrey D. Sachs, NBER and Harvard University, and **Andrew Warner**, Harvard University, "Natural Resource Booms and the Theory of the Big Push"

Edward E. Leamer, NBER and University of California, Los Angeles, "Latin American Income Inequality: A Heckscher-Olin Approach"

Anne Harrison, NBER and Columbia University, and **Gordon H. Hanson**, NBER and University of Texas, "Who Gains from Trade Reform? Some Remaining Puzzles"

Discussants: Pablo Serra and Rodrigo Fuentes, Universidad de Chile
Sebastian Edwards, and **Daniel Lederman**, Johns Hopkins University, "The Political Economy of Unilateral Trade Liberalization: The Case of Chile"

Beyer, Rojas, and **Vergara** explore the impact of trade liberalization on income distribution in Chile and conclude that trade openness increased wage inequality. Their research also indicates that the recent decline in wage inequality in Chile can be attributed to the relative increase in the number of college graduates there.

Engel, Galetovic, and **Raddatz** quantify the distributional effects of the Chilean tax system and assess the sensitivity of the distribution of income to changes in the tax structure and tax rates. They find that even radical modifications, such as raising the value added tax from 18 percent to 25 percent, or substituting a 20 percent flat tax for the current progressive income tax, have only a

slight effect on the aftertax distribution of income. In contrast, targeting expenditures, and changing the level of the average tax rate, are far more important determinants of the income distribution. Moreover, the high-yield but slightly regressive value added tax reduces inequality far more than the low-yield, strongly progressive income tax.

De Barros, Machado, and **Mendonça** report that the low educational level of the Brazilian population has been identified repeatedly as one of the main determinants of the country's high poverty levels. Yet while the improvement of educational indicators has been considered the country's most urgent goal in fighting structural poverty, it is important to note that this solution is necessarily

very slow. Further, other mechanisms operate on the Brazilian labor market, such as "occupational insertion," which permits even poorly educated workers to earn income that places them outside the poverty pool.

How concerned are various societies about the distribution of certain goods, chiefly basic education and health? **Gasparini** discusses a way of measuring unfairness in the distribution of any particular good. The consumption of the good is determined by both "socially acceptable" and "socially unacceptable" sources of differences in individual consumption. "Unfairness" in the distribution of a good is related to the dispersion in the values of conditional expectations across individuals. Using data for Argentina, Gasparini calculates

“unfairness indexes” for both health services and education levels.

Bernal, Cardenas, Nunez, and Sanchez explore the relation between macroeconomic conditions and urban income distribution in Colombia. They show that unemployment and inflation have significant negative effects, while growth in manufacturing output and improved conditions in rural areas of the country have positive effects on income distribution. As a result, the recent combination of high unemployment, overvalued currency, and low overall economic growth in Colombia have resulted in greater inequality. The authors also find that unemployment and inflation have an adverse effect on education levels of the poor. Thus, macroeconomic instability is detrimental for the accumulation of human capital, which affects the distribution of income in the long term.

Lustig and Székely analyze the evolution of poverty and inequality in Mexico between 1984 and 1994. Using the information from the four existing Income-Expenditure Household Surveys for the period under consideration, the authors find that overall poverty and inequality rose during the adjustment years, and it remained practically unchanged during the incipient and frustrated recovery of the early 1990s. However, these aggregate trends hide important differences. While aggregate poverty and inequality remained

almost unaltered between 1989 and 1994, a significant proportion of the poorest of the poor were worse off. In particular, poverty (extreme and moderate) increased in the primary sector, among rural workers, and in the backward areas of the Southern and Southeastern regions in Mexico. Also, while inequality among non-wage income sources declined, wage inequality showed a significant increase.

Sachs and Warner revisit the theory of the big push and related ideas about economic development in the 1950s. From the perspective of these theories, one would think that a large boom in natural resource output could provide the big push, stimulating industrialization and economic growth. But the authors present a big push model in which this is not necessarily the case. They also present preliminary evidence that commodity booms in Latin America in general have not stimulated faster growth.

Leamer suggests that the multifactor Heckscher-Ohlin model, using three or more factors—such as raw labor, arable land, natural resources, and physical and human capital—can serve as a foundation for studying the consequences of abundance of natural resources and arable land. As such, it can help us to answer important questions about Latin America. His analysis suggests that some types of natural resources actually limit the return on human capital and

contribute to the high Gini coefficients that are endemic to Latin America.

Harrison and Hanson argue that there are three unresolved issues with regard to the impact of trade reform: 1) many results linking trade reform to long-run growth are surprisingly fragile; 2) trade reform has only a small impact on employment in developing countries; 3) there seems to be a relationship between trade reform and rising wage inequality in developing countries. Focusing on the 1985 Mexican trade reform, they observe that wage inequality rose after the reform, which is puzzling in a Heckscher-Olin context, since Mexico had a comparative advantage in producing low-skill-intensive goods.

Edwards and Lederman analyze the political and economic circumstances surrounding Chile's unilateral trade liberalization. Between 1975 and 1979, Chile eliminated all quantitative restrictions and exchange controls, reduced import tariffs from an average of over 100 percent to a uniform 10 percent, and implemented other reforms. The authors examine the role played by the “reform team,” investigate some of the distributive consequences of the reforms, and analyze the mechanisms the government used to maintain a minimum level of support for the liberalization process.



The International Monetary Regime in the 21st Century

The NBER, the Tokyo Center for Economic Research (TCER), and London's Centre for Economic Policy Research (CEPR) jointly sponsored a conference on "The International Monetary Regime in the 21st Century" in Tokyo on December 19 and 20, 1997. NBER Research Associate Takatoshi Ito, also of Hitotsubashi University, organized the conference and selected the following topics for discussion:

Takatoshi Ito, Eiji Ogawa, Hitotsubashi University, and **Yuri Nagataki Sasaki,** Takachiho Sho-ka University, "How Did the Dollar Peg Fail in Asia?"
Discussants: Shin-ichi Fukuda, University of Tokyo, and Akihiko Matsui

Shigeru Akiyama and **Masahiro Kawai,** University of Tokyo, "Empirical Analyses of Exchange Rate Arrangements: Changing

Influences of the World's Major Currencies"

Discussants: Barry Eichengreen, NBER and University of California, Berkeley, and Shinji Takagi, Osaka University

Barry Eichengreen, "The Euro as a Reserve Currency"

Discussants: Kazuo Ueda, University of Tokyo, and Richard Portes, London Business School

George Alogoskoufis, Athens University of Economics and Business, **Richard Portes,** and **Helene Rey,** London School of Economics, "The Emergence of the Euro as an International Currency"

Discussants: Tsutomu Watanabe, Bank of Japan, and Kathryn M.E. Dominguez, NBER and University of Michigan

Kathryn M.E. Dominguez, "The Dollar Exposure of Japanese Companies"

Discussants: Michihiro Oyama, Keio University, and Philipp Hartmann, European Monetary Institute

Sahoko Kaji, Keio University, "The True Economic Benefit of EMU"

Discussants: Ken-ichi Ohno, Saitama University, and Helene Rey

Akihiko Matsui, "Strong Currency and Weak Currency"

Discussants: Nobuhiro Kiyotaki, London School of Economics, and Takeo Hoshi, Osaka University

Phillippe Martin, Graduate Institute of International Studies, "The Exchange Rate Policy of the Euro: A Matter of Size?"

Discussants: Mitsuhiro Fukao, Keio University, and Tsutomu Watanabe

Philip Hartmann, "The Future of the Euro as an International Currency"

Discussants: Phillippe Martin, and Eiji Ogawa, Hitotsubashi University

One of the factors that contributed to the Asian currency crises of 1997 is the exchange rate regime that had de facto pegged to the U.S. dollar. ASEAN and East Asian countries have considerable trade relationships with Japan, while their exchange rates are fixed to the U.S. dollar (either in nominal terms, as with Thailand, or with an inflation adjustment slide, as with Indonesia). The yen depreciation vis-à-vis the U.S. dollar caused the real effective exchange rate to appreciate in 1995 and 1996. **Ito, Ogawa,** and **Sasaki** ask what would be an optimal peg, in terms of profit maximization for Asian exporters to the United States who are competing with Japanese manufacturers. The optimal weights on the U.S. dollar and the Japanese yen would depend on demand elasticities as well as trade weights, they find.

Akiyama and **Kawai** ask how the influences of the world's major currencies have changed since the end of the Bretton Woods fixed exchange rate regime, and the adoption of a generalized floating system by the industrialized countries. They examine the exchange rate policies of all International Monetary Fund member countries since 1970, and pay particular attention to the G-5 currencies: the U.S. dollar, the German mark, the Japanese yen, the French franc, and the British pound sterling. They find that, on a global scale, only the U.S. dollar has played a dominant role; the influences of the other major currencies are mainly limited to their neighboring regions. Further, the size of the U.S. dollar currency area is rather large when compared with the currency areas of other major currencies, even though it is widely

believed that the influence of the U.S. dollar has been declining, and that the role of other major currencies, particularly the German mark and Japanese yen, have been increasing. Finally, the authors find that the apparent inertia in the behavior of reserve holdings can be explained by the size of a currency area.

Eichengreen considers the euro's prospects as a reserve currency after its introduction in 2002. He emphasizes that incumbency is a strong advantage in the competition for reserve-currency status. Because the dollar is the reigning champion, it accounts for a larger share of global foreign exchange reserves than suggested by a simple comparison of the GDP of the United States and the European Union countries, and it should for some time to come. Further, reserve currencies are issued

by the governments of countries that are international financial centers. The United States has gained its status as a financial center partly because it has a central bank engaged in day-to-day liquidity management that is prepared to mount lender-of-last-resort operations. The Maastricht Treaty does not presume that the European Central Bank will assume comparable responsibilities. This will tend to slow the development of the euro zone as an international financial center and, by implication, limit the euro's reserve-currency role.

The European Union will enter Stage Three of Economic and Monetary Union (EMU) in 1999. As euro securities markets become deeper and more liquid, and as transaction costs fall, euro assets will become more attractive, and the use of the euro as a vehicle currency will expand. These two effects will interact, **Alogoskoufis, Portes, and Rey** demonstrate. They find that the euro might take on some of the current roles of the dollar, but that will depend on policy decisions and on the beliefs of market participants. During the transition to the new equilibrium, the main effect of the introduction of the euro will come through portfolio shifts that are likely to favor an appreciation of the new currency vis à vis the dollar (and the yen). Whatever the likely long-run outcome, the dollar will remain quantitatively dominant for some time because of inertia and hysteresis. The early period could see considerable instability associated with the emergence of the euro, especially if the United States were to resist any decline in the international status of the dollar. Ultimately, if Japanese companies are able to fully hedge their dollar exposures by using derivative products, locating production in the United States, or matching dollar revenues with dollar costs, then the choice of invoicing currency will not

influence the yen profits of Japanese companies.

