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NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC. WINTER 1984/5

Program Report

Labor Studies

Richard B. Freeman

The Bureau's program in Labor Studies has completed several major projects in the two and a half years since the last program report was published (*NBER Reporter,* Summer 1982)—and has begun several new ones. It has continued to collect data files for labor researchers, to develop new bodies of data, and to improve econometric tools of analysis. During 1983 and 1984 the labor studies portion of the Bureau's Summer Institute dealt with such topics as labor market contracts, immigration, unionism, human capital, dual labor markets, job training, and worker responses to chemical labeling. Major studies of private sector unionism and minority youth, both directed by Richard Freeman, were also completed. Two ongoing projects directed by David Wise—Pensions and Labor Market, and Government Pay and Payrolls—are currently among the program's major focuses. Finally, the program is developing a new project on the economics of international flows of people, goods, and capital.

Trade Unionism: Private and Public

Trade unions are declining as a proportion of the private sector work force in the United States. Still, a sizable minority of workers are unionized, and the economics of unionism in the private sector remains an area of significant research. NBER researchers have completed two major books on the economic effects of private sector unionism. H. G. Lewis, who pioneered modern quantitative work on the effect of unions on wages, has finished a new book, *Union Relative Wage Effects: A Survey.* Freeman and James Medoff published the results of their NBER research on unions (described earlier in a program report: "Labor Economics," *NBER Reporter,* Winter 1978) in *What Do Unions Do?* Among the other studies, John Pencavel and Catherine Hartsog[1] have examined the effects of unions on relative employment, as well as on wages. Casey Ichniowski[2] has examined the effects of unions

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This issue of the *Reporter* highlights the Bureau's Program in Labor Studies. Next, Michael Grossman describes his work on the determinants of neonatal mortality in the United States. Then, Bennett McCallum discusses the macroeconomic effects of monetary policy. After the quarterly Economic Outlook Survey are biographical sketches, news of NBER conferences, the Conference Calendar, and other NBER news and reports. The *Reporter* concludes with short summaries of recent NBER Working Papers.

[1] *J. H. Pencavel and C. Hartsog, "A Reconsideration of the Effects of Unionism on Relative Wages and Employment in the United States, 1920-80," NBER Working Paper No. 1136, March 1984.*

[2] *C. Ichniowski, "Fuzzy Frontiers of Production: Evidence of Persistent Inefficiency in Safety Expenditures," NBER Working Paper No. 1366, June 1984; "Industrial Relations and Economic Performance Grievances and Productivity," NBER Working Paper No. 1367, June 1984; "Ruling Out Productivity? Labor Contract Pages and Plant Performance," NBER Working Paper No. 1368, June 1984.*

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on productivity in the paper industry, and Steven Allen[3] has examined unions' effects on productivity in construction.

Several researchers (William Dickens and Jonathan Leonard;[4] Glen Fine and David Ellwood;[5] Henry Farber[6]) have focused on the determinants of unionism, while David Card and Ronald Ehrenberg[7] have analyzed cost-of-living adjustment clauses in contracts. This extensive work on unionization has yielded numerous findings about the wage and nonwage effects of the institution, some of which are described in the two books cited above.

While private sector unionism has declined in recent years, public sector unionism has become stronger. To analyze this change in the composition of unionism, and to investigate how unions operate in a public rather than a private environment, the program has initiated a major study of public sector unionism with financial support from the Sloan Foundation. Among the issues under study are: the effects of changes in state laws on collective bargaining at the state and municipal level; the effect of public sector unionism on the finances of cities; the wage and employment consequences of public sector unionism; the economic determinants of legislative changes; and the effects of arbitration on outcomes. Freeman[8] and Ehrenberg[9] have provided two separate surveys of the existing literature on the public sector. Orley Ashenfelter and

[3] *S. G. Allen, "Unionization and Productivity in Office Building and School Construction," NBER Working Paper No. 1139, June 1983.*

[4] *W. T. Dickens and J. S. Leonard, "Accounting for the Decline in Union Membership," NBER Working Paper No. 1275, February 1984.*

[5] *D. T. Ellwood and G. A. Fine, "The Impact of Right-to-Work Laws on Union Organizing," NBER Working Paper No. 1116, May, 1983.*

[6] *H. S. Farber, "The Analysis of Union Behavior," NBER Working Paper No. 1502, November 1984; "Right-to-Work Laws and the Extent of Unionization," NBER Reprint No. 524, September 1984; "The Determination of the Union Status of Workers," NBER Working Paper No. 1006, October 1982.*

[7] *D. Card, "An Empirical Model of Wage Indexation Provisions in Union Contracts," NBER Working Paper No. 1388, June 1984; R. G. Ehrenberg, L. Danziger, and G. San, "Cost-of-Living Adjustment Clauses in Union Contracts," NBER Reprint No. 440, January 1984.*

[8] *R. B. Freeman, "Unionism Comes to the Public Sector," NBER Working Paper No. 1452, September 1984.*

[9] *R. G. Ehrenberg and J. L. Schwarz, "Public Sector Labor Markets," NBER Working Paper No. 1179, August 1983.*

David Bloom[10] have studied arbitration in terms of individual decisions; Farber[11] has provided theoretical and empirical analysis of arbitration. Ehrenberg, in conjunction with Joshua Schwarz,[12] has investigated the effects of unions on the productivity of libraries.

Minority Youth Unemployment

In August 1983 the NBER project on minority youth employment culminated in a major conference. Several project researchers made extensive use of the NBER Survey of Inner-City Poverty Youths. The project produced several interesting results. First, cities with a high proportion of women in the work force had the worst labor markets for young blacks. Second, inner-city black youths were fired from their last job more often than white youths—partly because of higher rates of absenteeism. Third, staying in school longer was beneficial for these youths; churchgoing and "right attitudes" also appear to have helped these youths to succeed. Fourth, the unemployment rate for black youths remains high because they have long spells out of work rather than going quickly in and out of jobs. Moreover, their past spells of unemployment make it difficult for them to get their next job. Finally, the youths' perceptions of the riskiness and rewards of crime are a major factor in whether they choose a legitimate job or criminal activity. (For a more detailed discussion of the findings see *NBER Reporter*, Winter 1983/4, pp. 9–12.)

Government Regulations

One of the major areas of interest in the labor program has been the effect on the labor market of various government programs ranging from occupational health and safety regulations to food stamps, Affirmative Action, and unemployment insurance. Leonard has studied the effects of Affirmative Action on employment and occupational advancement, using detailed data sets on individual establishments.[13] In separate studies, Ann Bartel[14] and Wayne Gray[15] have examined OSHA's impact on injuries. Gray has found an important negative effect of EPA and OSHA regulations on the growth of productivity in the labor market, whereas Leonard has detected no such effect for Affirmative Action. Daniel Hamermesh[16] has found that food stamps are often used as currency and can be considered another form of money, like currency and checks.

Demographic Groups

As noted earlier, researchers have devoted considerable activity to the economics of the aged, retirement, and to the job market for other demographic groups. Olivia Mitchell[17] (with Gary Fields), and Alan Gustman[18] (with Thomas Steinmeier), have analyzed the economic incentives to retire, either partially or fully. Edward Lazear[19] has analyzed the incentive effects of pensions and their effects on consumption and plans for retirement. Hamermesh[20] has studied life-cycle effects on consumption. And, in spring 1983, Wise organized a conference on the economics of pensions, the findings of which appear in the 1984 NBER Summary Report, *Pensions and the Labor Market*. (Also see Program Report: "Pensions and the Labor Market," *NBER Reporter*, Fall 1983.)

A number of researchers have begun to study women in the labor market, including the issue of comparable worth. Research by George Johnson and Gary Solon[21]

[10] *O. Ashenfelter and D. E. Bloom, "Models of Arbitrator Behavior: Theory and Evidence," NBER Working Paper No. 1149, June 1983.*

[11] *H. S. Farber and M. H. Bazerman, "The General Basis of Arbitrator Behavior: An Empirical Analysis of Conventional and Final-Offer Arbitration," NBER Working Paper No. 1488, November 1984; "Arbitrator Decision-Making: When Are Final Offers Important?" NBER Working Paper No. 1183, August 1983.*

[12] *R. G. Ehrenberg and J. L. Schwarz, "Unions and Productivity in the Public Sector: A Study of Municipal Libraries," NBER Reprint No. 370, May 1983.*

[13] *J. S. Leonard, "The Impact of Affirmative Action on Employment," NBER Reprint No. 535, October 1984; "Unions and Employment Opportunity," NBER Working Paper No. 1311, March 1984; "Splitting Blacks? Affirmative Action and Earnings Inequality Within and Across Races," NBER Working Paper No. 1327, April 1984; "Affirmative Action as Earnings Redistribution: The Targeting of Compliance Reviews," NBER Working Paper No. 1328, April 1984.*

[14] *A. P. Bartel and L. G. Thomas, "OSHA Enforcement, Industrial Compliance, and Workplace Injuries," NBER Working Paper No. 953, August 1982.*

[15] *W. B. Gray, "The Impact of OSHA and EPA Regulations on Productivity," NBER Working Paper No. 1405, July 1984.*

[16] *D. S. Hamermesh and J. M. Johannes, "Food Stamps as Money and Income," NBER Working Paper No. 1231, November 1983.*

[17] *O. S. Mitchell and G. S. Fields, "Rewards to Continued Work: The Economic Incentives for Postponing Retirement," NBER Working Paper No. 1204, September 1983; "Economic Incentives to Retire: A Qualitative Choice Approach," NBER Working Paper No. 1096, March 1983.*

[18] *A. L. Gustman and T. L. Steinmeier, "Retirement Flows," NBER Working Paper No. 1069, January 1983; "Minimum Hours Constraints and Retirement Behavior," NBER Working Paper No. 940, July 1982.*

[19] *E. P. Lazear, "Pensions as Severance Pay," NBER Reprint No. 501, July 1984.*

[20] *D. S. Hamermesh, "Consumption during Retirement: The Missing Link in the Life Cycle," NBER Reprint No. 517, September 1984.*

[21] *G. Johnson and G. Solon, "Pay Differences between Women's and Men's Jobs; The Empirical Foundations of Comparable Worth Legislation," NBER Working Paper No. 1472, September 1984.*

and by Ehrenberg and Robert Smith[22] suggest that a "comparable worth" pay policy would produce smaller changes in the job market than some have feared or hoped. Victor Fuchs[23] has found no gains for women in relative earnings between 1959 and 1979. Indeed, his evidence shows that, relative to men's, women's access to goods and services, and their income, were lower in 1979 than in 1959.

Methodology, Data, Theory

The issue of measurement error—in gross flows data on employment status from the Current Population Survey, in unionism, and in panel data in general—has emerged as a new topic of concern to NBER researchers. James Poterba and Lawrence Summers[24] have found that significant measurement errors in the CPS gross flows data lead to overstatement of the extent of movement into and out of unemployment. Nicholas Kiefer, Shelly Lundberg, and George Neumann[25] have dealt with the problems of measuring spells of unemployment in the CPS data. Freeman[26] has found that errors in union status are proportionately greater in panel data and hence that downward bias caused by measurement error is worse in those data than in cross-section data. Zvi Griliches and Jerry Hausman[27] have studied the broad issues underlying these two applications.

These studies represent the beginning of a more critical assessment of longitudinal (panel) data in light of the classical problem of measurement. In his new book, Lewis goes so far as to reject many estimates of union wage effects from longitudinal analysis on these grounds.

Finally, while the NBER labor program focuses largely on empirical issues, some researchers have expanded the frontiers of theory. Sherwin Rosen[28] has developed a labor market version of the implicit contracts unemployment model. Lazear[29] has continued his work on optimal contracts, while Andrew Weiss[30] has pursued analysis of the sorting model of education.

During the past two years, there has been a shift in topics of concern. Major projects on unionism, minority youth joblessness, and on government regulation in the labor market have come to fruition. The next few years will see work on quite different sets of topics as the NBER researchers in labor continue to pursue empirical analysis of major labor market and social issues.