Dominguez estimates the degree to which Japanese companies are exposed to movements in the dollar. Japanese companies are not obliged to disclose their derivative activity, and there is no systematic information on the degree of nonfinancial hedging by Japanese companies. Therefore, she must use Japanese stock market data and an international version of the Capital Asset Pricing Model to estimate the extent to which Japanese company returns are correlated with changes in the yen-dollar exchange rate. Presumably, if Japanese companies fully hedge their dollar exposures, then their stock price changes should not be correlated with movements in the dollar. Alternatively, if Japanese companies cannot or choose not to hedge fully their dollar exposures, then yen-dollar exchange rates will be correlated with stock prices.

Kaji's basic idea is that the EMU has one important economic benefit: it exerts foreign pressure, or "gai-atsu." Economic union member states, especially those on the Continent, must undergo structural reforms if their unemployment rates are to be brought down. Many such measures are politically unpalatable, but the monetary and fiscal constraints as well as price transparency that EMU brings will give member states no other choice. He examines the experiences of the Netherlands and France as examples.

Matsui presents a two-country model in which two currencies compete. The two currencies with different rates of inflation can circulate as mediums of exchange despite the fact that neither currency is forced to be used for transactions. Taxes are payable in the local currency, and fiat money is injected by the government for purchases of a certain good. Therefore, the currency with the

higher inflation rate—the weak currency—may still be used. In such an equilibrium, the government that issues the currency with a lower rate of inflation—the strong currency—collects seigniorage not only from its residents but also from the residents of the other country. The strong currency thus becomes an international medium of exchange. However, for a country with a weak currency, abandonment of the currency leads to a lower level of welfare.

Martin analyzes the effects of country size on exchange rate policy and volatility. He finds that exchange rate variability increases with country size for small countries but decreases with size for large countries. This holds for bilateral exchange rates of the OECD (Organization for Economic Cooperation and Development) countries between 1980 and 1995 and for a subsample of European exchange rates with respect to the dollar. These results suggest that the dollar/euro volatility may be lower than the current dollar/Deutschmark volatility.

Hartmann evaluates the consequences of the EMU for the use of a "vehicle currency" in international trade. At the beginning, the euro will be used for about one quarter of world trade, as compared to post-EMU shares for the U.S. dollar of 59 percent and for the Japanese yen of 6 percent. Gradually, EMU countries are likely to experience an increase in the international importance of their new currency. However, in the absence of any large adverse shock hitting the international monetary system or the U.S. economy, it is unlikely that the euro can overtake the dollar's leading role in world trade any time soon.

These papers are expected to be published in a special issue of the *Journal of the Japanese and International Economies*.

Monetary Policy Rules

NBER Research Associate John B. Taylor, also of Stanford University, organized a three-day NBER conference on "Monetary Policy Rules" which took place in Florida on January 15–18. This conference brought together academic economists whose research deals with monetary policy and representatives of the Federal Reserve System.

The papers presented at the conference, summarized here, and their discussions will be published in an NBER conference volume by the University of Chicago Press; its availability will be announced in a future issue of the *NBER Reporter*. They are:

Bennett T. McCallum, NBER and Carnegie Mellon University, and **Edward Nelson**, Carnegie Mellon University, "Performance of Operational Policy Rules in an Estimated Semi-Classical Structural Model"

Discussant: Mark Gertler, NBER and New York University

Michael Woodford, NBER and Princeton University, and **Julio J. Rotemberg**, NBER and Harvard University, "Interest Rate Rules in an Estimated Sticky Price Model"

Discussant: Martin S. Feldstein, NBER and Harvard University

Laurence M. Ball, NBER and Johns Hopkins University, "Policy Rules for Open Economies"

Discussant: Thomas J. Sargent, NBER and Stanford University

Nicoletta Batini and **Andrew Haldane**, Bank of England, "Forward-Looking Rules for Monetary Policy"

Discussant: Donald Kohn, Federal Reserve System

Glenn Rudebusch, Federal Reserve Bank of San Francisco, and **Lars Svensson**, NBER and Institute for International Economic Studies in Stockholm, "Policy Rules for Inflation Targeting"

Discussant: James H. Stock, NBER and Harvard University

Andrew Levin, **Volcker Weiland**, and **John C. Williams**, Federal Reserve Board, "Are Simple Monetary Policy Rules Robust to Model Uncertainty?"

Discussant: Lawrence Christiano, NBER and Northwestern University

John B. Taylor, "An Historical Analysis of Monetary Policy Rules"

Discussant: Richard H. Clarida, NBER and Columbia University

Robert King, NBER and University of Virginia, and **Alexander L. Wolman**, Federal Reserve Bank of Richmond, "What Should Monetary Policy Do When Prices Are Sticky?"

Discussant: Benjamin M. Friedman, NBER and Harvard University

Arturo Estrella, Federal Reserve Bank of New York, and **Frederic S. Mishkin**, NBER and Columbia University, "The Role of NAIRU in Monetary Policy: Implications of Uncertainty and Model Selection"

Discussant: Robert E. Hall, NBER and Stanford University

McCallum and **Nelson** explore several questions relating to the design of rules for monetary policy. They emphasize the concept of rule operability—that is, reliance on feasible instrumental variables and information sets. Many of their results pertain to Taylor type rules—that is, have an interest rate instrument set in response to inflation and output-gap measures—but some are reported for rules using a nominal income target or a monetary base instrument. The macroeconomic model they use features a specification designed to represent rational dynamic optimizing choices by the economy's private agents. Saving and portfolio balance behavior are expressed by optimizing versions of expectational IS and LM functions, with gradual price

adjustments specified differently in two variants of the model. One variant uses the well-known Calvo-Rotemberg price adjustment relation, while the second employs a newly rationalized version of the Mussa-McCallum-Barro-Grossman P-Bar model.

Rotemberg and **Woodford** evaluate alternative rules by which the Federal Reserve Bank might set interest rates. Their main finding is that low and stable inflation together with stable interest rates can be achieved by letting the funds rate respond positively to inflation while also responding to the lagged funds rate itself. A rule in which the interest rate is set in this extremely simple way does almost as well as a more complicated rule, in the sense of maxi-

mizing expected utility of the representative household. Furthermore, when the funds rate responds to inflation, but with a delay attributable to the lack of availability of inflation data, performance under the rule is reduced only slightly.

Ball examines the choice of a rule for monetary policy in an open-economy extension of his, and Svensson's, 1997 work. The optimal instrument rule departs in two ways from the Taylor rule, which is optimal in a closed economy. First, the policy instrument is an index of monetary conditions, or a weighted average of the interest rate and the exchange rate. Second, long-run inflation, which filters out the transitory effects of exchange rate movements, replaces inflation in the equation.

The model also implies that pure inflation targeting is dangerous in an open economy, because it implies large movements in exchange rates and output. Targeting long-run inflation avoids this problem and produces a close approximation to the optimal instrument rule.

Batini and **Haldane** evaluate a class of simple policy rules that feed back from expected values of future inflation: inflation-forecast-based rules, which are simple, and analogous to Taylor rule specifications. Because they are forecast-based, the rules are meant to mimic, albeit imperfectly, monetary policy behavior among inflation-targeting central banks. The authors ask how well these rules perform when the economy is buffeted by a combination of shocks. They show that inflation-forecast-based rules confer some real benefits: they embody transmission lags; they potentially embody all information useful for predicting future inflation; suitably designed, they can achieve a degree of output smoothing; and they are more efficient at minimizing inflation and output variability than standard Taylor rule specifications, almost as efficient as fully optimal rules, and seem robust across different model specifications.

Rudebusch and **Svensson** compare the properties and outcomes of explicit instrument rules versus targeting rules for monetary policy. The latter, which imply implicit instrument rules, might be closer to the actual operating procedures of inflation-targeting central banks, they note. The authors find that inflation forecasts are crucial for formulating good policy rules under inflation targeting. Some simple instrument and targeting rules do remarkably well

relative to the optimal rule; others, including some that are frequently used to represent inflation targeting, do less well.

Levin, Wieland, and Williams investigate the properties of alternative monetary policy rules using four structural macroeconomic models—the Fuhrer-Moore model, Taylor’s Multicountry Model, the MSR model of Orphanides and Wieland, and the Federal Reserve Bank staff model. The four all differ but incorporate the assumptions of rational expectations, short-run nominal inertia, and long-run monetary neutrality. The authors compute the output-inflation volatility frontier of each model for alternative specifications of the interest rate rule, subject to an upper bound on nominal interest rate volatility. In all four models, first-difference rules perform much better than rules of the types proposed by Taylor (1993) and Henderson and McKibbin (1993), in which the level of the federal funds rate responds to the output gap and inflation deviation from target. Furthermore, first-difference rules generate essentially the same policy frontier as more complicated rules (that is, rules that respond to a larger number of variables or additional lags of output, inflation, or the federal funds rate). Finally, this class of rules is robust to model uncertainty, in the sense that a first-difference rule taken from the policy frontier of one model is very close to the policy frontier of each of the other three models.

Taylor examines several episodes in U.S. monetary history using the framework of an interest rate rule for monetary policy. His main finding is that a monetary policy rule in which the interest rate responds to inflation

and real output more aggressively than it did in the 1960s and 1970s, or than during the time of the international gold standard, and more like the late 1980s and 1990s, is a good policy rule. Moreover, if one defines “policy mistakes” as deviations from such a good policy rule, then such mistakes have been associated with either high and prolonged inflation or drawn out periods of low capacity utilization.

King constructs a model in which there is a very short answer to the question of whether the monetary authority should stabilize the price level. Such a monetary policy rule is optimal in that it maximizes the welfare of the representative agent, subject to the resource constraints of the economy and the pricing practices of monopolistically competitive firms, which are constrained to only occasionally adjust their nominal prices. In the model economy, the case for price stability is broad, in that it is optimal to have a zero rate of inflation in the steady state, and also optimal to keep the price level constant in the face of productivity disturbances.

Estrella and Mishkin rethink the NAIRU (nonaccelerating inflation rate of unemployment) concept and examine whether it might have a useful role in monetary policy. They argue that it can, but its success depends critically on defining NAIRU as a short-run concept. The authors examine the effect of uncertainty on the use of NAIRU in policy. Uncertainty about the level of NAIRU does not imply that monetary policy should react less to the NAIRU gap; however, uncertainty about the effect of the NAIRU gap on inflation does require adjustments to the policy reaction function.

Conference on Immigration

On January 23 and 24, the NBER held a "Conference on Immigration" in Cambridge. This conference, organized by NBER Research Associate George J. Borjas, also of Harvard University, reported on the results of a long-term NBER project on the same topic. The agenda for the two-day conference was:

George J. Borjas, "The Economic Progress of Immigrants"

Discussant: Françoise Blau, NBER and Cornell University

David Card, NBER and University of California, Berkeley; **John**

DiNardo, NBER and University of California, Irvine; and **Eugene**

Estes, Princeton University, "The More Things Change: Immigrants and the Children of Immigrants in the 1940s, the 1970s, and the 1990s"

Discussant: George Johnson, University of Michigan

Edward P. Lazear, NBER and Stanford University, "Diversity and Immigration"

Discussant: Daniel S. Hamermesh, NBER and University of Texas

Julian Betts and **Magnus Lofstrom**, University of California, San Diego, "The Educational Attainment of Immigrants: Trends and Implications"

Discussant: Carolyn M. Hoxby, NBER and Harvard University

Edward Funkhouser, University of California, Santa Barbara, "Convergence in Employment Rates of Immigrants"

Discussant: Lawrence F. Katz, NBER and Harvard University

Janet Currie, NBER and University

of California, Los Angeles, "Do Children of Immigrants Make Differential Use of Public Health Insurance?"

Discussant: Rachel M. Friedberg, NBER and Brown University

Alan L. Gustman, NBER and Dartmouth College, and **Thomas Steinmeier**, Texas Technology University, "Social Security Benefits of Immigrants and U.S.-Born"

Discussant: Richard Freeman, NBER and Harvard University

Kristin Butcher, Boston College and **Anne Piehl**, NBER and University of California, Berkeley, "The Role of Deportation in the Incarceration of Immigrants"

Discussant: Jeffrey Grogger, NBER and University of California, Los Angeles

Borjas studies the economic progress experienced by immigrants in the U.S. labor market. He uses decennial Census data from 1970 to 1990 and finds that the correlation between the (log) entry wage and the rate of wage growth is positive. Further, the same source country characteristics that lead to high wages at the time of entry also lead to faster wage growth.

Card, DiNardo, and Estes present a comparative perspective on the economic performance of immigrants and their children. Using data from the 1940 and 1970 Censuses, and from recent (1994-6) Current Population Surveys, they find important links between the economic status of immigrant fathers and the status of their U.S.-native-born sons and daughters. Much of this linkage works through education. Children of more highly educated immigrants have higher levels of education, earn higher wages, and are more likely to

marry outside of their fathers' ethnic groups. Despite the dramatic shift since 1940 in the country-of-origin composition of the U.S. immigrants, the authors find that the rate of intergenerational assimilation has not changed much.

Lazear asks: What does diversity mean, and do current immigration policies enhance diversity? Any gains from diversity come through the interaction of individuals from one culture or background with individuals from another. A good partner in the interaction has different skills from the other, has skills that are relevant to his or her own activity, and is a person with whom one can communicate. Using 1990 Census data, Lazear concludes that current immigration policy fails to promote diversity. Balanced immigration, perhaps implemented through the sale of immigration slots, would do more to enrich the diversity of the U.S. population, he finds.

Betts and Lofstrom use data from the 1970, 1980, and 1990 U.S. Censuses to study trends in educational attainment and subsequent earnings of immigrants relative to those of natives. They find that educational differences explain more than half of the observed wage gap between the two groups. "Sheepskin effects" affect earnings significantly. But there are also differences in returns to pre- and postmigration education. Immigrants appear to crowd natives out of education, but the effects are stronger in secondary than in postsecondary education.

Funkhouser uses data from the 1980 and 1990 U.S. Censuses to examine convergence in employment outcomes of recent immigrants. He finds a large convergence in employment rates during the initial years following immigration, but little subsequent convergence. The convergence in employment rates is larger for immigrants who are more skilled.

Because changes in observed measures of skill or the returns to skill do not explain this finding, lack of transferability of human capital as a residual explanation is likely to be important during the initial years following migration.

Using data from the 1989 to 1992 waves of the U.S. National Health Interview Survey, **Currie** compares the health insurance coverage and utilization of medical care of children of immigrants and children of the native born. Increased Medicaid eligibility was associated with increases in the probability of having obtained at least one doctor's visit in the past year among both groups of children, she finds, but there were no effects on the subsequent number of doctor visits if the child had at least one visit. The number of hospitalizations rose only among children of the native born. Thus, the main effect of expanding Medicaid eligibility among children of immigrants was the reduction in the number of children going without any doctor visits. It is estimated that the cost of providing the approximately 37,000 additional visits to immigrant children was

between \$1.85 million and \$3.7 million per year.

Gustman and **Steinmeier** report that the income support feature of Social Security disproportionately transfers benefits to immigrants relative to those born in the United States. Immigrants who have worked in the United States for only a decade or two and who have high incomes gain the most from current benefit calculation procedures, which count all years they lived outside the United States as years of zero earnings. If earnings used to determine Social Security benefits are calculated only over the years immigrants reside in the United States, and benefits are prorated based on the share of a 35- or 40-year base period spent living in the United States, then the progressivity of the Social Security benefit formula would be preserved but would reduce the transfer towards immigrants.

Using data on all new admissions to California state prisons in 1986, 1990, and 1996, **Butcher** and **Piehl** find that the foreign born have a very different offense mix from native-born inmates, with foreigners much

more likely to be serving time for drug offenses. There have been many changes in the enforcement environment over this decade, including changes in the level of resources appropriated for enforcement activities targeting deportable aliens. These developments have resulted in much greater involvement of the Immigration and Naturalization Service (INS) in the incarceration of the foreign born. By 1996, the definition of deportable was expanded to cover all noncitizens in the California prison system. Throughout the period, those foreign-born inmates designated by the California Department of Corrections to be released to INS custody serve substantially (6 percent to 12 percent) longer terms (conditional upon sentence length) than natives or other similar foreigners. These longer terms of incarceration impose substantial costs on the state.

These papers and one missing from this summary, along with their discussions, will be published in an NBER conference volume by the University of Chicago Press. Its availability will be announced in a future issue of the *NBER Reporter*.



NBER Holds Conference on Currency Crises

To mark the conclusion of a project on "Currency Crises," the NBER held a conference on February 6 and 7 in Cambridge to hear the research reports of project participants. NBER Research Associate Paul R. Krugman, also of MIT, was director of the project and organizer of the conference. The following papers were presented:

Allan Drazen, NBER and University of Maryland, "Political Contagion in Currency Crises"

Discussant: Carmen Reinhart, University of Maryland

Barry Eichengreen, NBER and International Monetary Fund, and **Olivier Jeanne**, Ceras, Paris, "Currency Crises and Unemployment: Sterling in 1931"

Discussant: Michael D. Bordo, NBER and Rutgers University

Robert Flood, International Monetary Fund, and **Peter Garber**, Brown University, "Is Launching the Euro Unstable in the Endgame?"

Discussant: Peter B. Kenen, Princeton University

Robert J. Gordon, NBER and Northwestern University, "Macroeconomic Responses in the 1992 Breakdown of the ERM"

Discussant: Paul R. Krugman

Sebastian Edwards, NBER and University of California, Los Angeles, and **Miguel Savastano**, International Monetary Fund, "The Morning After: The Mexican Peso in the Aftermath of the 1994 Currency Crises"

Discussant: J. Bradford De Long, NBER and University of California, Berkeley

Guillermo Calvo, University of Maryland, "Balance of Payments Crises in Emerging Markets: Large Capital Inflows and Sovereign Governments"

Discussant: Roberto Rigobon, MIT

Gian Maria Milesi-Ferretti, International Monetary Fund, and **Assaf Razin**, NBER and Tel Aviv University, "Reversals in Current Account Deficits and Currency Crises"

Discussant: Jaume Ventura, MIT

Jeffrey D. Sachs, NBER and Harvard University, and **Steven Radelet**, Harvard University, "The Onset of the East Asian Financial Crisis"

Discussant: Frederic Mishkin, NBER and Columbia University

Drazen argues that the political nature of a country's motivation for fixed exchange rates may be crucial in understanding contagious currency crises. Specifically, a fixed exchange rate may be a criterion for membership in a monetary union or less formal political-economic arrangement in which the value of being a member depends positively on the composition of the union. If one potential member devalues and hence is less likely to be a member of the "club," other potential members will assign a lower value to maintaining a fixed exchange rate, especially when doing so requires sacrificing domestic goals. Speculators may be uncertain about a country's commitment to fixed rates but know that this commitment depends on the desire for membership in the arrangement, subject to the no-devaluation condition. Hence, a devaluation in one potential member country implies a lower commitment by other

members, thus making their currencies more vulnerable to attack. **Drazen** argues that this sort of "membership contagion" applies to the EMS crisis of 1992-3 and may be useful in understanding other episodes of contagion.

Eichengreen and **Jeanne** study the role of unemployment in the interwar experience of the British sterling. According to most narrative accounts, the proximate cause of the 1931 sterling crisis was a high and rising unemployment rate that placed pressure on British governments to pursue reflationary policies. The authors' model and evidence lend further support to the view that the proximate cause of the sterling crisis was the dramatic rise in unemployment brought about by external deflationary forces.

Flood and **Garber** note that recent analyses of the transition to the European Monetary Union have emphasized technical problems with the conversion ratios of currencies into

the euro at the start of Stage III. Restrictions on bilateral conversion rates imply that they must be the same as market bilateral rates at the end of Stage II. From this fact has come a conclusion that exchange markets may generate volatility, speculative attacks, or even indeterminacy of exchange rates on the last day of Stage II. Concerns for these technical issues *per se* as additional sources of exchange market volatility are red herrings: euro payment institutions that begin operating at the outset of Stage III make it easy for "in" central banks to establish any desired bilateral conversion ratios for their currencies. As long as Stage III itself is viable at the outset, "in" central banks are formidably armed to impose desired conversion ratios within the restrictions.