[22] *R. G. Ehrenberg and R. S. Smith, "Comparable Worth in the Public Sector," NBER Working Paper No. 1471, September 1984.*

[23] *V. R. Fuchs, "His and Hers: Gender Differences in Work and Income, 1959-79," NBER Working Paper No. 1501, November 1984.*

[24] *J. M. Poterba and L. H. Summers, "Response Variation in the CPS: Caveats for the Unemployment Analyst," NBER Reprint No. 497, July 1984.*

[25] *N. M. Kiefer, S. J. Lundberg, and G. R. Neumann, "How Long Is a Spell of Unemployment? Illusions and Biases in the Use of CPS Data," NBER Working Paper No. 1467, September 1984.*

[26] *R. B. Freeman, "Longitudinal Analyses of the Effects of Trade Unions," NBER Working Paper No. 1207, September 1983.*

[27] *Z. Griliches and J. A. Hausman, "Errors in Variables in Panel Data," NBER Technical Working Paper No. 37, May 1984.*

[28] *S. Rosen, "The Equilibrium Approach to Labor Markets," NBER Working Paper No. 1165, July 1983.*

[29] *E. P. Lazear, "Incentives and Wage Rigidity," NBER Working Paper No. 1299, March 1984; "Incentive Effects of Pensions," NBER Working Paper No. 1126, May 1983.*

[30] *A. Weiss, "Testing the Sorting Model of Education," NBER Working Paper No. 1420, August 1984.*

Research Summaries

Determinants of Neonatal Mortality Rates in the United States

Michael Grossman

From 1955 to 1964, the infant mortality rate in the United States declined by only 0.6 percent per year, but between 1964 and 1982 the decline accelerated to 4.5 percent per year (compounded annually). This trend in the infant mortality rate is strongly related to the neonatal mortality rate (that is, deaths of newborn infants within the first 27 days of life). In 1982, the neonatal mortality rate, 7.6 deaths per 1000 live births, was twice as large as the postneonatal mortality rate (deaths of infants between the ages of 28 and 364 days) of 3.6 deaths per 1000 live births. Furthermore, since 1964 the neonatal mortality rate has been falling at 4.6 percent per year, while the postneonatal mortality rate

has fallen only 3.9 percent per year. As a result, 77 percent of the reduction in the infant mortality rate during the past two decades can be accounted for by the decline in the neonatal rate.

Any attempt to explain the recent behavior of infant mortality thus must focus on neonatal mortality. The period beginning in 1964 witnessed the introduction of Medicaid, maternal and infant care (M and I) projects, community health centers (CHCs), federally subsidized family planning services for low-income women, the Special Supplemental Food Program for Women, Infants, and Children (WIC program), the legalization of abortion, the widespread adoption of oral and intrauterine contraceptive techniques, and dramatic advances in perinatal and neonatal science. These developments have been cited as causes of the accelerations in the downward trends in infant, and especially in neonatal, mortality rates. Still, there have been few attempts to study this issue. The NBER research project that Hope Corman, Theodore J. Joyce, and I have undertaken explores the determinants of neonatal mortality rates in the United States by emphasizing the factors just mentioned and by controlling for other correlates of neonatal mortality such as poverty, schooling levels, and the availability of obstetricians/gynecologists.[1]

We began by analyzing differences in neonatal mortality rates in 1977 among large U.S. counties (at least 50,000 population). After we made these estimates, we applied our county results to national trends in the exogenous variables to help explain the overall downward trend in neonatal mortality.

Between 1964 and 1977, the white neonatal mortality rate declined by 7.5 deaths per 1000 live births, while the black neonatal mortality rate declined by 11.5 deaths per 1000 live births. Our analysis explains approximately 29 percent of the white decline and 32 percent of the black decline.

For blacks, the increased availability of abortion was the single most important factor in the reduced neonatal mortality rates. Not only does the growth in abortion dominate the other program measures, but it also dominates trends in schooling, poverty, female employment, and availability of physicians. The actual reduction resulting from abortion amounts on average to 1.2 deaths per 1000 live births, or 10 percent of the observed decline. Moreover, the estimated contribution of abortion is almost twice as great as the next largest factor and is very stable regardless of the estimation technique used.

The second most important factors in the decrease in black neonatal mortality are the rise in availability of neonatal intensive care and the rise in female schooling. Both are responsible for declines of 0.7 deaths per 1000 live births. The Medicaid contribution (0.5 deaths per 1000 live births) ranks fourth on average, but the measured effect is subject to much uncertainty. The effect of the Bureau of Community Health Services (BCHS) project, responsible for a decline of 0.3 deaths per 1000 live births, is smaller than the Medicaid effect but much more stable. WIC also reduces black neonatal mortality by 0.3 deaths per 1000 live births, but the estimated effect varies widely across specifications.

The results of the analysis for whites are less dramatic than those for blacks and less clear-cut. The increase in white female schooling contributes most to the decline in white neonatal mortality (0.5 deaths per 1000 live births). The schooling factor is followed in importance by WIC, Medicaid, and availability of neonatal intensive care (0.4 deaths per 1000 live births each). The rise in availability of abortion ranks fifth (0.3 deaths per 1000 live births); the reduction in poverty ranks sixth (0.2 deaths per 1000 live births); and the expansion in the availability of organized family planning ranks seventh (0.1 deaths per 1000 live births). However, the contributions of abortion and neonatal intensive care may affect the outcome of white births more than the rankings suggest, because the estimates of these two factors are more stable than those for schooling, WIC, and Medicaid.

It is notable that the abortion effect on blacks is four times larger than the abortion effect on whites, and that the effect of neonatal intensive care for blacks is almost twice as large as the corresponding effect for whites. These results are important because abortion reform and advance in neonatalogy—unlike WIC, Medicaid, BCHS projects, and organized family planning clinics—clearly were not targeted at the poor. Yet these developments appear to have had their largest impact on blacks, the population group with the lowest income and the largest neonatal mortality rate.

To the extent that very ill newborns die in the postneonatal period, the above findings may overstate the importance of the availability of neonatal intensive care. Yet the postneonatal mortality rate has fallen every year since 1964 for both races, suggesting that this argument is not relevant.

Since the beginning of 1981, budget cutbacks have curtailed the rate of growth in such poverty-related programs as WIC, Medicaid, M and I projects, CHCs, and subsidized family planning services. When inflation is taken into account, the absolute size of some of these programs has declined in real terms. Yet in spite of these cutbacks, the neonatal mortality rate fell between 1980 and 1982 from 8.5 deaths per 1000 live births to 7.6 deaths per 1000 live births.

Our results help to explain why the neonatal mortality rate declined after 1980. They suggest that the continued growth in availability of abortion and neonatal intensive care coupled with levels of female schooling have sustained the downward trend in the mortality

[1] *This research summary is based primarily on H. Corman and M. Grossman, "Determinants of Neonatal Mortality Rates in the United States: A Reduced-Form Model," NBER Working Paper No. 1387, June 1984. Estimates of infant health production functions are contained in H. Corman, T. J. Joyce, and M. Grossman, "Birth Outcome Production Functions in the United States," forthcoming as an NBER Working Paper.*

rate. Moreover, our study of infant health[2] reveals that cutbacks in such social programs as AFDC actually have the potential to lower neonatal mortality by lowering the benefits of illegitimate births.

Our results are also relevant to the current U.S. policy debate about abortion. Our estimates indicate that, if abortion were illegal, neonatal mortality, especially among blacks, would fall more slowly than otherwise and might even rise.

[2]*H. Corman, T. J. Joyce, and M. Grossman, "Birth Outcome Production Functions in the United States."*

Macroeconomic Effects of Monetary Policy

Bennett T. McCallum

It has long been recognized that the role of money in an economy, and the relationship between monetary policy actions and macroeconomic consequences, are two items of fundamental importance for the design of policy as well as the scientific understanding of macroeconomic phenomena. Although these topics are not new ones, they have been of heightened interest recently as a result of practical and professional developments. In particular, the recent recession and recovery have been attributed in large part to changes in Federal Reserve policy. At the same time, the theoretical and econometric advances of the past decade have called for new ways of modeling the monetary sector of an economy and its interaction with real output and employment variables.

In terms of professional developments, the methodological advances provided by the rational expectations revolution in macroeconomics, plus the associated development of equilibrium business cycle analysis, have led to widespread recognition that an essential prerequisite of sound policy analysis is an analytical framework in which the posited relationships do not shift with changes in policy strategy. This recognition has in turn led to increased emphasis on explicit analysis of economic agents' problems of dynamic optimization, with these expressed in terms of taste and technology parameters. Explicit analysis of this type is especially diffcult in monetary theory, however, because of the absence of general equilibrium theories in which the medium-of-exchange role of money is both rigorously and convincingly depicted.

Overlapping-Generations Models

One of the most prominent attempts to surmount this last-mentioned difficulty has resulted from the application of a class of overlapping-generations (OG) models—that is, dynamic equilibrium models that emphasize the differing perspectives on saving of young and old individuals—to a variety of problems in monetary economics. The particular class of OG models in which, although there is an analytical entity termed "fiat money," the specification excludes any cash-in-advance or money-in-the-utility-function feature that would represent the transaction-facilitating property of that asset. Thus the OG approach tries to avoid the difficulty of modeling the medium-of-exchange function of money by simply ignoring it and emphasizing instead the store-of-value function.

One object of my recent research has been to investigate the adequacy of this approach.[1] I begin with the identification of the most distinctive implications of the OG model as applied to monetary topics. As it happens, I readily find three striking and distinctive properties. First, if the authorities cause the stock of money to grow at a rate even slightly in excess of the rate of output growth, money will be valueless and the price level infinite. Second, stationary equilibriums in which the price level is finite will be Pareto optimal if and only if the growth rate of the money stock is not positive. Third, open-market changes in the stock of money have no effect on the price level. The next step in the investigation is to determine whether these implications result from the model's neglect of the medium-of-exchange function. In fact, my analysis indicates that if that neglect is remedied, all three of the distinctive implications vanish. Consequently, it becomes apparent that the class of OG models in question provides a misleading vehicle for the analysis of monetary topics. It should be noted that this flaw arises not from the generational structure itself but from the adherence to an overly stringent version of the principle that assets are valued by the stream of returns that they provide; the error in this case arises from neglect of the nonpecuniary returns afforded by the medium of exchange.

A practical application of the foregoing conclusion occurs in my recent analysis of Thomas Sargent and Neil Wallace's "rehabilitation" of the venerable and infamous *real bills doctrine*.[2] An apparent message of their work is that interest rate fluctuations are more damaging to individuals' welfare, in a well-defined sense, than are fluctuations in the price level. As my paper explains, however, the alleged rehabilitation takes place in an OG model of the type described above. Consequently, in the model economy, the entity identified as money actually does not serve as a medium of exchange. Thus the model's "price level" is not the money

[1]*B. T. McCallum, "The Role of Overlapping-Generations Models in Monetary Economics," NBER Reprint No. 463, March 1984, and* Carnegie-Rochester Conference Series on Public Policy *18 (Spring 1983), pp. 9-14.*

[2]*See T. J. Sargent and N. Wallace, "The Real-Bills Doctrine versus the Quantity Theory: A Reconsideration,"* Journal of Political Economy *90 (December 1982); and B. T. McCallum, "Some Issues Concerning Interest Rate Pegging, Price Level Determinacy, and the Real Bills Doctrine," NBER Working Paper No. 1294, March 1984.*

price of commodities, but a relative price. The apparent policy message, then, does not follow from the Sargent-Wallace analysis.

My paper also explores the feasibility of conducting monetary policy so as to "peg" a nominal interest rate at some arbitrarily chosen value. The analysis suggests that it is in fact possible to keep nominal interest rates low (or high) as desired, but the way to do so is by creating money at slow (or rapid) rates. An attempt to do so by simply standing ready to buy or sell securities at the desired interest rate does not constitute a well-defined policy.

Bond-Financed Deficits

In another recent paper,[3] I examine the possible theoretical validity of the following "monetarist" hypothesis: that a constant *positive* deficit in the government budget can be maintained permanently, and without inflation, if it is financed by the issue of bonds rather than money. I study this question in a discrete-time, perfect-foresight version of the competitive equilibrium model of Sidrauski, modified by the inclusion of government bonds as a third asset. I show that the monetarist hypothesis is invalid if "deficit" is defined exclusive of interest payments but is—perhaps surprisingly—valid under the conventional definition. I also show that the stock of willingly held government bonds can grow indefinitely at a rate in excess of the rate of output growth, provided that the difference is less than the typical individual's rate of time preference. As these results rely upon rather stringent Ricardian assumptions, however, they should perhaps be interpreted, from a practical perspective, not as claiming that unbounded debt growth is possible in actual economies but rather as a means of identifying and considering reasons why such growth may not be feasible.

Equilibrium Models of the Business Cycle

As mentioned above, one influential development of the past decade was the equilibrium approach to business cycle analysis. A series of innovative theoretical papers[4] has shown that it is possible to construct models that incorporate crucial features of actual fluctuations while rigorously adhering to the assumption that prices adjust promptly to clear all markets. Furthermore, empirical studies have shown that models of this type can be roughly consistent with aggregative U.S. data in several respects. There is one important empirical regularity, however, that is difficult to reconcile with models of the flexible-price variety: namely, the apparent sensitivity of output and employment to monetary surprises. The difficulty arises because of the prompt and widespread availability of information on nominal aggregates, including money stock measures and price indexes. This availability is critical because the impact of monetary shocks on output and employment in most flexible-price equilibrium models requires, as is well known, that individual agents be ignorant of contemporaneous nominal aggregative magnitudes.