Gordon's point of departure is the conventional wisdom that the European countries that devalued their currencies and departed from the

Exchange Rate Mechanism in 1992 (the "leavers") had achieved an enviable combination of more rapid output growth with little if any extra inflation, as contrasted with the "stayer" countries that had maintained their currencies pegged to the German mark. In contrast, his paper flips the conventional wisdom on its head. On average, the six leaver countries experienced almost double the inflation rate of the average for the five stayers from 1992 to 1996, he points out. And, 80 percent of their extra nominal GDP growth was chewed up by extra inflation, leaving only 20 percent to spill over to faster real GDP growth. The slow growth in domestic demand in the leaver countries is attributed to two factors: the flexibility of real wages that caused nominal labor costs to rise at a slower rate than domestic inflation, and the unrelated pressure of the Maastricht criteria that caused the external demand stimulus to be almost entirely cancelled by fiscal tightening.

Edwards and **Savastano** address the 1994 Mexican crisis, concentrating on the events leading to the exchange rate collapse in December 1994 and examining the behavior of some key microeconomic variables in the following three years. First, the authors ask what forces supported the apparent stability of the peso-dollar exchange rate during 1996-7. Second, they inquire about the role of the Bank of Mexico's (BOM) monetary policy in the postcrisis period, and, in particular, whether it was geared toward maintaining a degree of nominal exchange rate stability that may have been at odds with the requirements of a floating regime. Their analysis suggests that throughout most of 1995-7, Mexico's exchange rate behavior was largely

consistent with (quasi) floating rates. However, it is also consistent with BOM's taking into account exchange rate developments for conducting monetary policy. Using daily and weekly data for 1996-7, the authors inquire whether BOM used a feedback rule that accounted for nominal exchange rate behavior. Notwithstanding the perils of relying on "noisy" high-frequency data to address that question, some preliminary evidence supports that view.

Calvo shows that the combination of large capital inflows and sovereign governments could give rise to self-fulfilling balance of payments (BOP) crises. He argues that a current account deficit could impair the resolution of such crises, but the crises themselves could occur even though the current account was in balance. The key is a weak financial sector, possibly made so by an accommodating central bank. In contrast with most of the literature on this subject, this paper makes output endogenous and discusses the channels through which a BOP crisis can result in output collapse. Calvo shows that a growth slowdown can take place even though a BOP crisis does not encourage a current account reversal.

Milesi-Ferreti and **Razin** study sharp reductions in current account deficits and of currency crises in low- and middle-income countries, examining the factors that help predict a reversal or a crisis and the ways these events affect macroeconomic performance. Both domestic and external factors trigger reversals and currency crises, and the two types of events are not necessarily associated; indeed, current account imbalances are not sharply reduced in the years following a currency crisis. Economic performance around these events is

also quite different in that an exchange rate crash is associated with a fall in output growth and a recovery thereafter, while for reversal events there is no systematic evidence of a growth slowdown.

Sachs and **Radelet** provide an early diagnosis of the financial crisis in Asia, focusing on the empirical record leading to the crisis. They emphasize the role of financial panic (as opposed to weak fundamentals) as essential to the Asian crisis. At the core of the crisis were large-scale foreign capital inflows into financial systems that became vulnerable to panic. While there were significant underlying problems besetting the Asian economies at both a macroeconomic and microeconomic level, the imbalances were not severe enough to warrant a financial crisis of the magnitude that took place in the latter half of 1997. A combination of panic on the part of the international investment community, policy mistakes at the onset of the crisis by Asian governments, and poorly designed international rescue programs turned the withdrawal of foreign capital into a full-fledged financial panic and deepened the crisis more than was either necessary or inevitable.

The conference concluded with a panel discussion of the current issues. The participants in that panel were **Richard Portes**, NBER and London Business School, **Jeffrey A. Frankel**, Council of Economic Advisers, **Stanley Fischer**, International Monetary Fund, and **Jeffrey Schafer**, Salomon, Smith Barney.

These papers and their discussions will be published as an NBER Project Volume. Its availability will be announced in a future issue of the *NBER Reporter*.

Capital Inflows to Emerging Markets

Participants in an NBER project on "Capital Inflows to Emerging Markets," organized by Sebastian Edwards of NBER and the University of California, Los Angeles, gathered in Cambridge on February 20 and 21 to hear the following reports:

Sebastian Edwards, "Capital Flows, Real Exchange Rates, and Capital Controls: Latin American Experiences"

Discussant: Jose de Gregorio, University of Chile

Paul R. Krugman, NBER and MIT, "Fire-Sale FDI"

Discussant: Aaron Tornell, NBER and Harvard University

Enrique Mendoza, Duke University, and **Guillermo Calvo**, University of Maryland, "Contagion, Globalization, and the Volatility of Capital Flows"

Discussant: Rudiger Dornbusch, NBER and MIT

Stijn Claessens, **Daniel Oks**, and **Rossana Polastri**, The World Bank, "Capital Flows to Central and Eastern Europe and the Former Soviet Union"

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

Philippe Bachetta, Studienzentrum, Gerzensee, and **Eric Van Wincoop**, Federal Reserve Bank of New York, "Capital Flows to Emerging Markets: Liberalization, Overshooting, and Volatility"

Discussant: Carmen Reinhardt, University of Maryland

Geert Bekaert, NBER and Stanford University, and **Campbell R.**

Harvey, NBER and Duke University, "Capital Flows and the Behavior of Emerging Market Equity Returns"

Discussant: James Conklin, Lehman Brothers

Holger C. Wolf, NBER and New York University, "Is There a Curse of Location? Spatial Determinants of Capital Flows to Emerging Markets"

Discussant: Miguel Savastano, International Monetary Fund

Barry Eichengreen, NBER and International Monetary Fund, and

Ashoka Mody, University of Pennsylvania, "What Explains the Falling Spreads on Emerging-Market Debt: Fundamentals or Irrational Exuberance?"

Discussant: Sylvia Maxfield, Yale University

Takatoshi Ito, NBER and Hitotsubashi University, "Capital Flows in Asia"

Discussants: David Folkerts-Landau, International Monetary Fund, and Dani Rodrik, NBER and Harvard University

Edwards discusses Latin America's experience during the last 25 years regarding the effects of capital flows on real exchange rates and international competitiveness, and then focuses on the role of capital controls as a device for isolating emerging economies from the volatility of international capital markets. His empirical analysis of Chile's recent experiences with capital controls, and comparisons to Colombia's and Mexico's recent experiences, is particularly important because many analysts have praised the Chilean practice of imposing reserve requirements on capital inflows to reduce the vulnerability associated with the volatility of capital flows.

Krugman draws attention to and stimulates discussion of the phenomenon of fire-sale foreign direct investment (FDI), which is likely to be-

come a major economic and political issue in the coming years. He indicates the ways this phenomenon might emerge in the context of alternative crisis models. Finally, he examines the welfare implications of crisis-induced sales of domestic assets to foreign firms and asks how those implications depend on the diagnosis of the crisis itself.

Mendoza shows that globalization of securities markets exacerbates the volatility of capital flows by strengthening the incentives that promote contagion. His model includes imperfect information: country-specific information can be acquired at a fixed cost, and portfolio managers bear certain variable costs that depend on portfolio performance. Using historical data from equity markets and country credit ratings, he shows that contagion can induce large cap-

ital outflows from emerging markets. Further, globalization has a large magnifying effect on contagion.

Claessens, **Oks**, and **Polastri** observe that private capital flows to Central and Eastern Europe and the former Soviet Union have increased sharply. From 1992-6, FDI was the most important capital flow, but recently flows of short-term debt have become more important. Perhaps more so than in other developing countries, to these regions reform efforts are the most important determinants of private flows. Official flows have been used to finance fiscal deficits and appear to have supported, rather than followed, countries' reform efforts. High real interest rates have been a factor in motivating private flows, particularly debt flows, raising questions about sustainability and vulnerability.

Bachetta and **Wincoop** analyze the effect of financial liberalization and reform in emerging markets on the dynamics of capital flows to these markets, using a simple model of international investors' behavior. First, they show that the gradual nature of liberalization, combined with the cost of absorbing large inflows in emerging economies, often implies an initial period of overshooting as portfolios adjust. Asset prices will overshoot as well. Second, they show that if investors have incomplete information about emerging markets and learn over time, then there can be high volatility of capital flows as well as contagion.

Foreign portfolio flows may reflect deep changes in the functioning of an emerging market economy and its capital markets. Using a database of monthly net U.S. equity flows, **Bekaert** and **Harvey** investigate the relationship of these flows to the behavior of equity returns, the structural characteristics of the capital markets, exchange rates, and the strength of the economy. They find that increases in capital flows are associated with a lower cost of capital, higher correlation with world market returns, slightly lower volatility, lower asset concentration, lower inflation, larger market size relative to GDP, more trade, and higher wealth per capita.

Wolf illuminates the role of geog-

raphy in determining financial flows. He begins by examining the determinants of access to assess whether location matters. He then examines source countries to determine the spatial distribution of outward financial flows. Using a dataset of capital outflows by type and destination for the G-7 economies, he estimates specifications for trade and for four types of capital flows—foreign direct investment, bank lending, portfolio debt, and portfolio equity. This approach yields a direct estimate of the sensitivity of capital flows to distance, and hence of the importance of location. Second, it permits a comparison of the relative importance of distance, common borders, and common language across the different types of capital flows.

Eichengreen and **Mody** analyze data on about 1,000 developing-country bonds launched from 1991–6, a period of heavy reliance on bonded debt. They analyze both the issue decision of debtors and underwriters and the pricing decision of investors, and minimize selectivity bias by treating the two decisions jointly. The results confirm that higher credit quality leads to higher probability of issue and to lower spreads, which supports the presumption that the market discriminates among issuers according to risk. They also isolate the fourth quarter of 1994, when the Mexican

crisis erupted and spreads moved sharply higher before falling below initial levels. Comparing the first quarter of 1991 to the third quarter of 1994 with the period from the first to the fourth quarter of 1995 (that is, the pre- and post-Mexican crisis subperiods), they find that changes in spreads were dominated by sharp adverse shifts in market sentiment rather than by changes in fundamentals. The same is true of the subsequent compression, which reflected favorable shifts in market sentiment.

Ito summarizes the characteristics of capital flows in Asia before and after the 1997 crisis. Just a few years ago, FDI to Asian emerging markets was praised as a model for the rest of the world. Capital flows to Asia increased investment and growth in this region. Exchange rate and stock price movements also reflected the strong outflow of capital from Asian countries, including Thailand, Malaysia, the Philippines, Indonesia, and Korea. By 1997, many Asian currencies depreciated, and stocks from these regions devalued, as regions are strongly affected by the currency crises of a single country in the region.

The University of Chicago Press is expected to publish the project volume of these conference proceedings. Its availability will be announced in a future issue of the *NBER Reporter*.



The Impact of International Trade on Wages

On February 27 and 28, 1998, the NBER held a conference on "The Impact of International Trade on Wages." Organized by Robert C. Feenstra, of the NBER and the University of California, Davis, the conference was held in Monterey, CA, and focused on the following topics:

Edward E. Leamer, NBER and University of California, Los Angeles, and **Christopher F. Thornberg**, Clemson College, "Effort and Wages: A Theoretic and Empirical Analysis"

Discussant: Alan B. Deardorff, University of Michigan

Paul R. Krugman, NBER and MIT, "And Now for Something Completely Different: An Alternative Model of Trade, Education, and Inequality"

Discussant: James E. Rauch, NBER and University of California, San Diego

James Harrigan, NBER and Federal Reserve Bank of New York, "International Trade and American Wages in General Equilibrium, 1967-1995"

Discussant: Jonathan Eaton, NBER and Boston University

Matthew J. Slaughter, NBER and Dartmouth College, "What are the Results of Product Price Studies and What Can We Learn from Their Differences?"

Discussant: Robert F. Baldwin, NBER and University of Wisconsin

Mary E. Lovely, Syracuse University, and **J. David Richardson**, NBER and Syracuse University, "Trade Flows and Wage Differentials: Does Who or What Matter?"

Discussant: George J. Borjas, NBER and Harvard University

Robert C. Feenstra, **Gordon H. Hanson**, NBER and University of Texas, and **Deborah L. Swenson**, NBER and University of California, Davis, "Offshore Assembly from the United States: Production Characteristics of the 9802 Program"

Discussant: James A. Levinsohn, NBER and University of Michigan

Lori G. Kletzer, University of California, Santa Cruz, "Trade and Job Loss in U.S. Manufacturing, 1975-1994"

Discussant: Lisa M. Lynch, NBER and Tufts University

Robert Z. Lawrence, NBER and Harvard University, "Does a Kick in the Pants Get You Going or Does It Just Hurt You? The Impact of International Competition on Technological Change in U.S. Manufacturing"

Discussant: Alan B. Krueger, NBER and Princeton University

Andrew B. Bernard, NBER and Yale University, and **J. Bradford Jensen**, Carnegie Mellon University, "Understanding Increasing and Decreasing Wage Inequality"

Discussant: Lee G. Branstetter, NBER and University of California, Davis

Linda S. Goldberg and **Joseph Tracy**, NBER and Federal Reserve Bank of New York, "Implications for U.S. Industry and Regional Labor Markets"

Discussant: Andrew K. Rose, NBER and University of California, Berkeley

Leamer and Thornberg provide empirical support for the idea that high-wage, high-effort jobs occur in capital-intensive sectors and show that this wage-effort offer curve has shifted in ways that suggest globalization effects. During the 1970s, when relative prices of labor-intensive goods declined, the wage-effort curve twisted, showing lower pay being offered for low-paying jobs in the labor-intensive sectors but higher pay being offered for the high-paying jobs in the capital-intensive sectors. The problem they face is how to measure "effort," the product of hours of capital operations multiplied by "intensity." Intensity, which is not

only speed of operations, but also attentiveness, willingness to take risks, and all those other intangibles that raise productivity without causing increased capital costs is not observed here. They use hours as the only indicator of effort, suggesting that intensity is not so negatively correlated with hours that there is no relationship between hours and effort.

Krugman shows the way a process quite distinct from either the simple trade or the simple technology story might be key to understanding the growth of inequality. The basic idea is that the labor market might, over some range of conditions, be characterized by multiple

locally stable equilibriums, some more egalitarian than others. If that is the case, unequalizing shocks of modest size—shocks that could originate in changing trade opportunities, changing technology, or both—could push the economy out of an egalitarian equilibrium and set in motion a process of growing inequality. In Krugman's model, that process, which essentially feeds on itself, could easily be misinterpreted as exogenous skill-biased technical change.

In the last quarter century, wage inequality has increased dramatically in the United States. At the same time, the United States has become

more integrated in the world economy, relative prices of final goods have changed, the capital stock has more than doubled, and the labor force has become steadily more educated. **Harrigan** estimates a flexible, empirical, general equilibrium model of wage determination in an attempt to sort out the connections among these trends. Aggregate data on prices and quantities of imports, outputs, and factor supplies are constructed from disaggregate sources. The econometric analysis concludes that wage inequality has been driven partly by changes in relative factor supplies and relative final goods prices. In contrast, imports have played a negligible role.

In recent years many economists have analyzed whether international trade has contributed to increasing U.S. wage inequality by changing relative product prices. **Slaughter** surveys and synthesizes the findings of nine product-price studies, which demonstrate the evolution of the methodology of product-price studies. By surveying these papers chronologically, he relates each to the theory framework and to the papers preceding it and draws two main conclusions. First, this literature has refined empirical strategies for applying the SS theorem to the data from which important methodological lessons can be learned. Second, despite the methodological progress that has been made, research still has fundamental limitations regarding the key question of how much international trade has contributed to rising wage inequality. Most important, more work is needed to link the various exogenous forces attributable to international trade to actual product-price changes.

Lovely and **Richardson** examine the literature on the ways wages are distinctively affected by trade in inputs (international "outsourcing") and the ways returns to human cap-

ital vary across time and space. They look at the literature on "interindustry wage differentials" and the way such differentials correlate with measures of international trade. The authors model inter- and intra-industry trade between and within a primary-producing "southern" tier of countries that also can assemble final manufactures, and a "northern" tier of countries that assemble final manufactures and produce the intermediate components from which they are assembled. They isolate three important exogenous trends during the past two decades and deduce their effects on trade flows, on pure wages, and the return to skills. Using U.S. worker data, they assess whether the relation of trade to pure wages differs from its relation to the return to an individual worker's human capital, and whether such patterns differ by (manufacturing) industry. The authors distinguish several categories of trade that could have different relations to wages and human capital returns, by disaggregating U.S. trade into producer intermediate and capital goods and consumer goods. Finally, they also distinguish types of trade by trading partner, keeping track of annual trade in the three categories for three groups of trading partners: industrial countries, newly industrial countries, and primary-product producers. Using individual wage regressions, the authors estimate the correlations between wage and intraindustry trade in the aggregate and at the industry level. Taking a more traditional approach, they estimate industry wage premiums and estimate their correlations with trade flows and with measure of the extent of intraindustry trade.

Feenstra, Hanson, and Swenson examine trade conducted through the U.S. offshore assembly program (OAP) to gain insight into recent outsourcing trends and their potential consequences. As firms disperse their

production across countries through the OAP, one prediction that follows from Feenstra's and Hanson's work is that U.S. content of OAP imports should be intense in its usage of skilled labor. Their findings are mixed concerning the measurement of the skilled labor intensity of production by the share of nonproduction labor, though they find that OAP imports of apparel, machinery, and transportation equipment from industrial countries, support their hypothesis. They also investigate how OAP outsourcing responds to changes in the relative cost of U.S. production, as measured by the industry-specific trade-weighted exchange rates. They find that elevated costs of production in the U.S. cause firms in many industries to use foreign production. While cost-induced movements toward the purchase of OAP inputs are small when compared to U.S. industry, the predicted response to cost changes implies a significant change in the magnitude of many OAP industries.

Kletzer examines the relation between increasing foreign competition and job displacement in U.S. manufacturing from 1975–94, a period of increased trade flows, large swings in the value of the dollar, falling trade barriers in developing countries, and widespread permanent job loss, particularly in manufacturing. The results are broadly consistent with the perception that imports displace some domestic jobs, apparently a result of a strong positive relation between increasing foreign competition and job displacement for industries long identified as import-competing, such as footwear, leather products, radio and television, watches and clocks, and toys. At the same time, there are many import-competing industries with below-average rates of job loss, and considerable job loss from industries facing little or no change in import

competition. With this variation, the relation between increasing foreign competition and permanent job loss appears much less systematic, and it appears that increasing foreign competition accounts for a small share of job displacement. This conclusion would be highlighted if the analysis sample included trade and service industries, where rates of job loss are high while the services produced are mostly nontradables. In the absence of satisfactory proxies for technological change, the role of technological change remains an open research question.

Lawrence suggests that import competition from developing countries has reduced total factor productivity (TFP) growth, particularly in sectors with low levels of concentration but has stimulated competition in sectors in which concentration is high. Industries with a high employment share of high school workers particularly have felt these negative effects on TFP. While these industries had slightly faster total productivity growth in the 1980s than did the rest of manufacturing, the effect of trade has been negative. If the demand for

products in these industries is elastic, operating through induced effects on TFP, international competition tends to reduce the wages of unskilled workers. Lawrence's results support the argument that the effect of international competition on wages is greater because of its effects on productivity. However, this mechanism is not finished inducing faster automation or innovation; on the contrary, it appears to have stopped the reduction of incentives for innovation. Also noted is that import competition from developed countries is associated with positive labor productivity growth, suggesting a response in the form of increased investment rather than innovation.

Bernard and Jensen use data on inequality among U.S. states to determine the sources of increasing national inequality during the 1980s. After providing evidence that labor markets clear regionally long before they clear nationally, the authors use regional labor market shocks to identify the sources of rising aggregate wage inequality. They find that individual states have very different wage levels, and changes in industrial com-

position, in particular the loss of manufacturing jobs, are strongly correlated with regional inequality increases.

Exchange rates have different implications for state and for industry labor markets in the United States. **Goldberg and Tracy** demonstrate these distinctions over time and across labor markets using two decades of annual industry-level data for employment, hours, and hourly earnings. Industries are directly exposed to currency movements through their export shares, imported input use, and import penetration. However, the effects of exchange rates on labor markets differ across regions, highlighting the potential cross-industry spillovers of exchange rates through local labor markets. The overall labor market implications of exchange rates depend on both the industry in which a worker is employed and other industries in the worker's locality. They also document the relative importance for labor markets of the industry, regional, and specific trade exposure channels for exchange rates.