The foregoing argument, which is emphasized in recent papers by myself and Herschel I. Grossman,[5] contains a potentially significant gap. In particular, it relies on versions of the equilibrium theory that are less satisfactory than the quasi-definitive model in Lucas's "Expectations and the Neutrality of Money." More recently, accordingly, I have extended the investigation to that framework. In the latter, it may not be true that observed monetary shocks have no output/employment effects if autocorrelated money supply changes are specified to be lump sum in nature, rather than proportional to individuals' money holdings—a simplifying assumption made by Lucas only to focus attention on other aspects of his theory. As a preliminary step, I devised a linear version of Lucas's model that can tractably be enriched, as needed, for the inquiry, yet which (unlike other linear rational expectations models) retains the basic structure of Lucas's original.[6] Subsequent analysis of this model indicates that, while monetary shocks have output/employment effects, their direction depends on the time-series properties of the money supply process. Furthermore, in the empirically relevant case—with positive serial correlation of money growth rates—the effect of unexpectedly high monetary values serves to *reduce* output and employment. Thus this structure is evidently inconsistent with well-known evidence indicating a positive relationship between monetary surprises and output.

With regard to that evidence, it should be mentioned that Christopher Sims has shown that money stock innovations have very little explanatory power for postwar U.S. output if an interest rate measure is included among the variables of the vector autoregression (VAR)

[3] *B. T. McCallum, "Are Bond-Financed Deficits Inflationary? A Ricardian Analysis," NBER Reprint No. 474, April 1984, and* Journal of Political Economy *92, 1 (February 1984), pp. 123-135.*

[4] *Including, as prominent examples, R. E. Lucas, Jr., "Expectations and the Neutrality of Money,"* Journal of Economic Theory *4 (April 1972), and R. J. Barro, "A Capital Market in an Equilibrium Business Cycle Model,"* Econometrica *48 (September 1980). The most notable empirical piece is F. E. Kydland and E. S. Prescott, "Time to Build and Aggregate Fluctuations,"* Econometrica *50 (November 1982).*

[5] *B. T. McCallum, "Macroeconomics After a Decade of Rational Expectations: Some Critical Issues," NBER Reprint No. 473, April 1984, and Federal Reserve Bank of Richmond* Economic Review *68, 6 (November/December 1982), pp. 3-12; and H. I. Grossman, "The Natural-Rate Hypothesis, the Rational-Expectations Hypothesis, and the Remarkable Survival of Nonmarket-Clearing Assumptions," NBER Reprint No. 452, February 1984, and* Carnegie-Rochester Conference Series on Public Policy *19 (Autumn 1983), pp. 225-245.*

[6] *B. T. McCallum, "A Linearized Version of Lucas's Neutrality Model," NBER Reprint No. 475, April 1984, and* Canadian Journal of Economics *17, 1 (February 1984), pp. 138-145.*

system yielding the innovations. In a short analytical paper, however, I have shown that this finding does not warrant the conclusion that monetary policy surprises have been an unimportant source of fluctuations in the business cycle.[7] The point is that *money stock* innovations do not necessarily reflect surprise components of *monetary policy* actions. Indeed, when the Fed uses an interest rate as its operating instrument—as it has during most of the postwar period—surprise policy actions are likely to be better represented by the VAR system's interest rate innovations than by its money stock innovations.

Sticky-Price Equilibrium Models

In "Macroeconomics After a Decade of Rational Expectations," I show that a number of crucial macroeconomic facts, including the monetary effects stressed above, are explicable within a simple model in which product prices are sticky (indeed, rigid) within each period but adjust between periods in a manner consistent with the natural-rate hypothesis. I emphasize that adoption of a sticky-price specification does not imply rejection of the equilibrium *approach* to macroeconomic analysis as the latter does not require the existence of perfect price flexibility. Thus, for example, a model in which nominal multiperiod contracts are endogenously explained as the response of rational agents to adjustment, bargaining, or other transaction costs would accord with the equilibrium approach and would in principle inherit its virtues: a specification expressed in terms of potentially policy-invariant relationships and the possibility of policy analysis based on the utility of individual agents. Such a model, in fact, seems to be what is needed for the satisfactory analysis of stabilization policy.

This point of view has been adopted by a significant number of economists and a sizable literature has accumulated in which multiperiod contracts between buyers and sellers are explained as the outcome of rational optimizing behavior. But two features of contractual arrangements are crucial for the issue at hand: not only must arrangements be set in advance but they also must involve exchange ratios (prices) that are set in nominal terms. Virtually all of the existing research in the area—much of which emphasizes risk aversion and/or asymmetric information—is concerned only with the first of these features, in effect providing explanations of contracts specified in real terms. A leading objective of my current research, accordingly, is to develop an understanding of why contracts and prices are so often specified in terms of nominal monetary magnitudes.

[7] *B. T. McCallum, "A Reconsideration of Sims's Evidence Concerning Monetarism,"* Economic Letters *13 (1983). For a description of Sims's results, see "C. A. Sims, "Comparison of Interwar and Postwar Business Cycles: Monetarism Reconsidered,"* American Economic Review *70 (May 1980).*

Economic Outlook Survey

Fourth Quarter 1984

Victor Zarnowitz

The summer was marked by a sharp economic slowdown and, until recently, the autumn has produced few signs of improvement. Nevertheless, the economy will grow by more than 3 percent next year and not slide into a recession, according to the November survey of 31 professional forecasters taken by NBER and the American Statistical Association.

Having persisted at or near 7.5 percent of the civilian labor force during most of the slack second half of 1984, the unemployment rate should decline during 1985, but only slightly. Inflation may rise somewhat, but it is not seen as a major threat in the near future. Interest rates are expected to decline some more but then to rise later in 1985; exceeding 9 percent for Treasury bills and 12 percent for corporate bonds throughout the year, they are predicted to continue to be high relative to inflation.

A Slow Transition to Moderate Growth

The median forecast from the survey shows real GNP growing at an annual rate of 2.6 percent in the current quarter, a modest improvement on the latest estimate of 1.9 percent for 1984:3. In the year ahead (1984:4–1985:4) total output of the economy is expected to rise 3.3 percent at a fairly steady quarter-to-quarter pace. The annual averages are 6.9 percent for 1983–84 and 3.4 percent for 1984–85, slightly lower than in the survey taken three months ago.

The medians are based on point forecasts that presumably are near the center of what the respondents regard as the range of the possible outcomes. In addition, the survey respondents reported the probabilities they attach to the alternative intervals of year-to-year change in real GNP. The tabulation below shows the percentage distributions of the means of these figures.

Percentage Change in Real GNP	*Percentage of Responses* 1983–84	1984–85
6 and higher	86	8
4–5.9	12	25
2–3.9	2	51
0–1.9	0	14
Negative (none less than −2)	0	2

Projections of GNP and Other Economic Indicators, 1984-85

	Annual				
				Percent Change	
	1983 Actual	1984 Forecast	1985 Forecast	1983 to 1984	1984 to 1985
1. Gross National Product ($ billions)	3304.8	3665.0	3941.0	10.9	7.5
2. GNP Implicit Price Deflator (1972 = 100)	215.3	223.5	233.0	3.8	4.3
3. GNP in Constant Dollars (billions of 1972 dollars)	1534.7	1640.0	1695.0	6.9	3.4
4. Unemployment Rate (percent)	9.6	7.5	7.2	-2.1[1]	-0.3[1]
5. Corporate Profits After Taxes ($ billions)	127.4	147.2	153.0	15.5	3.9
6. Nonresidential Fixed Investment (billions of 1972 dollars)	171.0	204.0	220.6	19.3	8.2
7. New Private Housing Units Started (annual rate, millions)	1.7	1.8	1.7	5.9	-7.8
8. Change in Business Inventories (billions of 1972 dollars)	-3.6	26.3	19.6	29.9[2]	-6.7[2]
9. Treasury Bill Rate (3-month, percent)	8.6	9.7	9.5	1.1[1]	-0.2[1]
10. Consumer Price Index (annual rate)	3.2	4.2	4.3	1.0[1]	0.1[1]

	Quarterly							
		1984	1985				Percent Change	
	1984 Q3 Actual	Q4	Q1	Q2	Q3	Q4	Q3 84 to Q3 85	Q4 84 to Q4 85
		Forecast						
1. Gross National Product ($ billions)	3701.2	3761.0	3832.5	3900.0	3978.2	4065.4	7.5	8.1
2. GNP Implicit Price Deflator (1972 = 100)	224.4	226.6	229.0	231.6	234.2	236.6	4.4	4.4
3. GNP in Constant Dollars (billions of 1972 dollars)	1649.6	1660.0	1674.0	1688.0	1702.0	1714.9	3.2	3.3
4. Unemployment Rate (percent)	7.5	7.4	7.3	7.2	7.2	7.1	-0.3[1]	-0.3[1]
5. Corporate Profits After Taxes ($ billions)	139.3	145.0	147.2	151.5	155.0	154.0	11.3	6.2
6. Nonresidential Fixed Investment (billions of 1972 dollars)	206.8	212.0	216.0	220.0	222.3	224.0	7.5	5.7
7. New Private Housing Units Started (annual rate, millions)	1.6	1.6	1.7	1.7	1.7	1.7	3.4	2.5
8. Change in Business Inventories (billions of 1972 dollars)	31.2	22.3	20.5	18.7	19.5	19.5	-11.7[2]	-2.8[2]
9. Treasury Bill Rate (3-month, percent)	10.3	9.5	9.3	9.5	9.7	9.9	-0.6[1]	0.4[1]
10. Consumer Price Index (annual rate)	4.4	4.0	4.1	4.3	4.6	4.6	0.2[1]	0.6[1]

SOURCE: National Bureau of Economic Research and American Statistical Association, Business Outlook Survey, December 1984. The figures on each line are medians of thirty-one individual forecasts.

[1]Change in rate, in percentage points.
[2]Change in billions of dollars.

The probabilistic forecasts are very instructive. They demonstrate a shift in expectations toward much lower but generally still positive growth rates. There was a further scaling down of the forecasts from August (when 59 percent of the distribution for 1984-85 fell below 4 percent) to November (where the corresponding proportion is 67 percent).

The Threat of a Recession and the Odds against It

The survey participants believe that the probabilities that real GNP will decline in the four successive quarters of 1985 are 22 percent, 19 percent, 19 percent, and 21 percent, respectively. Most forecasters, then, view the risk of a recession as serious but not very high throughout the next year. The estimated probabilities from the November survey are not systematically higher than estimates from the August survey. The record of the forecasts shows that these figures tend to move above 30 percent or even 40 percent before each recession but exceed 50 percent only after a downturn has actually occurred.

The unemployment rate is predicted to decrease slightly from 7.4 percent in 1984:4 to 7.1 percent in 1985:4, according to the group averages. But the individual responses show considerable dispersion. Twelve forecasters see the jobless rate as fairly steady with some downward tendency, ten as falling below 7 percent (the lowest figure is 6.6 percent), and nine as rising moderately (the highest is 8.1 percent).

Inflation to Remain Relatively Stable in the Near Future

Survey participants forecast that the consumer price index will increase 4.3 percent in 1985, barely more than

in 1984, but the quarterly changes at annual rates in the CPI will rise gradually from 4 percent to 4.6 percent between 1984:4 and 1985:4. The median predictions for the GNP implicit price deflator are very similar: 3.8 percent for 1983–84, 4.3 percent for 1984–85, 4.4 percent for 1984:4–1985:4. Three months ago, the group predicted higher inflation rates, rising above 5 percent in mid-1985 for both CPI and IPD.

About 60 percent of the respondents predict that inflation will be higher in 1985:4 than in 1984:4, but the anticipated rises are generally small. One in four foresees little net change, and only one in seven anticipates further disinflation.

A more definite shift to higher inflation is revealed by probabilistic forecasts that compare the changes in IPD for 1983–84 and 1984–85. The percentage distributions of the means of the probabilities reported by the individuals are as follows:

Percentage Change in IPD	*Percentage of Responses*	
	1983-84	*1984-85*
8 and higher	0	1
6–7.9	0	8
4–5.9	23	56
Less than 4	77	35

Interest Rates Lower Early Next Year, Higher Later

The three-month Treasury bill rate is predicted to decline from 10.3 percent in 1984:3 to 9.2 percent in 1985:1 and then rise slowly to 9.9 percent in 1985:4. The average forecasts for 1984 and 1985 are 9.7 percent and 9.5 percent. The yield on new high-grade corporate bonds will fall from 13.7 percent in 1984:3 to 12.5 percent in 1985:2 and then move up to 12.9 percent in 1985:4. Here the annual averages are 13.3 percent for 1984, 12.8 percent for 1985. These median forecasts represent large downward revisions from the corresponding figures in the August survey.