Bureau News

NBER Announces Nonprofit Fellowships

The NBER has just announced that it will award dissertation fellowships on "The Economics of the Nonprofit Sector" to five graduate students for the coming academic year: Mark Duggan, Harvard University, whose topic is "Delivery of Uncompensated Care by For-Profit and Not-for-Profit Hospitals"; Florence Kwan, City University of New York, who is studying the "Choice of For-Profit versus Not-for-Profit Abortion Providers"; Darius Lakdawalla, University of Chicago, for "Medicaid Subsidies and the Role of For-Profit and Not-for-Profit Providers

of Long-Term Medical Care"; Alan Sorensen, MIT, who is studying "Competition and Pricing Behavior of For-Profit and Not-for-Profit Hospitals"; and Marcus Stanley, Harvard University, for "Nonprofit Nursing Home Providers." This is the second year of an NBER program designed to encourage research on nonprofit institutions by NBER Research Associates and Faculty Research Fellows, and to support dissertation research on the same subject by graduate students in economics who work closely with them.

Faculty grants were made to: James Hines, University of Michigan, who will study "Taxation and the Behavior of Nonprofit Organizations"; Christopher Ruhm, University of North Carolina-Greensboro, who will focus on "Compensation in the Nonprofit Sector"; David Scharfstein, MIT, whose research is on "Economic Incentives in For-Profit and Not-for-Profit Hospitals"; and Jonathan Skinner, Dartmouth College, who will analyze "Hospital Conversions and the Choice of For-Profit and Not-for-Profit Status."

Project on Higher Education Meets

Members and guests of the NBER's Project on Higher Education, directed by NBER Research Associate Charles T. Clotfelter, also of Duke University, gathered in Cambridge on December 5, 1997. Their day-long meeting covered the following topics:

Charlotte Kuh, National Research Council, "Tenure Track and Non-Regular Faculty Employment Among Ph.D.s"

Discussant: John Siegfried, Vanderbilt University

Sandra Baum, Skidmore College, "The National Student Loan Survey: The Attitudes and Lifestyles of Borrowers in Repayment"

Discussant: Ronald G. Ehrenberg, NBER and Cornell University

Thomas J. Kane, NBER and Harvard University, and **Cecilia E. Rouse** and **Douglas O. Staiger**, NBER and Princeton University, "Estimating Returns to Schooling When Schooling is Misreported"

Discussant: Richard Murnane, NBER and Harvard University

Eric A. Hanushek, NBER and University of Rochester, and **Ban Chuan Cheah** and **Charles Ka Yui Leung**, University of Rochester, "Redistribution Through Education and Other Transfer Mechanisms"

Discussant: Michael Rothschild, NBER and Princeton University

Andrew Dick, University of Rochester, and **Aaron Edlin** and **Eric Emch**, University of California, Berkeley, "Savings Incentives in College Financial Aid"

Discussant: Malcolm Getz, Vanderbilt University

Sarah E. Turner, University of Virginia, and **William G. Bowen**, The Andrew W. Mellon Foundation, "Choice of Major: The Changing (Unchanging) Gender Gap"

Discussant: Paula Stephan, Georgia State University

Over the past 14 years, employment in adjunct, part-time, and non-tenure track jobs among Ph.D.s has grown steadily. This growth has occurred at the same time that the growth of tenure track academic employment has stagnated or been very slow. **Kuh** documents that change,

and looks at the characteristics of various segments of the doctoral work force. It turns out that full time non-tenure-track jobs primarily are research jobs, at least in the science and engineering fields. Part-time and adjunct jobs are primarily teaching positions. This change in the compo-

sition of academic employment affects the nature of the academic enterprise, which still relies on regular faculty for academic governance.

Baum reports on the responses of 1,100 student loan borrowers to a survey conducted during the summer of 1996. Average debt levels have

risen sharply over the last decade, but they conceal considerable variance in borrowing patterns, with a small proportion of borrowers having very high debt levels. About half of the borrowers feel burdened by repayment, but, overall, student debt has not caused most borrowers to change their lifestyles dramatically, nor do most of them regret the investments they have made. Many of them have accumulated significant amounts of noneducation debt, which causes them as much discomfort as do their student loans.

Kane, Rouse, and Staiger estimate the labor market payoff to schooling when schooling is misreported. Their results suggest that two assumptions in previous work—that the measurement error in educational attainment is “classical,” and that transcript-based measures of educational attainment represent “true” schooling—are unjustified. As a result, certain estimates of the payoff to schooling are biased.

Educational subsidies frequently are justified as a method of altering the income distribution. Thus it is natural to compare education to other tax-transfer schemes designed to achieve distributional objectives. **Hanushek, Cheah, and Leung** use data on school attendance, labor supply, wage determination, and aggregate production to compare alternative redistribution devices in terms of both deadweight loss and distributional outcomes. Without externalities, redistribution through education is an inferior approach to direct wage subsidies, although it is frequently superior to a negative

income tax. With externalities in production, there is a clear although bounded role for government subsidy of education.

When parents save for their children's college education, a portion of their savings is later taken away in the form of reduced eligibility for college financial aid. In this way, the college financial aid system levies a sizable implicit tax on assets. **Dick, Edlin, and Emch** suggest that these implicit taxes can reduce aggregate savings accumulations by as much as \$500 billion. They consider as an alternative policy the elimination of all financial aid, and find that total asset accumulation would increase by 21 percent (\$540 billion) from families affected by this scenario, even though college consumption would decrease. Their second policy alternative bases aid on a long stream of labor income, rather than on asset accumulation. According to this scenario, the total asset accumulation of affected families would increase by about 20 percent (\$500 billion), with only small effects on college consumption.

The external factors (both the pre-collegiate and other “out-of-college” factors) presumed to be at work in determining choice of college major include: 1) student preparation and achievement prior to college, especially in mathematics; 2) differences between men's and women's preferences for various fields of study, which might be encouraged by parental and societal expectations and modified by in-college experiences; and 3) gender-specific labor market prospects associated with a given set of

skills, which might provide more encouragement to one sex than the other to pursue certain fields of study. **Turner and Bowen** focus on the extent to which differences between men and women in precollegiate achievement, as measured by the Scholastic Achievement Test (SAT) verbal and math scores, account for differences in choice of major at the college level. They find that the choices men and women have made in elective fields of study have shown a considerable degree of convergence between the 1950s and the late 1970s, followed by small changes from that time to the present. Differences in academic preparation of women and men as measured crudely by standardized test scores explain some of the observed differences in characteristic choices of major. But such differences in SAT scores are only part of the story, and a modest part at that. An array of residual forces—including differences in preferences, labor market expectations, gender-specific effects of the college experience, and unmeasured aspects of academic preparation—account for the main part of today's gender gap in choice of academic major. The simple science-nonscience dichotomy is no longer useful as a taxonomy if the objective is to understand field choices by women and men. Quite plainly, there is a widening divide between the life sciences, on the one hand, and math-physical science-engineering, on the other, in terms of their attractiveness to women.

NBER's Japan Project Meets in Tokyo

A number of U.S. and Japanese economists gathered in Tokyo on December 18, 1997, for a meeting of the NBER's Japan Project. The program, organized by NBER Research Associates Fumio Hayashi, also of University of Tokyo, Takatoshi Ito, also of Hitotsubashi University, and Anil Kashyap, also of University of Chicago, was:

Michael R. Darby and **Lynne Zucker**, NBER and University of California, Los Angeles, "Capturing Technological Opportunity via Japan's Star Scientists: Evidence from Japanese Firms' Biotech Patents and Products" (NBER Working Paper No. 6360).
Discussant: Akiko Tamura, Hosei University.

Lee G. Branstetter, NBER and University of California, Davis, "Are Knowledge Spillovers International or Intranational in Scope? Microeconomic Evidence from the U.S. and Japan" (NBER Working Paper No. 5800).

Discussant: Akira Goto, Hitotsubashi University.

Michael D. Bordo, NBER and Rutgers University, **Takatoshi Ito**, and **Tokuo Iwaisako**, University of Tsukuba, "Banking Crises and Monetary Policy: Japan in the 1990s and the U.S. in the 1930s".

Discussant: Masahiro Higo, Bank of Japan.

Gordon Bodnar and **Richard C. Marston**, NBER and University of Pennsylvania, and **Bernard**

Dumas, NBER and HEC School of Management, "Pass Through and Exposure".

Discussant: Eiji Ogawa, Hitotsubashi University.

Takeo Hoshi, Osaka University, and **John McMillan** and **Ulrike Schaefer**, University of California, San Diego, "Competition and Financial Structure in Japanese Firms".

Discussant: Mitsuhiro Fukao, Keio University.

Nobuhiro Kiyotaki, London School of Economics, and

Kenneth D. West, NBER and University of Wisconsin, "Land Prices and Business Fixed Investment in Japan".

Discussant: Hiroshi Yoshikawa, University of Tokyo.

Using detailed data on biotechnology in Japan, Darby and Zucker report that identifiable collaborations between particular university star scientists and firms have a large positive impact on firms' research productivity, increasing the average firm's biotech patents by 34 percent and products on the market by 8 percent from 1989 to 1990. However, there is little evidence of geographically localized knowledge spillovers. In Japan, the legal and institutional context implies that firm scientists work in the stars' university laboratories. In America, in contrast, the stars are more likely to work in the firms' labs. As a result, star collaborations in Japan are less localized around the research universities, and there is less impact on local economic development in university areas. Stars' scientific productivity increases less during collaborations with firms in Japan than in the United States.

Branstetter points out important shortcomings in previous attempts to

estimate the effects of intranational and international knowledge spillovers. Then, he provides new estimates of the relative impact of intranational and international knowledge spillovers on innovation and productivity at the firm level, using previously unexploited panel data from the United States and Japan that provide a rich description of the firms' technological activities and allow for potentially much more accurate measurement of spillover effects. The estimates indicate that knowledge spillovers are primarily intranational in scope.

Bordo, **Ito**, and **Iwaisako** compare the recession of the 1990s in Japan with the Great Depression of the United States in the 1930s. Both episodes included a period of asset price inflation and deflation that preceded a recession with a banking crisis. In both the slow growth period with asset price deflation of Japan in 1991-6 and the onset of a banking crisis in 1930 in the United States,

monetary authorities were dedicated to eradicating speculation. The Great Depression experience, beyond the onset of the First Banking Crisis in the fall of 1930, is unparalleled in the Japanese case, though. Lender-of-last-resort action by the Bank of Japan prevented debt deflation from occurring in Japan in the 1990s, but resolution of the problem of bad loans has yet to take place. The authors estimate several VAR systems to isolate the determinants of industrial production in both crises. In the U.S. case, they find, both monetary and credit explanations are important. In the Japanese case, credit variables predominate.

Firms differ in the extent to which they pass through changes in exchange rates into the prices they charge in foreign markets. They also differ in their exposure to exchange rates—that is, in the responsiveness of their profits to changes in exchange rates. Yet, pricing behavior should be governed by many of the

same firm and industry characteristics that determine the exposure of a firm's profits to exchange rates. **Bodnar, Dumas, and Marston** consider an imperfectly competitive environment in which foreign firms compete with local firms. Using both a quantity-based competition model and a price-based competition model, they derive the optimal pass-through decisions and from these determine the exchange rate exposure that would result. They use Japanese export industry data, and then compare pass-through and exposure estimates across industries.

Hoshi, McMillan, and Schaede study the roles of product market competition and financial arrangements in determining corporate performance. Using data from large

Japanese manufacturing firms, they focus on the interaction between product market discipline and financial management discipline, asking whether they are complements (in the sense that one is more effective when the other is present) or substitutes (in the sense that one is less effective when the other is present). They find that high market concentration tends to improve corporate performance by increasing the monopoly rent. Main-bank dependence also increases corporate performance, and complements market competition. High leverage also improves corporate performance, but it substitutes for market competition. Concentrated shareholding in Japan hurts corporate performance, but its interaction with market competition is not clear.

In recent years, land prices and business fixed investment in Japan have boomed and collapsed. Similar episodes have occurred in earlier periods. **Kiyotaki and West** develop a simple model that includes land in the production function and show that increases in land prices may cause an increase in investment if the elasticity of substitution between land and capital is greater than one. They then estimate an aggregate investment function and confirm that increases in land prices lead to increases in business investment. In the end, however, movements in land prices explain relatively little of the movement in the business fixed investment.

Research Meeting on Economic Fluctuations and Growth

On February 6, more than 30 members and guests of the NBER's Program on Economic Fluctuations and Growth met to discuss their research. Michael Kremer, of NBER and MIT, and Mark W. Watson, of NBER and Princeton University, chose the following papers for presentation.

Shubham Chaudhuri, Columbia University, "Income Seasonality, Precautionary Saving, and Borrowing Constraints in an Agrarian Economy"

Discussant: Christopher D. Carroll, NBER and Johns Hopkins University

Olivier J. Blanchard, NBER and MIT, "The Medium-Run"

Discussant: Robert E. Hall, NBER and Stanford University

Per Krusell, University of Rochester, **Lee Ohanian**, Federal Reserve Bank of Minneapolis, **José Victor Rios-Rull**, Federal Reserve Bank of Minneapolis, and **Giovanni Violante**, University College, London, "Capital-Skill Complementarity and Inequality: A Macroeconomic Analysis"

Discussant: Lawrence F. Katz, NBER and Harvard University

Peter Rupert, Federal Reserve Bank of Cleveland, and **Richard Rogerson** and **Randall Wright**, NBER and University of Pennsylvania, "On the Macroeconomic Implications of Models with

Household Production"

Discussant: John F. Kennan, NBER and University of Wisconsin

Giancarlo Corsetti, Yale University, and **Paolo Pesenti**, NBER and Princeton University, "Welfare and Macroeconomic Interdependence"

Discussant: Maurice Obstfeld, NBER and University of California, Berkeley

Philippe Aghion, University College, London, **Abhijit Banerjee**, MIT, and **Thomas Piketty**, CEPREMAP, "Dualism and Macroeconomic Volatility"

Discussant: Paul M. Romer, NBER and Stanford University

Households in many poor agrarian economies derive their income from agriculture which depends on rain. This raises the possibility that households accumulate information about future cash inflows (that is, harvests)

from rainfall patterns early on in the crop cycle. Using detailed data from three villages in India, **Chaudhuri** explores whether households use this information in the ways suggested by modern consumption the-

ories. He finds fairly strong support for the joint hypothesis of precautionary saving and forward-looking behavior in the presence of borrowing constraints.

Blanchard considers the evolu-

tion of OECD countries over the last 30 years. Motivated by the very different shares of unemployment and capital in Continental Europe versus Anglo-Saxon countries, he offers a broad interpretation of events: Continental Europe was affected by strong adverse labor supply shifts in the 1970s and by strong adverse labor demand shifts in the 1980s. The earlier supply shifts largely reflected the failure of wages to react to the slowdown in productivity and the increase in oil prices. The more recent labor demand shifts are attributable to a combination of change in the distribution of rents from workers to firms, and technological progress biased against labor. Together with the implied dynamics of employment and capital accumulation, these labor supply and demand shifts can explain the increase and persistence in unemployment, as well as the increase in capital shares, that have characterized most Continental European countries. These shifts have been largely absent in Anglo-Saxon countries; as a result, unemployment has been lower, and capital shares have not increased.

The notion of skilled-biased technological change is often held responsible for the recent behavior of the U.S. skill premium (or the ratio of

the wages of skilled to unskilled labor). **Krusell, Ohanian, Rios-Rull, and Violante** evaluate the fraction of the skill premium's variation that is caused by changes in observable variables. In their model, the key feature of aggregate technology is capital-skill complementarity: the elasticity of substitution is higher between capital equipment and unskilled labor than between capital equipment and skilled labor. With this feature, changes in observable variables can account for nearly all the variation in the skill premium over the last 30 years. This suggests that increased wage inequality results from economic growth driven by new, efficient technologies embodied in capital equipment.

Standard estimates of the propensity to substitute leisure for work rely on life cycle data and implicitly assume that only wages vary systematically over the life cycle. **Rogerson, Rupert, and Wright** argue that non-market opportunities also vary systematically over the life cycle with changes in factors such as childbearing and home ownership. If these opportunities are correlated with market wages, then previous estimates might be biased downward. The authors formulate a life cycle model with household production

and estimate it using data from the Time Use Survey. They find that the model can account for as much as three quarters of the variability of hours in the actual data.

Corsetti and Pesenti analyze the international transmission of monetary and fiscal policies. In contrast with the traditional literature, their findings emphasize the positive externalities of foreign monetary expansions and foreign fiscal contractions on domestic welfare, while highlighting the ambiguous effects of domestic policy shocks on welfare.

Aghion, Banerjee, and Piketty show that capital market imperfections, together with unequal access to investment opportunities among individuals, can generate macroeconomic volatility, that is permanent fluctuations in aggregate gross domestic product, investment, and interest rates. The model they present also offers a transparent rationale for countercyclical fiscal policies: since slumps are periods in which some idle savings are not being used efficiently because of the limited debt capacity of potential investors, one way to foster recovery would be to issue public debt during recessions in order to absorb those idle savings and finance investment subsidies or tax cuts for investors.



Programs on Health Care and Industrial Organization

On February 6 and 7, the NBER sponsored a joint meeting of the "Programs on Health Care and Industrial Organization." Organized by Alan M. Garber of NBER, and Garth Saloner and Frank A. Wolak of NBER and Stanford University, this joint session was held in Stanford, CA. Presentations included the following:

David M. Cutler, NBER and Harvard University, "Cost Shifting or Cost Cutting? The Incidence of Reductions in Medicare Payments"

Tomas Philipson, NBER and University of Chicago, **Darius Lakdawalla**, University of Chicago, "Nonprofit Production and Competition"

Discussant: Fiona Scott Morton, NBER and University of Chicago

Laurence C. Baker, NBER and Stanford University, "Managed-Care

and Technology Adoption in Health Care: Evidence from Magnetic Resonance Imaging

Discussant: William Vogt, Carnegie-Mellon University

Sarah Feldman, Brigham and Women's Hospital, and **David S. Scharfstein**, NBER and MIT, "Managed-Care and Provider Volume"

Discussant: Martin Gaynor, NBER and Carnegie-Mellon University

Dinner speaker: Victor R. Fuchs, NBER and Stanford University

Daniel Kessler, NBER and Stanford University, and **Mark B. McClellan**, "Is Hospital Competition Socially Wasteful?"

Discussant: Roger Noll, Stanford University

Scott Stern, NBER and MIT, and **Manuel Trajtenberg**, NBER and

Tel-Aviv University, "The Empirical Implications of Physician Authority in Pharmaceutical Decision Making"

Discussant: Peter C. Reiss, NBER and Stanford University

Arthur Kalnins, University of Michigan, and **Francine Lafontaine**, NBER and University of Michigan, "Incentive and Strategic Motives for Vertical Separation: Evidence from Location Patterns in the Texan Fast-Food Industry"

Discussant: Severin Borenstein, NBER and University of California, Berkeley

Judith A. Chevalier, NBER and University of Chicago, **Glenn Ellison**, NBER and MIT, "Career Concerns of Mutual Fund Managers"

Discussant: Jeff Zwiebel, Stanford University

Cutler examines how Medicare's reductions in hospital payments affect hospital operations. The author looks at two episodes of payment reductions—the late 1980s and the early 1990s and finds a large difference in the impact of payment reductions in these two time periods. In the 1980s, reduced Medicare payments were offset dollar for dollar by increased prices to private insurers. In the 1990s, however, payment reductions result in lower hospital profits, which must ultimately reduce hospital costs. Hospitals have responded to the payment reductions by reducing the number of beds and nurses, and sometimes by closing entirely, but not by reduced acquisition of high tech equipment.

Philipson and **Lakdawalla** argue that previous analysis of nonprofit organizations, such as health care and education, has not separated profit-deviating preferences from the state-defined regulatory status of

nonprofit production. They argue that this separation is crucial for providing predictions about the underlying forces that allow the coexistence of nonprofit and for-profit production in an industry as well as for predicting such fundamental matters as the share of nonprofit activity. By separating choice of nonprofit status from profit-deviating preferences, the authors predict the forces that determine the share of nonprofit production in an industry. The authors argue that this share falls with the share of the demand that is publicly subsidized, rises with the total number of firms in the industry, and rises with growth in the pace or extent of cost-reductions resulting from learning-by-doing. These predictions stem from a basic aspect of regulatory nonprofit choice that links the degree of competition in a market with the share of nonprofits: the availability of economic profits under for-profit status raises the cost of choosing non-

profit status when such a status is associated with a distribution constraint. Empirical evidence using panel data on U.S. states in the long term care industry from 1989 to 1994 suggests these predictions hold for this industry.