In the year ahead both short and long-term rates should show small increases according to the group averages. The summary below lists the percentages of individuals reporting rises, declines, and no change in the predicted interest rates (the entries in each line add up to 100).

	1985:3 Compared with 1984:4		
	Higher	*Lower*	*Unchanged*
Treasury bill rate	65	6	29
Corporate bond yield	55	10	35

The Decline in Residential Construction Not Likely to Persist

Housing starts peaked in February before interest rates started rising and are now one-third lower. Measured in millions of units per annum, housing starts are predicted to increase from 1.6 in 1984:3 to 1.7 in 1985:2, then decrease slightly to 1.65 in the second half of 1985, according to the median forecasts. These movements are inversely related to the predicted changes in interest levels. Thus the prevailing view is that the fall in housing starts will be arrested shortly. The forecasts are very dispersed with respect to sign, with about as many individuals predicting declines as rises in the year ahead. But most figures for 1985:4 lie in the interval of 1.5–1.7, close to recent levels; nine are higher (1.8–1.9) and only three lower (1.3–1.4). Residential fixed investment in constant dollars is also seen by most of the respondents as fairly stable, averaging $50–60 billion at annual rates (in 1984:3 it was $61 billion).

High Trade Deficit and Slower Growth of Industrial Production

The majority forecast is that net exports in constant dollars will run below but close to their most recent level; few expect that the U.S. trade deficit will increase much further. This is consistent with the reported assumptions about the dollar, namely that it will weaken (19 responses) rather than continue moving up (5 responses). As a result, there should be a retardation of imports and an acceleration of exports, but only in the longer run. Over the next year, the negative merchandise balance will still be adversely affecting large areas of the economy, notably outlays on domestically produced durable goods and manufacturing. The index of industrial production will gain 11 percent in 1983–84 but only 3.7 percent in 1984–85 and 4 percent in 1984:4–1985:4. The cutbacks would help correct the recent overbuilding of inventories to which the import penetration has contributed. Change in business inventories peaked at an annual rate of $31 billion (1972 dollars) in 1984:3; it is predicted on the average to decline below $20 billion in the year ahead.

Consumer Spending Weaker in 1985

Total consumption expenditures in constant dollars will increase at an annual rate of 4.5 percent in the current quarter. The median forecast spells a relatively favorable outlook for the Christmas shopping season. For 1984 as a whole, the predicted growth of consumption is 5.2 percent, considerably less than the 6.9 percent forecast for real GNP. But in 1985 real consumption is expected to rise 3.4 percent and in 1984:4–1985:4 only 3.2 percent (in both cases roughly matching the corresponding growth rates for constant-dollar GNP).

After the Boom in Business Profits and Investment

Corporate profits after taxes are expected to rise 15.5 percent in 1983–84, 3.9 percent in 1984–85, and 6.2 percent in 1984:4–1985:4. Should inflation exceed 4 percent next year as anticipated, these group forecasts imply low real gains. The drop in the growth of corporate cash flow would force companies to finance much more of their investment in credit markets at the still high interest rates. The slowdown in final demand and capacity utilization can also be presumed to influence investment adversely. Indeed, there is a high degree of consensus among the forecasters that the boom in business outlays on plant and equipment is over, but this sector is still viewed as relatively strong. Nonresidential fixed investment in constant dollars is expected to be as much as 19.3 percent higher in 1984 than in 1983; the projected gains for 1984–85 and 1984:4–1985:4 are 8.2 percent and 5.7 percent, respectively. It should be noted that imports of durable goods represent a substantial fraction of business investment, as well as of consumer outlays.

Government Spending and Policy Assumption

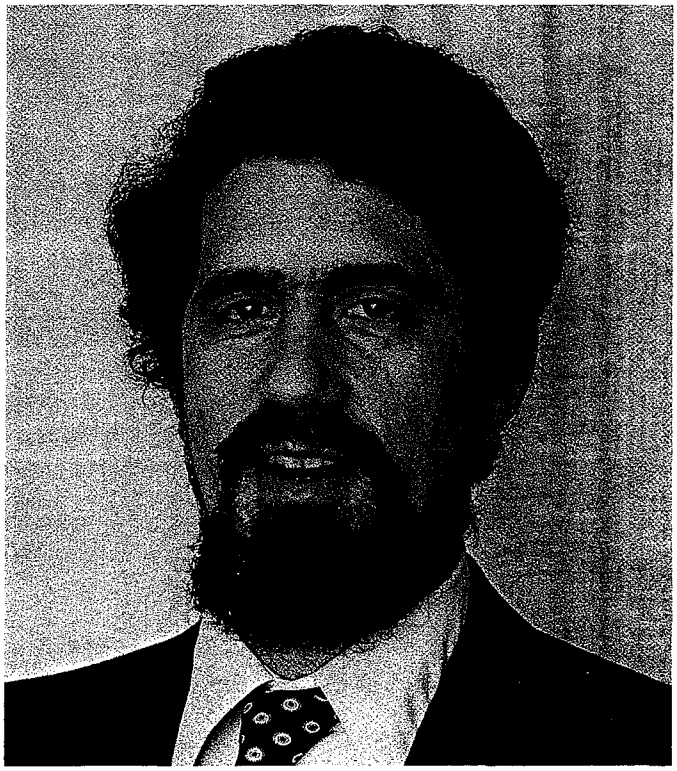
Federal government purchases of goods and services in constant dollars will rise 5.8 percent in 1983–84, 7.4 percent in 1984–85, and 4.2 percent in 1984:4–1985:4. The corresponding median predictions for state and local government purchases are 2.4 percent, 2.8 percent, and 1.8 percent, respectively. Most forecasters assume that efforts to contain budget deficits will concentrate on the expenditure side in the near future; few see any additional taxes in 1985. The views on defense outlays are divided as a large minority anticipates that the buildup will proceed more slowly. Some acceleration in the growth of monetary aggregates is expected by most respondents to the question on the assumptions concerning monetary policy. Energy prices are believed more likely to fall than rise.

This report summarizes a quarterly survey of predictions by about thirty business, academic, and government economists who are professionally engaged in forecasting and are members of the Business and Economics Statistics Section of the American Statistical Association. Victor Zarnowitz of NBER and the Graduate School of Business of the University of Chicago, assisted by Robert E. Allison, Dayle Ballentine, and Patrick Higgins of NBER, was responsible for tabulating and evaluating this survey.

NBER Profiles

Geoffrey Carliner

Geoffrey Carliner joined the NBER staff in the fall of 1984 as associate director and was recently named executive director to succeed David Hartman. Carliner received his A.B. from Harvard University and his M.A. and Ph.D. in economics from the University of California, Berkeley.



Carliner has taught at Oberlin College; the University of California, Berkeley; and the University of Western Ontario. From 1980 until August 1984 he worked at the Council of Economic Advisers, first as senior economist on labor issues, then on international trade policy, and finally as staff director and special assistant to the chairman of the Council.

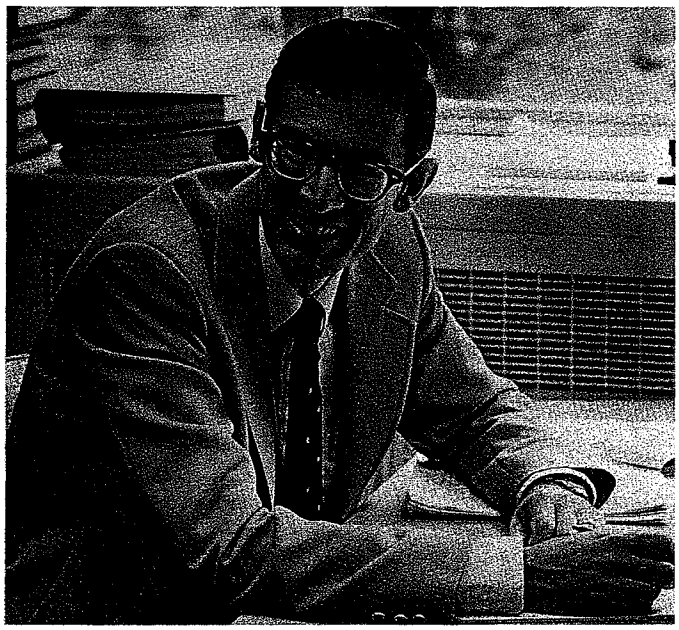
Carliner's articles, primarily on labor topics, have been published in a number of economic journals. His current research interests include industrial and trade policies as well as labor economics.

Carliner and his wife Astrid live in Newton (MA) with their two children, Benjamin and Hannah, and a cat.

Bennett T. McCallum

Bennett T. McCallum, professor of economics at Carnegie-Mellon University, has been a research associate in NBER's Program in Economic Fluctuations since 1979 and in the Program in Financial Markets and Monetary Economics since 1982. He received his bachelors degrees (B.A. and B.S. in chemical engineering) and his Ph.D. from Rice University and an M.B.A. from Harvard University.

McCallum was on the economics faculty of the University of Virginia from 1967 to 1981, progressing from assistant to associate professor in 1970 and to professor in 1974. He was also a visiting professor at Carnegie-Mellon during the 1980-81 academic year.



In addition, McCallum has served as a consultant to the Board of Governors of the Federal Reserve System (1974-75) and as an advisor to the Richmond Fed (since 1981). He has been a member of the advisory board of the Carnegie-Rochester Conference Series on Public Policy since 1980 and currently serves on the Board of Editors of the *Journal of Monetary Economics*, *Economics Letters*, and the *Journal of Money, Credit, and Banking*.

Over the years, McCallum's research interests have gradually shifted from econometrics toward macroeconomics and monetary policy. He has published a long list of journal articles, with particular emphasis on rational expectations, aggregate supply behavior, and issues in monetary theory.

McCallum and his wife Sally make their principal residence in Pittsburgh but also keep a second home in Washington, near Sally's job at the Library of Congress.

Conferences

U.S. Corporate Capital Structures

About 40 senior financial officers of major firms in both financial and nonfinancial industries met with members of the NBER's Program in Financial Markets and Monetary Economics in Williamsburg (VA) on September 20 and 21 for an in-depth discussion of corporate capital structures in the United States. This conference, the second to emerge from NBER's Project on The Changing Roles of Debt and Equity in Financing U.S. Capital Formation, included six formal presentations of NBER research:

- Patric H. Hendershott, NBER and Ohio State University, "Debt and Equity Returns Revisited" (NBER Working Paper No. 1521)
- Robert L. McDonald, NBER and Northwestern University (coauthors Zvi Bodie and Alex Kane, NBER and Boston University), "Risk and Required Returns on Debt and Equity"
- Benjamin M. Friedman, NBER and Harvard University, "Implications of Government Deficits for Interest Rates, Equity Returns, and Corporate Financing" (NBER Working Paper No. 1520)
- Robert A. Taggart, Jr., NBER and Boston University, "Have U.S. Corporations Grown Financially Weak?" (NBER Working Paper No. 1523)
- Scott P. Mason, NBER and Harvard University, "Valuing Financial Flexibility" (NBER Working Paper No. 1522)
- Alan J. Auerbach, NBER and University of Pennsylvania, "The Economic Effects of the Corporate Income Tax: Changing Revenues and Changing Views" (NBER Working Paper No. 1519)

Hendershott's study examines data on returns to corporate equities, corporate bonds, and six-month Treasury bills from 1953 to 1984 to see whether the returns of the 1980s are in line with those of the previous 25 years. He finds few surprises in the performance of the equity and bond markets in the 1980s: as usual, equity returns have been driven by the business cycle, and bond returns have responded to unexpected changes in rates on new-issue Treasury bonds. The evidence on Treasury bills is quite different, however: real rates on six-month bills in the 1980s have averaged 5½ percentage points, far above the 2 percentage point average since 1953, and about equal to rates in 1926-30. Nevertheless, on an aftertax basis the real bill

rate *has* been in line with rates in the 1950s and 1960s but significantly above the low rates of the 1970s.

The paper by Bodie, Kane, and McDonald helps explain the behavior of real interest rates during the last several years. Specifically, they show that the increased volatility of bond prices since the change in Federal Reserve operating procedures in October 1979 has substantially increased the required real risk premium on long-term bonds. They also consider and reject the possibility that increased risk alone accounts for the recent increase in the short-term interest rate. Finally, they discuss the implications of their model for the question of why no private market for index-linked bonds exists in the United States.

According to the Friedman paper, how the financing of government budget deficits affects the structure of expected asset returns depends on assets' relative substitutabilities in investors' aggregate portfolios. These substitutabilities in turn depend on how investors perceive the risks associated with the respective assets' returns. Friedman's empirical results, based on three different ways of representing investors' perceptions of risk, consistently indicate that government deficit financing raises expected debt returns relative to expected equity returns, regardless of the maturity of the government's financing. More specifically, financing government deficits by issuing short-term debt lowers the return on long-term debt and lowers the return on equity by even more, relative to the return on short-term debt. Financing deficits by issuing long-term debt raises the return on long-term debt but lowers the return on equity, again in comparison to the return on short-term debt.

The magnitudes of these effects differ according to the method used to represent investors' perceptions of risk, but the qualitative results are consistent throughout. Moreover, many of the indicated magnitudes are large enough to matter economically. These results imply that continuing large government deficits at full employment lead to market incentives for individual business corporations to emphasize reliance on equity (including retentions) and reduce reliance on debt, in comparison with the composition of corporate financing that would prevail in the absence of the need to finance the government budget deficit.

"The key determinants of future patterns in corporate financing will be the degree of instability in the economy and the relative level of federal government borrowing."

Taggart's paper addresses the widespread feeling that the financial strength of U.S. corporations has eroded over the past 20 years. This trend is often blamed on some combination of the tax system, inflation, and overly optimistic assessments of business risk. Taking a long-run perspective on recent developments in corporate financing, Taggart concludes that the trends appear less dangerous when viewed within the context of the entire 20th century rather than the post-World War II years only. Second, he finds that powerful corrective mechanisms, particularly noticeable over the past ten years, are at work to keep corporate financial positions from becoming too risky. Third, Taggart has difficulty in tracing the effects of business financing of the tax system, inflation, and business risk; apparently their impact is less straightforward than has been commonly thought. Finally, he asserts that the key determinants of future patterns in corporate financing will be the degree of instability in the economy and the relative level of federal government borrowing.

Two facts that corporations, underwriters, and investors have been forced to confront are increased volatility in the capital market and increased complexity in the design of securities. However, Mason's paper argues that these two facts are not unrelated. Virtually all of the complexity in securities can be viewed as the inclusion of different options in a straight debt contract. Given the fact that the value of options is driven most significantly by volatility, the advantage of including options (that is, financial flexibility) in securities has increased with increased volatility in the market. Hence, both corporate issuers and institutional investors have shown substantial interest in these securities, which improve their flexibility in volatile markets. Therefore, techniques that can consistently reflect the role of volatility in the value of options, or flexibility, should be of interest to issuers, underwriters, and investors.

Mason's paper summarizes the results of some research he did in 1984 with Jones and Rosenfield. It also presents new results that test the ability of a model, based on option pricing principles, to predict the market price of callable corporate debt and, therefore, the price of such common debt covenants as call provisions and call protection. In addition, Mason reports some numerical results that demonstrate the impact of changing volatility of interest rates on the value of call provisions and call protection.

Auerbach's paper reviews recent work on the impact of the U.S. corporate income tax on firms. He focuses on four specific areas. First, he asks the extent to which taxing dividends imposes a double tax on corporate source earnings. Auerbach questions the double-tax result; he suggests that dividend taxes need not affect an investor's return as they may be reflected instead in the firm's market value.

Second, he considers the historical impact of taxes on investment incentives and on the value of corporate equity. Since investment incentives defer tax payments by corporations, income from newer assets is taxed less heavily than income from older assets. Thus, aggregate corporate taxes are meaningless as economic indicators. Because new investments provide a relatively bigger tax shield, older assets are discounted when the corporation's market value is determined. Auerbach concludes that this effect leads to a second

tax-associated cause for the presence of a discount in the value of corporate equity.

Third, Auerbach studies how limited loss-offset provisions affect the incentives to invest in risky assets. He shows that a corporation's incentive to invest depends significantly on its tax status. The incentive to invest is greater for a firm that is currently taxable because in the early years after an investment is made, investment tax credits and accelerated depreciation provisions lead to negative accrued tax liabilities.

Finally, Auerbach looks at the determinants of corporate leverage. He finds that financial decisions may influence a firm's choice of investment. Financial and real decisions may be related but not strictly according to any pattern predicted by prevailing theories.

Research Conference Held in New York

The following four articles summarize the presentations made at NBER's Annual Research Conference in New York on October 1.

Annual Research Conference—I:

Trade Policy in a Volatile World Environment

J. David Richardson

This report summarizes results to date from NBER's ongoing research on international trade policy. As a backdrop to the summary, it is helpful to begin with a description of the project's unique structure.

Project Structure and Uniqueness

Two years ago NBER began a project to provide information for the U.S. trade policy community, broadly defined to include representatives of industry and labor groups as well as government. The research was not intended to make policy recommendations or judgments; rather, it was intended to provide background studies to improve the policy process.

Two mandates beyond provision of basic research made the project unique. One was to form a diverse yet cohesive research team. The second was to communicate coherently with the policy community on both research results and the research agenda. To fulfill the first mandate, NBER assembled a group of its research associates. The diversity of this project is illustrated by the quite different emphases of its members' research, which spanned abstract, applied, empirical, institutional, and interdisciplinary approaches. The project also commissioned research by others whose areas of expertise best met a specific need. The assembled researchers fostered cohesion within the project by emphasizing joint efforts among team members and by frequent reporting of results.

To fulfill the second mandate, NBER experimented with several formats for communication and has made special efforts to involve the policy community in its normal channels of communication on research. Professionals from the policy community are always invited to the group's meetings and often serve as discussants. Some conferences and reports feature them as presenters, with NBER researchers as discussants. Some meetings have been aimed specifically at soliciting suggestions for research from the policy community. Others have attempted to trade generalizing principles from abstract research for practical illustrations and case-study documentations that were consistent (or not) with the principles. Research summary reports on various topics have been circulated widely.

Research Findings

The project is divided into three main areas of research, each of which is divided into sub-areas. The three main topics are: (1) the global environment for trade policy; (2) the effects of recent U.S. trade policy; and (3) the effects of prospective U.S. trade policy.

(1) *Research on the global environment for trade policy examines the structural environment, the macroeconomic environment, and the policy environment.* Work by Branson and by Kravis and Lipsey illustrates the research on the structural environment. Branson traces trends over several decades in the commodity composition and pattern of U.S. trade. He shows how the past ten years have seen an acceleration of long-standing trends. There has been a shift in U.S. comparative competitiveness toward high technology sectors employing highly skilled workers and away from sectors that rely on standard technology and less skilled workers. More than half of recent U.S. exports of manufactured goods can be characterized as capital goods. The location of this production also has changed dramatically. Between 1973 and 1980, from 10 to 15 percent of manufacturing employment moved out of the "rust belt" between New York and Michigan to other parts of the country. Branson shows how these trends are "both good news and bad news." The good news is the opportunity for significant growth in productivity, as resources move from low- to high-productivity endeavor. The bad news is the severe adjustment burden borne by workers and communities who are dependent on contracting sectors.

The geographical patterns of U.S. trade have also changed dramatically. Branson describes how the United States has become increasingly interdependent with the developing world—especially the newly industrializing countries (NICs). NICs purchase nearly one-fourth of the dollar exports of capital goods.

They provide more than half of the nonfood, nonauto manufactured imports that Americans purchase. Until the recent international debt crisis, U.S. trade with NICs illustrated a classic "trade triangle" with large U.S. trade surpluses with Latin America (chiefly capital goods) offsetting large U.S. trade deficits with East and Southeast Asia (chiefly consumer goods).

U.S. trade interdependence with Japan has also increased, as revealed in the strong head-to-head competition that has developed between U.S. and Japanese suppliers here, there, and in third-country markets. Kravis and Lipsey have endeavored to explain exactly why Japanese shares of world exports have grown so fast. Their research reveals little that could be described as sinister. Rising Japanese shares of world exports in the 1960s can be explained by the fact that Japan was opening her economy to world trade at a faster rate than other countries, shifting from domestic to foreign suppliers and from domestic to foreign markets for her products. In the 1970s and 1980s, this influence faded, but higher Japanese growth rates overall (by world standards) included relatively more rapid export growth. Japanese export specialization on products for which world productivity growth and market expansion seemed particularly rapid also led to the export trend. Kravis and Lipsey found that Japanese export gains could not be completely explained by declines in Japanese export prices relative to competitors but rather seemed to involve worldwide declines in prices of Japan's export products, driving less efficient producers from the markets for these goods.

These same researchers have carried out most of the Bureau's work on the macroeconomic environment for U.S. trade policy. Branson has shown how recent trends in the U.S. fiscal/monetary position, expectations, real interest rates, and the "strong dollar" created unusually severe problems for U.S. producers of tradable durables. Export sectors, such as capital equipment, and import-competitive sectors, such as iron and steel, were dealt a double blow during the recent recession because of interest and exchange rates. The same influences have made durable tradables recover more slowly than the rest of the economy since early 1983.

Use of the term "strong dollar" of course presupposes some exchange rate norm against which strength and weakness (over and undervaluation) can be measured. Kravis and Lipsey's research moves beyond the most familiar of alternate norms: that associated with purchasing power parity (PPP)—comparable price levels from country to country. Kravis and Lipsey show that divergences from PPP norms have grown since the 1950s, and especially rapidly since generalized floating in 1973. Yet they also show that such divergences are not just disorderly caprice. On the contrary, the divergences themselves have predictable determinants, and their predictability has been growing along with their size. Determinants that appear to make countries' price levels high relative to a PPP norm include relatively high per capita income, the openness of their economies to trade, share of output that is nontradable, and, in the short run, monetary restraint.

Baldwin and Richardson have been chiefly responsible for research on the policy environment itself. They have attempted to distinguish their work from familiar fact-laden descriptions and positional pamphlets, focusing instead on fundamental economic issues raised by policy trends. For example, they show how increasing U.S. trade dependence inevitably "domesticates" trade policy. Trade policy can be blamed for many things, and it can be enlisted to alleviate wholly domestic difficulties (especially because U.S. legislation provides potential relief from import-related injury no matter what the underlying cause, whether foreign success or domestic shortcoming). Baldwin and Richardson also describe the recent rise in the resource cost of administering trade policy and of seeking redress under it. This trend is the result of the inherent opacity and unpredictability of growing nontariff instruments and of the proliferation of trade policy "turfs" among congressional committees and (even) the judiciary.

(2) *Research on recent U.S. trade policy aims at establishing the same analytical, empirical, and institutional basis for assessing nontariff policy instruments as exists for tariffs.* Policy instruments that have been examined include voluntary export restraints (VERs), trigger-price antidumping barriers, tax incentives for export corporations, and changes in countervailing-duty administration. Policy instruments that are candidates for future examination include domestic content guidelines, mixed export credits, offshore assembly rules, free trade zones, and barriers to services and agricultural trade.

Much of this research falls under NBER's project on trade relations, administered by Baldwin. He has overseen and edited two volumes of research so far, with two companion volumes planned over the next several years. One of these pairs is devoted to empirical estimation of new trade policy instruments, the other to their institutional description and the economic issues they raise.

The following sampling of results represents papers that are designed to provide empirical estimates. Robert C. Feenstra of Columbia University is continuing to estimate the effects of VERs on Japanese autos from 1981–84. Calculations to date suggest increases in Japanese auto prices in the United States of 16 percent from VERs over the three-year period, with nearly all of this amount explained by quality upgrading. Consumer losses have occurred because the yen depreciation has not been reflected in lower prices of imported autos. Barry Eichengreen and Hans van der Ven of Harvard University find a surprising possibility that U.S. trigger-price protection against dumping of steel in the late 1970s may have increased national purchasing power by as much as $6 billion. The explanation of this possibility is that the additional trade barrier alleviated a second distortion to the competitive norm—a smaller-than-ideal amount of U.S. steel production resulting from imperfect competition. Harry Grubert of the U.S. Department of the Treasury and John Mutti of the University of Wyoming find that domestic international

sales corporations (DISCs) increased U.S. exports on average by about 3 percent. More interesting, yet not unexpected, is their calculation of the way DISCs tilt the U.S. income distribution against lower-skilled labor, since they draw resources into production of exportables and encourage greater U.S. imports.

A good illustration of institutional and issues-centered research is a paper by Shannon Stock Shuman and Charles Owen Verrill, Jr. Their results show how subtle, complex, and resource-consuming is a rules-based effort to measure export subsidies abroad for purposes of predictably implementing U.S. countervailing duties. The obvious question for policymakers to wrestle with is whether "it's worth it."