Advances in medical technology have been identified as major drivers of increases in health care costs over the past several years, but increases in managed care may alter the incentives associated with the acquisition of new technologies and with their use. **Baker** discusses mechanisms by which managed care might influence the adoption of new technologies and empirically examines the relation between health maintenance organization (HMO) market share and the diffusion and use of magnetic resonance imaging (MRI) equipment. The author finds that increases in HMO activity have slowed the diffusion of MRI and reduced the number of MRI procedures performed. These results

suggest that technology adoption in health care does respond to managed care activity, which might have implications for future health care costs. More broadly, these results imply that it is important to consider the effects of managed care on the structure and functioning of the entire health care market, not just on patients who enroll in HMOs.

There is considerable evidence that patients who are treated by high-volume physicians and hospitals have better health outcomes than patients treated by low volume physicians and hospitals. Thus, provider volume can serve as an indirect measure of the quality of health care. **Feldman** and **Scharfstein** compare the quality of managed care and more traditional fee-for-service health insurance by comparing the average provider volume of cancer patients covered by these two types of plans. The authors find that managed care patients tend to be treated by lower volume providers and that the magnitude of the differences vary by the particular cancer and managed care plan.

Kessler and **McClellan** provide evidence of the impact of competition on patient welfare by examining the links among hospital choices, hospital market structure, medical treatment decisions, health care costs, and health care outcomes. They study the consequences of hospital competition for heart attack care for all non-rural elderly Medicare beneficiaries from 1985 to 1994. Before 1991, competition led to higher costs and lower rates of adverse health outcomes; but after 1990, competition led both to substantially lower costs and substantially lower rates of adverse outcomes. The authors also investigate the sensitivity of the basic result to controls for other factors that may affect hospital market structure, such as the utilization of hospital bed capacity. Not only do decreases in market concentration lead to increases in social welfare post-1990, even

when capacity utilization is controlled, but also capacity utilization is itself an important determinant of health care costs and outcomes.

Stern and **Trajtenberg** study how physician authority affects pharmaceutical prescribing. Physicians engage in a costly process of "matching" patients to the drug that most suits their particular conditions and characteristics. The relative efficiency of this matching process results from the diagnostic skill of the physician along with the investments made by the doctor in learning about different drugs. The authors find substantial variation in the degree to which physician prescribing is concentrated (that is, that some physicians prescribe a more diverse portfolio of drugs than others). Second, this concentration is correlated with observable drug characteristics. In particular, concentrated prescribers tend to prescribe drugs with high levels of advertising, low prices, and high (lagged) market shares. Physicians who are able to more finely partition the differences among their patients are both more likely to have less concentrated prescribing portfolios and to be less sensitive to information that promotes the use of a drug for an "average" patient.

Kalnins and **Lafontaine** focus on the fact that under "aggressive" strategic motives, franchisors should not allocate to the same franchisees the right to own outlets in contiguous markets. But if franchisors use franchising to make themselves less aggressive toward rivals, or to provide incentives for effort and to reduce free riding, they might want to allow franchisees to own units that share market boundaries. The authors use information on the locational patterns of units in the six largest fast food chains in Texas to show that contiguity has a positive effect on the probability that a particular franchisee is allowed to own a new unit. This evidence suggests that franchising is not an entry deterrence

or output increasing strategic device. The data also suggest that the allocation of units is not determined by the franchisee's desire to diversify away risk through his or her portfolio of franchises. Instead, the potential for increased upstream cooperation, the minimization of monitoring or free-riding costs, and the franchisor's reliance on the franchisee's local market expertise apparently determine the allocation of units across franchisees.

Chevalier and **Ellison** examine the labor market for mutual fund managers' and managers' responses to the implicit incentives created by their career concerns. The authors find that managerial turnover is sensitive to a fund's recent performance. Consistent with the hypothesis that fund companies are learning about managers' abilities, managerial turnover is more performance-sensitive for younger fund managers. Interpreting the separation-performance relationship as an incentive scheme, several of the results suggest that a desire to avoid separation may induce managers at different stages of their careers to behave differently. Younger fund managers appear to be given less discretion in the management of their funds; that is, they are more likely to lose their jobs if their fund's beta or unsystematic risk level deviates from the mean for their fund's objective group. The authors also show that the shape of the job separation-performance relationship may provide an incentive for young mutual fund managers to be risk averse in selecting their funds' portfolio. Younger fund managers take on lower unsystematic risk and deviate less from typical behavior than their older counterparts. Finally, additional results on the flow of investments into mutual funds suggest that rather than just being the result of a screening process, firing decisions also might be influenced by a desire to stimulate inflows of investment into the fund.

Program Meeting on Development of the American Economy

The NBER's Program on the Development of the American Economy met at the Bureau's Cambridge office on March 7, 1998. Organizers Claudia Goldin, Program Director, also of Harvard University, and John J. Wallis, NBER and University of Maryland, chose the following presenters and topics:

Lee J. Alston, NBER and University of Illinois, and **Kyle Kauffman**, Wellesley College, "Social Norms

of Racial Discrimination and Their Impact on Land Rentals in the U.S. South"

Joshua Rosenbloom, NBER and University of Kansas, and **William Sundstrom**, Santa Clara University, "The Sources of Regional Variation in the Severity of the Great Depression: Evidence from U.S. Manufacturing, 1919–1937"

Charles Calomiris, NBER and Columbia University, and **Berry**

Wilson, Federal Communications Commission, "Bank Portfolio Risk and Capital: The 1930s Capital Crunch and Scramble to Shed Risk"

Dora Costa, NBER and MIT, "The Unequal Work Day: A Long-term View"

Richard H. Steckel, NBER and Ohio State University, "Tax Records and the Distribution of Wealth, 1820–1910"

At the turn of 20th century, a variety of racially discriminatory laws and norms affecting the behavior of blacks existed in the U.S. South. **Alston** and **Kauffman** provide an indirect test of how the southern institutions of discrimination affected market prices. They start from the observation that in 1920 in the U.S. South, black cash renters paid more per acre than did white cash renters within the same county. The explanation for the cash rent differences is not discrimination in the classic sense but rather a reflection of the absence of civil rights for blacks. In the presence of discriminatory laws and practices, black renters were willing to pay "paternalism premiums" for protection from potential abuses.

The severity of the Great Depression in the United States varied by region, especially when measured in terms of employment fluctuations. Most notably, compared with the rest of the country, the south Atlantic states experienced a milder contraction, while the mountain states suffered more severely. The effect of the contraction was more uniform across other regions of the country. **Rosenbloom** and **Sundstrom** use data from the biennial Census of Manufactures on 20 individual manufacturing industries disaggregated by state to analyze the relative contributions of industry mix and location to regional

variations in economic performance from 1919 to 1937. The authors find that industrial composition had a significant effect on regional employment growth, with regions that concentrated in the production of durable goods or inputs to the construction sector tending to fare worse than others.

Focusing on New York City banks in the 1920s and 1930s, **Calomiris** and **Wilson** examine how banks manage risk during normal times, and in response to severe shocks. The authors find that during the 1920s profitable lending opportunities and low costs of raising capital prompted banks to accumulate capital and increase their asset risk, while still maintaining low default risk on deposits. In response to loan losses in the early 1930s and high costs of raising new capital, banks cut dividends but avoided new offerings of stock and thus allowed capital to remain low. To reduce deposit risk, banks substituted riskless assets for loans. Cross-sectional differences in the cost of issuing new equity explain differences in banks' choices of asset risk and capital ratios.

Costa investigates how the distribution of daily hours worked among prime-aged men has changed since the 1890s. She finds that although hours of work have fallen for all workers, the decline was dispropor-

tionately large among the lowest paid workers. In the past, hours worked were very unevenly distributed, with the lowest paid workers working the longest day. Today the highest paid workers work the longest day. Much of the change in the relative length of the work day can be explained by changes in the number of daily hours that workers are willing to supply. The unequal distribution of work hours in the past equalized income; in recent times, the unequal distribution of hours worked magnifies income disparities, suggesting that wage or wealth data may underestimate long-run improvements in the welfare of the lowest paid workers.

Steckel presents and analyzes wealth data from a widely available but neglected source—Census manuscript schedules of household heads matched with real and personal property tax lists. Records on approximately 20,000 households in Massachusetts and Ohio provide new evidence for periods heretofore lacking information, including the important early industrial era of the antebellum period and the Gilded Age of the late 19th and early 20th centuries. The author considers regional and temporal patterns of inequality as measured by GINI coefficients and the shares of wealth held by various groups.

Bureau Books

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The Defining Moment: The Great Depression and the American Economy in the Twentieth Century

The Defining Moment: The Great Depression and the American Economy in the Twentieth Century, edited by Michael D. Bordo, Claudia Goldin, and Eugene N. White, is now available from The University of Chicago Press for \$60.00.

This volume explores a question that is of continuing interest to economists and economic historians: "To what extent was the Great Depres-

sion a 'defining moment' in the history of American economy?" Was it the Great Depression itself that triggered fundamental changes in social programs, the relationship between the economy and government, and labor relations, or did it simply accelerate changes that were already under way?

The result is a fascinating manuscript that will be of interest not only to economists but also to American historians and policymakers. The chapters are organized into four sections: macroeconomic policy; expanding government programs and regulation; expanding social programs; and international programs and relations. Among the topics examined are monetary policy, deposit insurance, federal government regulation of agriculture, unemployment compensation, Social Security, U.S. trade policy, and international capital mobility.

Goldin is Director of the NBER's Program on the Development of the American Economy and a professor of economics at Harvard University. Bordo and White are Research Associates in the DAE Program and professors of economics at Rutgers. Bordo is also a Research Associate in the NBER's Program on Monetary Economics, and Goldin is also a Research Associate in the NBER's Program on Labor Studies.

Essays in the Economics of Property-Casualty Insurance

Essays in the Economics of Property-Casualty Insurance, edited by David F. Bradford, is available from The University of Chicago Press for \$37.00. This volume, which includes papers presented at an NBER conference on the subject, discusses new research and findings on several key aspects of the property-casualty insurance industry, including the origins and effects of rate regulation in the automobile insurance industry; how the organizational form of an insurance company affects its responses to different situations; how external financing affects insurance cycles; who insures the insurers; and how tax law changes in the 1980s affected insurance-industry prices. It should be of interest not only to academic economists, but also to government policymakers and insurance industry representatives.

Bradford is a Research Associate in the NBER's Program in Public Economics and a professor of economics at Princeton University.

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