Closely related research describes trade policy abroad, especially in the way it affects U.S. multinational corporations (MNCs). Harvey E. Bale, Jr., of the Office of the U.S. Trade Representative, has described performance requirements and other investment policies. He finds that preconditions abroad for MNC entry were becoming easier, while conditions for continued activity by already-admitted MNCs were becoming tougher. Ksenia Kulchycky and Lipsey find similar results in an ongoing study of performance requirements and other influences on investment and trade in the automotive sector. Such requirements do appear to affect the number, scale, and geographical diffusion of auto and parts production and assembly operations. Nevertheless, these requirements seem less significant than economic factors underlying locational decisions, or than the traditional closure of national auto markets by tariffs and other import barriers.

(3) *The project's research on prospective U.S. trade policy received practical impetus from congressional pressures for "new reciprocity" from U.S. trading partners and for more active U.S. sectoral policy.* At the same time, much of this research is the most rigorous of the project.

The rigor stems from an effort to merge the analysis of trade policy with recent theoretical analysis of imperfect competition. The merger creates a strikingly untraditional framework for describing trade policy. The framework furnishes new reasons to contemplate active trade policy, and new reasons to avoid it.

Trade policy in what the project calls "strategic environments" has quite different effects than in perfectly competitive environments. Strategic environments are those in which small numbers of agents (firms or governments) make visibly interdependent decisions. Each calculates the potential countermoves made by rivals in deciding "best" courses of action. Each considers what decisions deter or preempt predatory thrusts by rivals. Threats, bluffs, promises, commitments, and conjectures all play a role. None of this characterizes traditional perfectly competitive environments in which each of a large number of agents takes the actions of rivals as given, invariant to its own decisions. The analysis of trade policy in competitive environments is familiar, clear, and exhaustive.

Illustrative of "strategic" analysis is research on trade policy as a profit-shifting device. James Brander of the University of British Columbia and Barbara Spencer of Boston College, along with Paul Krugman of MIT, have pioneered this research. They show how active trade policy may increase a nation's real income by capturing larger shares of a world pool of supernormal profits, or by avoiding their forfeiture to aggressive foreign competitors. The supernormal profits themselves are accepted as a given fact of life in the strategic environment, because it contains a small number of imperfectly competitive firms. Avinash Dixit and Albert S. Kyle of Princeton University show how the case for active trade policy can be extended to entry. A nation's real income can be raised by protecting its own firms against entry from abroad, or by promoting their own entry into foreign markets. Dixit and Kyle show that, in general, the promotional policy makes the two nations collectively better off, while the protective policy makes them collectively worse off.

Dixit, Gene Grossman of Princeton University, and Jonathan Eaton of the University of Virginia forcefully clarify and condition these conclusions. Their results inject prohibitive caution into any blithe attempt to apply them practically. Eaton and Grossman show how subjective conjectures of countermoves by rivals dictate whether to tax or subsidize trade. Optimistic conjectures call for one policy, pessimistic conjectures for its exact opposite. When conjectures are accurate—consistent with rival behavior—free trade is "best" after all. Dixit and Grossman show how some of the strategic trade policy conclusions crumble when there is more than one domestic firm or when domestic consumption is large. They also show how the case for strategic trade policy may vanish when there is more than one sector with supernormal profits and when strategic interplay between firms and governments could lead to "capture" of the latter by the former.

Virtually all conclusions from this research depend crucially on institutional and empirical circumstances. This was observed early in the research by David R. Macdonald, then Deputy U.S. Trade Representative (USTR). With his encouragement, Branson, Klevorick, and USTR representatives created a small working group on strategic behavior and trade policy. The group had two research goals. One was to identify sectors where strategic trade policy insights might (and might not) be applicable. The second was to assess the extent to which the research perspective of strategic environments could be of general usefulness to USTR professionals.

Alleged trade problems of five U.S. sectors have been examined in three meetings of the working group to date. Strategic insights appeared to have some potential for applicability to two (semiconductors, large civilian aircraft), but not to the other three (telecommunications equipment, steel, and autos). In semiconductors, the potential was suggested by small numbers of Japanese producers cooperatively researching and developing products with official encouragement—a contrast to the large number of independent, competitive U.S. producers. In large civilian aircraft, the potential was suggested by the existence of essentially two dominant

producers in the world, Airbus and Boeing, with heavy direct subsidization of one and indirect subsidization of both. Yet Krugman's research concludes that neither semiconductors nor aircraft show the pervasive supernormal profits that are the distinguishing characteristic of strategic environments. So even for these sectors, the appropriateness of a strategic perspective is in doubt. The working group plans continued meetings to integrate the conceptual and empirical emphases of this research focus.

The Future

Work in all three areas of the trade policy project will continue for at least the next two years. In the first area —the global environment for trade policy—a study of the interaction between movements of capital and goods is planned for 1985. As part of the project's second focus area, a conference on the trade policy issues facing the second Reagan Administration will be held in 1985. Finally, in the third area—prospective policy—a meeting on "new approaches in trade policy" is being organized for the summer of 1985.

Annual Research Conference—II:

Recent Developments in the Residential Mortgage Market

Patric H. Hendershott

Dramatic changes occurred in the residential mortgage market during the last three years; perhaps the most startling was the change in the form of the underlying mortgage instrument. More than 60 percent of conventional mortgages closed in 1984 had adjustable, not fixed, rates, up from near zero in early 1981. The form of mortgage investments also has been altered noticeably. Conventional pass-through (fixed-rate) mortgage securities held by the private sector quadrupled since the end of 1981, and $12 billion in collateralized mortgage obligations (CMOs) were issued in just over a year. (CMOs have been described as the "stealth bomber" of the mortgage markets, appearing out of nowhere in June 1983.) Finally, the trading of existing mortgage-related securities has jumped sharply, with the turnover rate tripling in just two and a half years.[1]

These are significant changes that warrant attention and careful scrutiny.[2] This article focuses on why these changes occurred, what impact they had on the real economy, and what the prospects are for the continuation or reversal of these trends in the future.

Adjustable-Rate Mortgages (ARMs)

Use of ARMs has grown rapidly since the Federal Home Loan Bank Board (FHLBB) approved their issue by federally chartered thrifts in 1981. In August 1984, 68 percent of conventional loans closed were ARMs. This growth required that both borrowers and investors (lenders) view ARMs favorably. In the last two years, mortgage borrowers needed a coupon rate below the 13 to 15 percent generally available on fixed-rate mortgages (FRMs) to qualify for loans sufficient for the purchase of houses of reasonable size. Short-term ARMs provided lower initial coupon rates than long-term FRMs for three reasons: (1) the yield curve was sloping steeply upward; (2) a large prepayment premium was built into FRM coupons;[3] and (3) the initial ARM rate was discounted significantly. For the first eight months of 1984, the spread between the coupons on FRMs and one-year ARMs averaged 2½ percentage points.

ARMs also appealed to many mortgage investors, particularly thrift institutions under regulatory pressure to decrease their interest rate risk exposure. Many thrifts were, in fact, so eager to limit interest rate risk and so unknowledgeable of the potential costs of giving interest rate and payment caps and teaser (discounted) rates that they have significantly underpriced ARMs relative to FRMs, further contributing to the popularity of ARMs with borrowers.

The widespread use of ARMs largely isolated single-family housing from the normal rise in interest rates experienced during the current economic expansion. When the yield curve shifted upward, borrowers slid down it and then dropped below, because of the ARM discounts. As a result, they avoided the reduction in housing affordability that normally occurs. That is, we should realize, a one-time gain for the housing industry. If the yield curve rises further or if it inverts, affordability will be reduced in the usual manner.

What about the future? ARMs could have peaked in their popularity in the summer of 1984 because the spread between FRM and ARM rates is probably shrinking and because private mortgage insurers tightened the qualification standards on shorter-term ARMs in August. The mortgage insurers raised their fees on ARMs relative to FRMs and limited the amount of annual interest rate/payment increases that they will

[1] *The best source and interpretation of secondary mortgage market data is Freddie Mac's* Secondary Mortgage Markets *and* Monthly Market Reports. *I thank David Andrukonis of their staff for making second quarter data available to me.*

[2] *For another view of change in the mortgage market, see E. J. Kane, "Change and Progress in Contemporary Mortgage Markets," NBER Working Paper No. 1478, October 1984.*

[3] *For a quantification of the determinants of this premium, see S. A. Buser and P. H. Hendershott, "Pricing Default-Free, Fixed-Rate Mortgages," NBER Working Paper No. 1408, July 1984 (see also* Housing Finance Review, *October 1984).*

insure. Both of these actions increase the effective cost of ARMs, the latter because ARM rates will be higher when tighter interest rate caps are used.[4] Insurers also reduced the extent to which teaser rates can be employed. Moreover, they lowered from 33 to 28 percent the maximum share of household income that can be devoted to ARM payments, approximately offsetting the effect of a 2½ percent teaser rate on affordability. Some savings and loans will be tempted to self-insure default rather than to accept the fall-off in demand for ARMs that the resultant reduction in affordability is likely to imply.[5] At the same time, Freddie Mac issued guidelines that lenders must qualify ARM borrowers at the rate reflecting the full gross margin, not the initial period rate. Without effective teaser rates and with more accurate pricing of both default and interest rate (the caps) risk, the demand for ARMs is certain to decline. While the decline may not be sharp, particularly if lenders self-insure against default and if Freddie Mac's standards are not widely adopted (as I would forecast), a significant reduction in ARM usage seems likely.[6]

The Securitization of Conventional Mortgages[7]

Virtually all FHA/VA mortgage debt has been securitized for some time now; three-quarters of government-insured mortgages are pooled into GNMAs directly upon issue and most of the rest is purchased by FNMA and thus financed by their debt securities. In contrast, only about 5 percent of conventional mortgages were pooled directly in the late 1970s, and the fraction purchased by FNMA was small. At the end of 1981, only $26 billion in conventional pass-through securities were held by the private sector, about 2 percent of the outstanding stock of conventionals.

While the stock of conventional pass-throughs has quadrupled in the last two and a half years, the share of conventional mortgages pooled directly has risen only modestly. Of the recent increase in conventional pass-throughs, 90 percent were agency issues—Freddie Mac Participation Certificates (PCs) and Fannie Mae MBSs—and 80 percent of these were swaps of existing whole mortgage loans for an equal amount of mortgage securities backed by the loans. The agencies charge about a quarter-point in annual yield for their swaps. For an institution needing to sell mortgages, this quarter-point is well spent because the price obtained upon sale of the pass-throughs, even with the lower coupon, is more than if whole loans were sold.

The swaps were and still are largely attributable to the recent experience of the thrift industry. Mortgages were "swapped" for the pass-through securities of Freddie Mac and Fannie Mae and then borrowed against to obtain funds needed to deal with the unprecedented disintermediation that occurred in 1981 and most of 1982 until thrifts received the authority to issue money market deposit accounts.[8] Many thrifts also began to participate in these programs because of a developing perceived need to reduce their interest rate risk exposure by selling off FRMs and replacing them with ARMs. Finally, there were savings and loans with low net-worth-to-debt ratios that were (and still are being) forced to sell assets (and reduce deposits) in order to raise their ratios. Selling for the above reasons was facilitated by the FHLBB ruling in September 1981 that losses on sales of low-rate mortgages could be amortized over their remaining life for regulatory accounting purposes.

What, then, is the effect of the increased securitization of the conventional mortgage market? The small increased direct placement of conventional mortgages in pools reflects greater specialization of the mortgage origination function and a further slight broadening of the investor base for mortgages. This links the mortgage market even more closely to financial markets in general. The main effect, however, relates to the massive agency swap programs that allowed continued mortgage investment by thrifts, enhanced mergers, and limited the reported losses of the FSLIC. Households were spared a period of substantially above-market, fixed-rate mortgage loans; some thrifts stayed in business when they might not have otherwise and their shareholders maintained positive equity values. On the negative side, little progress has been made in addressing the fundamental problems of the FSLIC program.[9]

As for the future, substantial use of the agency swap programs after current thrift problems have been resolved seems unlikely. Swaps are useful when mortgage sales are necessary or thrifts are unable to attract funds at market rates. With deposit rate ceilings removed, these circumstances are not likely to exist. Increased securitization of conventional mortgages

[4] *On this, see S. A. Buser, P. H. Hendershott, and A. B. Sanders, "Pricing Rate Caps on Default-Free, Adjustable-Rate Mortgages," NBER Working Paper No. 1525, December 1984; and P. H. Hendershott and J. D. Shilling, "Valuing ARM Rate Caps: Implications of 1970-84 Interest Rate Behavior," forthcoming NBER Working Paper.*

[5] *On the pricing of default insurance, see D. F. Cunningham and P. H. Hendershott, "Pricing FHA Mortgage Default Insurance," NBER Working Paper No. 1382, June 1984 (see also* Housing Finance Review, *October 1984).*

[6] *Of course, if the yield curve should level out, demand could fall sharply.*

[7] *For readers interested in exploring further the topics contained in the rest of this paper, I suggest the articles by George Kaufman and David Seiders in the July 1984 issue of* Housing Finance Review, *published by Freddie Mac.*

[8] *The aggregate net (of interest credited) new savings inflow to savings and loan associations was -$25.4 billion in 1981 and -$16.9 billion in 1982 (through November). This contrasts with positive inflows of $15.0 and $10.7 billion in 1979 and 1980, respectively, and $62.8 billion in 1983.*

[9] *For a full discussion of Federal Deposit Insurance, see E. J. Kane,* The Gathering Crisis in Federal Deposit Insurance, *M.I.T. Press, forthcoming.*

will occur in the long run only if it is beneficial to the placement market, that is, if originators of conventional mortgages wish to place them directly with some other party, as is largely true in the FHA/VA market. Securitization thus depends on who the ultimate investors in conventional mortgages will be and whether the mortgages will be issued in the form the investors want. These are the next topics I will address.

Collateralized Mortgage Obligations (CMOs)

The CMO differs from both mortgage-backed bonds (MBBs) and straight mortgage pass-through securities (MPSs) in that principal payments are divided into multiple maturity classes (usually three or four, the longest possibly being a zero-coupon instrument). Investors in the shortest maturity class get payments first; investors in the longest payment class get them last. Sometimes the issuer of the CMO provides payment guarantees—holders of the shortest class will get *all* their principal *by* such-and-such a date (earlier than simple amortization would provide); holders of the longest class will not get *any* principal *before* such-and-such a date. This supposedly broadens the investor base for fixed-rate mortgages. Commercial banks that would normally invest only in ARMs will buy the shortest-term slice of the CMO; and pension funds, which have long-term nominal liabilities, will buy the longest slice. As a result, the slices of the mortgage can be marketed at a lower overall yield than the whole pie. (Of course, Fannie Mae has always been able to play to the preferred habitats of different investors to finance mortgages by issuing debt in varying maturities, but they have chosen to play the yield curve.)

Since June 1983, $12 billion CMOs have been marketed, with 4 Freddie Mac issues amounting to $3 billion, 15 builder bond issues raising $2 billion, and 15 other issues accounting for nearly $7 billion. Dominance of the market by these three groups appears to be the result of two factors. First, CMOs, like MBBs, are affected adversely by the bankruptcy risk of the underlying firm.[10] Because Freddie Mac is a federal agency and the investment banking firms are equity rich, they have a comparative advantage in issuing CMOs. Second, builders are able to set up subsidiaries to do the issues because mortgage finance is viewed as a separate activity from building; being wholly independent, the subsidiaries are not subject to the bankruptcy risk of the building enterprise.

The investor base for mortgages seems to have been broadened by CMOs. While commercial banks and pensions purchased only 10 percent of Freddie Mac PCs issued in 1983, these institutions bought 60 percent of Freddie's CMOs. But CMOs have not represented a significant further securitization of the mortgage market. Two-thirds of the underlying mortgages were already in pass-through form (Freddie Mac PCs and mostly GNMAs), and the builder bonds—where builders gain the tax advantages of installment sale accounting—surely would have been issued even without the multiple concept.

What has been the impact, and will be the future, of CMOs? The tax advantage of builder bonds has certainly benefited builders and homebuyers in some combination and will continue to do so in the absence of changes in the tax law. For CMOs generally, it is not clear whether their high values reflect their initial novelty and an overestimate of the perceived reduction in prepayment risk or whether a true arbitrage opportunity has been exploited.[11] In any event, such opportunities are unlikely to persist indefinitely. Not only CMO issuers, but also corporate borrowers and even the U.S. Treasury, will exploit these opportunities out of existence (there is no rule that says only mortgage borrowers can benefit from them).[12]

The Surge in Trading in the "After" Market

A large volume of relatively liquid mortgage pass-through securities was issued in the 1970s; by the end of the decade, over $100 billion (mostly GNMA securities) were outstanding. The trading of existing pass-throughs was believed to be minimal (precise data are not available). Actively traded securities tend to be those in which perceptions of expected returns by different investors are continually undergoing change (corporate equities are a good example) or in which liquidity traditionally resides (shorter-term Treasuries). Because mortgage pass-throughs did not fit either of these categories, a lack of trading was not surprising.

The surge in trading in recent years is attributable in large part to the earlier noted thrift experience that triggered swaps and then sales. An additional cause has been the need of some thrifts to show positive income, which can be achieved by selling mortgages at capital gains (mortgages marked down to market value in 1981 and 1982 when mergers occurred could be sold in 1983 and 1984 at a profit). Two other factors, related to activities of investment bankers, also have contributed to trading. The returns earned on mortgages held to maturity depend on the path of future interest rates because the prepayment of mortgages is highly dependent on this path. As this dependency became more apparent and research was conducted on the prepayment response, investors' perceptions of expected returns be-

[10] *Why this is so is not entirely clear. If the issuer of an MBB goes into bankruptcy after interest rates have risen, the investor in the MBB will receive the market value of the MBB, not the higher par value. But the investor is still no worse off than if bankruptcy had not occurred, so there would not seem to be any reason for a higher return to be demanded.*

[11] *Arturo Estrella and Andrew Silver argue that CMOs have not significantly reduced prepayment risk, in "Collateralized Mortgage Obligations: Do They Reduce Cash Flow Uncertainty?"* Quarterly Review, *Federal Reserve Bank of New York, Summer 1984, pp. 58-60.*

[12] *In recent months, congressional actions or threats of actions have limited a number of Treasury initiatives to reduce the cost of the Treasury debt by tapping low-cost sources of funds.*

came more diverse. Also, a view has developed from total return calculations that mortgages are better investments than bonds. Both the efforts to reap gains on assessments of mortgage cash flows that differ from the markets and the general shift of some investors from bonds to mortgages have generated trades of existing mortgages.

What about the future? At this point, I suspect that the 1990s will be more like the 1970s, rather than the first half of the 1980s. Thrift-related trading will probably decline drastically as thrift portfolio rebalancing is achieved and thrift net worth problems are resolved one way or the other. A significant decline in interest rates—possibly stemming from tax reform that reduces the taxation and deductibility of interest income and expense—would speed up this process. Also, further research will undoubtedly both narrow the plausible range of responses of mortgage prepayments to interest rates, reducing potential trading profits, and dispel the notion that mortgages are better investments than bonds.[13] A greater ex post return on mortgages than on 20-year corporates or 10-year Treasuries during a decade of unexpected increases in interest rates is hardly surprising or indicative of greater expected future returns. Had interest rates declined unexpectedly, the reverse relation between ex post returns on mortgages and bonds would have resulted. When the dust settles, we will likely return to the world of old. However, during the next few years at least, trading should continue at high levels as the thrift restructuring is worked out and traders capitalize on widely diverse and often mistaken investor perceptions.

The Ultimate Mortgage Investors

Historically, mortgage investment has been predominately undertaken by the thrifts and Fannie Mae (sometimes labeled the world's largest savings and loan). And for good reason. Because of the Treasury's implicit guarantee of Fannie Mae's debt and the inexpensive deposit insurance FSLIC provides thrifts, Fannie Mae and the thrifts have been able to borrow short and lend long at low cost. Maturity intermediation is profitable, in the absence of a continuing upward trend in interest rates, because short rates are generally less than long rates (3-month bill rates have averaged nearly a percentage point less than long-term Treasury rates over the past 15 years).[14] Thrifts also have the Section 593 bad debt allowance that lowers their effective tax rate based upon (large) minimum investment in mortgages. When thrift profits are "normal," the lower effective tax rate enables them to lend at ½ percentage point below the market rate and still make money.[15] To the extent that FNMA and the thrifts have passed through their advantages to households, the cost of housing finance has been below market.

While the thrifts and FNMA experienced serious difficulties in 1981 and 1982, and will do so again if interest rates rise further, their surge back into the forefront as mortgage investors in 1983 and 1984 is indicative of their long-run advantages in housing finance. We will, of course, continue to have interesting secondary market conduits. Builder bonds will surely persist under the current tax law, and there will be GNMA securities, Freddie Mac PCs, and Fannie Mae MBSs to allow separation between the origination of and investment in mortgages. But mortgage investment is likely to continue to be dominated by thrifts and FNMA under current regulations, tax law, and insurance schemes. Only if changes in these occur—not altogether an unlikely prospect—will a fundamental change in the structure of mortgage investment be forthcoming.

[13]*For an example of this research, see J. R. Green and J. B. Shoven, "The Effects of Interest Rates on Mortgage Prepayments," NBER Working Paper No. 1246, December 1983.*

[14]*Because interest rates have trended upward, maturity intermediation has not been profitable ex post. If FNMA and the thrifts were liquidated today, the current federal deficit would increase by tens of billions of dollars.*

[15]*See P. H. Hendershott and K. E. Villani, "Savings and Loan Usage of the Authority to Invest in Corporate Bonds," in* Savings and Loan Asset Management under Deregulation, *Proceedings of the Sixth Annual Conference of the Federal Home Loan Bank of San Francisco, 1980.*

Annual Research Conference—III:

The Female Labor Force in American Economic History

Claudia Goldin

The increased participation of women in the labor market has been the most significant of all changes in the American labor force throughout its history. A century ago only 18 percent of all prime-aged (15- to 64-year-old) women were in the labor force; today the figure stands above 60 percent. Women of all ages now constitute 43 percent of the American labor force

In contrast, the labor force participation rates of prime-aged and young males have fallen in the past century. Indeed, increased participation of women in the labor market has been the only major factor counteracting the changes among men. Economists know that when the labor force participation of a nation increases, its measured national income per capita also rises. Thus, the increased participation of women has been vital. In fact, if the female participation rate were to return to its 1890 level, national income would decline by about 15 to 30 percent, a loss of 13 to 25 years of economic growth.[1]

[1]*C. Goldin, "The Female Labor Force and Economic Growth, 1890 to 1980," in S. Engerman and R. Gallman, eds.,* Long-Term Trends in the American Economy, *Chicago: University of Chicago Press, forthcoming.*

Much of the expansion in the female labor force has occurred since World War II. Furthermore, most Americans perceive that the pace of change in the economic role of women has quickened in the past 10 to 15 years. But has change in the economic role of women really accelerated in the last decade, especially since the 1950s? That is, why has the female labor force expanded over time, and were the same causal factors that existed in the recent past at work in the more distant period of American history?

One key part of the broader question is whether the expanding female labor force has been caused largely by factors outside the marketplace or by factors that themselves determine other economic quantities. That is, have the changes in the female labor force been the result of social movements, government actions, social pressure, and institutional change, or were they determined by factors related to economic development, changes in the employment share of various sectors of the economy, and increases in the general level of education of the labor force?

"The increased participation of women in the labor market has been the most significant of all changes in the American labor force throughout its history."

My conclusion is that change in the economic role of women can be explained by economic factors. The process of economic development, and not a series of unrelated events, has been the major driving force in increasing the participation rates of women. To understand this process, we must consider the entire sweep of history, look at cohorts over time, and fully comprehend the underlying structure of economic change. Increases in female labor force participation rates have been quite dramatic at certain times in our history but not at others. They have been rapid for particular cohorts but not for others. Contemporaneous factors, such as increases in women's wages, may explain only part of these changes. Differences in the way cohorts respond to economic variables may be rooted in their own pasts.

As part of my work, I have produced a matrix of cross-section and time-series labor force participation rates by marital status, age, race, and national origin for 1890 to the present.[2] My focus here is on one part of this matrix: the labor force participation of white (native-born) married women, born from 1866 to 1955.

For every cohort born since 1866, participation in the labor force has increased during marriage, at least to about age 55. Despite the currently popular notion that married women universally have experienced interruptions in their work careers, in fact the majority who entered the labor force after their children began school had not worked since they were single, if ever. The notion of interrupted work careers has arisen, in part, from the pattern of double-peaked labor force participation characteristic of cross-sectional data for women's work experiences in many contemporary developed nations. (A double-peaked profile means a high labor force participation rate for married women at the youngest ages, then a lower one for those in their late twenties to early thirties, and then an increase with age, declining again near the time of retirement. Such profiles are derived from synthetic cohorts; that is, they come from cross sections of women.)

The labor force experience of actual cohorts has been increasing participation rates throughout the life cycle. Each successive decade saw more married women participating in the market economy. Thus, the participation rates for cohorts are substantially different from those for cross sections.

Certain cohorts experienced large increases in their labor force participation rates throughout their lifetimes. For example, until the cohorts born around the turn of this century, participation rates for married women were relatively low, near 10 percent. But the cohort born around 1906–15 attained a participation rate of over 35 percent at age 50, although it began at about 15 percent participation. The cohorts born in the early 1900s set the stage for those that followed. Similarly, the cohorts born after the mid-1940s experienced larger increases in participation rates over their life cycles than did their immediate predecessors.

Time-series trends in the labor force data are best understood by looking at two age groups of married women: those 25 to 34 years old and those 45 to 54 years old. The greatest expansion of the labor force participation rates for the older group occurred in the World War II and postwar periods, when the participation of the younger women was relatively constant. The younger women had relative expansions in their market work both in the 1920s and in the most recent periods.

These cohort experiences and time-series data are for the entire United States. But the observed increases in female labor force participation over time do not merely reflect a long-run movement of the population out of agriculture and rural areas into cities. Similar data for urban areas alone are virtually identical for the period after 1950; they differ before 1950 in that there was a greater increase in the labor force participation of young married women in the cities during the 1920s.

One implication of these data is that no generation of young women could have predicted solely from the experiences of their elders what their own work histories would be. Indeed, in 1930 a cohort of 20-year-old daughters born in 1910 would have been off by a factor of about four in predicting their own participation rates in 25 years, had they extrapolated simply on the basis of the experiences of their 45-year-old mothers born in 1885. An econometric model that I have developed to

[2] *C. Goldin, "The Changing Economic Role of Women: A Quantitative Approach,"* Journal of Interdisciplinary History *XIII (Spring 1983), pp. 707–733.*

explain changes in the labor market over time, which recognizes education and fertility differences between daughters' and mothers' cohorts, would have been off by a factor of about two. The remainder of the difference between those two groups of women can be explained by changes over time in the structure of the economy, increases in the earnings capabilities of women, and possibly by changed notions of work for women.

These young women undoubtedly were more capable of predicting their future labor force participation than a simple extrapolation on the basis of their mothers' experience would suggest. However, they were probably unable to foresee entirely the changes that did eventually take place (indeed, all professional predictions of change in the economic role of married women have erred on the low side and, on average, all self-reported forecasts have underestimated future labor force participation). The implication is that these individuals may not have been investing enough in job training and schooling that would pay off later in the labor market.

Why did the labor force participation of married women rise rapidly during some decades but not others, and for certain age groups or cohorts at some times but not at others? A complete answer must combine economic and historical analysis, involving various forces—the increase in earnings relative to the price of home-produced goods and changes in the structure of the economy, among others. There are also factors specific to each cohort—such as education, fertility, and labor force expectations—that may affect each group early in its life cycle and get carried with it through time. Thus each cohort, it would appear, has been influenced both by economic and social conditions at a particular date and by aspects of early socialization and training. One particularly instructive example of a cohort-specific change is education.

Data on median years of schooling and on the percentage of individuals completing high school show a remarkable rise beginning approximately with the cohorts born between 1900 and 1910. Over a very brief period, the median female increased her years of education by about one-third, from about nine to twelve years. This rapid rise in years of schooling was a product of the well-known increase in high school education of individuals leaving school from 1915 to 1928. The cohort that experienced this educational transformation was the same one that substantially increased its labor force participation, both during its early years and even more so at age 40 to 50, during the 1950s. The implications of this increased education for females are linked to subsequent changes in the structure of jobs in the economy and the emergence of the clerical sector as a major employer of females.

After this initial increase in schooling, median years of education increased only gradually, until the most recent cohorts. Changes in their educational attainment may be measured by the percentage having four or more years of college. This indicator has increased most rapidly with the cohorts born after 1940, precisely those with substantially higher labor force participation in the most recent decades.

Education is one of a number of cohort-specific factors. In the econometric model estimated for 1890 to 1980, these factors accounted for 28 to 34 percent of the long-term movement in female labor force participation rates. Point-in-time effects, especially the rise in the earning ability of women (relative to the general price level, but not necessarily relative to men) account for another one-third. The remaining one-third is the result of other factors incorporated in a time trend.

"The ratio of female to male earnings has remained relatively constant at about 0.60 from 1950 to 1980. . . ."

What is the historical relationship between the earnings of females (relative to those of males) and increased labor force participation? Readily available data on earnings exist only for the period after 1950; my estimates for the previous period have been constructed from earnings and wage data for various occupations and sectors.[3] They indicate that relative earnings did rise from the earliest recorded levels in 1800 until about 1930 to 1940. Rising earnings of females relative to males were a logical result of industrialization—the replacement of human strength with machinery—and the transformation of the labor force from blue to white collar—the replacement of job training with education.

The ratio of female to male earnings has remained relatively constant at about 0.60 from 1950 to 1980 (0.69 adjusted for differences in hours worked) despite the expansion in the female labor force. This ratio, also known as the gender gap, has only recently begun to rise. The reasons for the relative constancy of this ratio after 1940 are to be found in other factors that determine earnings—the experience and education of the working population.

The data show that women's participation rates increased very rapidly at certain times. If women once in the labor force tend to stay in it for a long time, then those who enter the labor force at a time of rising participation must have very limited previous work experience. If, on the other hand, working women tend to have very rapid turnover, then an increase in the participation rate may indicate that the same women are in

[3] *C. Goldin, "The Female Labor Force and American Economic Growth, 1890 to 1980."*

the labor force but the turnover rate has decreased. Surely the actual experience of working women is some combination of these two extreme scenarios, but the degree to which it is more like the former or the latter determines whether increased participation rates will increase or decrease the experience level of the working population of women. Also, years of experience in the work force and education are determinants of earnings. Earnings increase or decrease with changes in labor force participation depending upon how current participants differ from the total population.

The working population of women has tended to be more continuous in its attachment to the labor force than previously thought. Thus, increased participation has put downward pressure on the experience level of the working population of women.[4] From 1930 to 1950, the level of work experience increased very slightly; from 1950 to 1980, it did not increase at all. The ratio of the educational attainment of the working population of females (relative to males) also decreased from 1950–80, by substantially more than did the ratio with respect to the total population.[5]

The experience level of the working population of women has just begun to rise over the past five years, and the average education of the total working population has just begun to exceed that of women. Therefore, the increases in women's labor force participation are completely consistent with the relative constancy of earnings and occupations up to 1980. The gender gap has recently narrowed because women's labor force participation rates are high enough that recent entrants do not lower the experience level of working women as much as older participants, with increased experience, raise it.

Economic history can do more than answer why participation rates increased and what relationships exist among various economic and social indicators; it can add perspective to our understanding of these indicators. We think of ourselves as having experienced a quickening in the pace of change in the economic role of women. Yet consider the following comment by a past president of the American Economic Association: "Our age may properly be called the Era of Women, because every thing which affects her receives consideration quite unknown in the past centuries.... Woman is valued as never before . . . and . . . it is perceived that the welfare of the other half of the human race depends more largely upon the position enjoyed by woman than was previously understood." The man who made this statement was not John Kenneth Galbraith, a past president of the Association who made women's rights an internal issue, but one of its first presidents, Richard T. Ely, who wrote this passage in 1893.

[4] *C. Goldin, "Life-Cycle Labor Force Participation of Married Women: Historical Evidence and Implications," NBER Working Paper No. 1251, December 1983.*

[5] *J. P. Smith and M. P. Ward,* Women's Wages and Work in the Twentieth Century, *Rand Corporation Report, 1984.*

Annual Research Conference—IV:

Labor Aspects of Pension Plans

David A. Wise

Over the past three decades, there has been rapid growth in pension coverage in the private sector and a steady upward trend in coverage in the government sector as well. Approximately 50 percent of private wage and salary workers, or 50 percent of the civilian labor force, is now covered by a pension plan. Moreover, almost all government workers have pension coverage. In addition, the percentage of the civilian population aged 55 or older that receives pension benefits has risen very rapidly in the last 20 years, to about 20 percent.

The rapid increase in pension plan coverage and, in particular, the substantial increase in the proportion of older individuals receiving pension benefits, has been accompanied by a dramatic decrease in the labor force participation rate of older workers over the past two decades. Between 1960 and 1980, the rate for men between the ages of 55 and 65 fell from 87 percent to 72 percent; the rate for men 65 and older fell from 35 percent to 26 percent. Even in the decade of the 1970s, the decline in participation rates was startling. In 1969, almost 76 percent of men aged 60 to 64 and 27 percent of men 65 and older were in the labor force, while by 1979 only 61 percent of the younger group and about 20 percent of the older men were. The simultaneous increase in pension plan coverage and the dramatic increase in the labor force participation rate of older workers suggests that the two trends may be causally related. In fact, the provisions of many private pensions often provide incentives for older workers to leave the labor force or at least to quit work on the current job.

To demonstrate the incentive effects of the plans, it is useful to consider the rate at which pension wealth is accrued: that is, the change in the present value of pension wealth from one year to the next. There are three aspects of defined-benefit plans—by far the most common type of private plan—that should be understood. First, the provisions of almost all of these plans imply negative rates of accrual after the age of normal retirement, sometimes as young as 55 and almost always by 65. If a person works after 65, the loss in pension benefits is greater than the increases in future benefits when the person does retire. Working past 65 is often associated with no increase in future benefits. The loss in pension wealth from working between 65 and 66 frequently amounts to 50 percent of salary earnings during that year.

Second, a large proportion of defined-benefit pension plans have an early retirement option. There is often a sharp decline in the rate of accrual of pension wealth at this age, because the benefit reduction rate for early retirement is typically less than actuarially fair. Thus, the reduction in pension benefits associat-

ed with receiving them before the age of normal retirement is typically not large enough to offset the increase in total benefits associated with receiving them for an additional year.

Third, the abrupt increase in pension wealth at the time of vesting in the plan, often after ten years of plan coverage, may range from 3 or 4 percent of salary in that year to a very substantial proportion of salary. That depends on the age of entry into the plan and on future inflation and interest rates.

In summary, accrual rates under the typical defined-benefit plan have the following characteristics: The accrual rate is zero until the age of vesting. Pension wealth in that year could range from a small to a very large proportion of salary income in that year. After vesting, the accrual of pension benefits is relatively slow with increasingly higher accrual rates until the age of early retirement. Then, the accrual rate typically falls until the age of normal retirement. After age 65, pension accrual is typically negative; often the loss in pension wealth is equivalent to a very substantial proportion of earnings. Finally, changing jobs is likely to involve a substantial loss in pension accrual. This loss occurs because pension benefits under the defined-benefit system are based both on years of service and earnings in the last year or the last few years of employment under the plan. The increases are lost if one goes to a new job covered by a different pension plan where the pension is based only on years of service in the new plan.

Average accrual rates for *actual plans* with selected early and normal retirement ages, which Laurence Kotlikoff and I calculated, demonstrate the path just described. Consider first the plans with both early and normal retirement at age 55. For these plans, the average decline in the rate of pension accrual at age 55 is equivalent to about 30 percent of salary. If a person under these plans continued to work at age 65, pension accrual would be negative and equivalent to approximately 30 percent of earnings. Whereas at age 54 the pension benefit accrual amounts to about 30 percent of salary earnings in that year, at age 65 the benefits accrued amount to a loss of about 30 percent of earnings. Thus, between the ages of 54 and 65, the fall in the rate of pension accrual is approximately equivalent to a 60 percent salary reduction.

The more common plans, with early retirement at age 55 and normal retirement at age 65, call for increasing rates of pension benefit accrual up to age 55 with a decline thereafter. However, the decline in accrual rates between the ages of 55 and 65 is not nearly as dramatic as the decline ascribed to plans that have both early and normal retirement at age 55. Under the more common plans, pension wealth declines substantially at age 65.

Only under plans with both early and normal retirement at age 65 does pension wealth continue to increase until age 65. Under plans with these provisions, the rate of pension accrual after age 65 drops rapidly and significantly. In this case, the loss in pension wealth from working an additional year would be approximately equivalent to 40 percent of salary. In short, all of the plans provide a strong incentive to work up to the age of early retirement, then an incentive to leave the labor force that gets stronger every year until the age of normal retirement.

Even among plans with the same early and normal retirement ages, there is a wide range in plan provisions. While the typical plan may provide positive pension accrual rates at some age—say 62—the accrual rate may be substantially negative for some plans. Some plans may provide a strong incentive for a person to quit work at a given age while others provide a strong incentive not to quit at that same age. The relatively small proportion of plans that provide a strong incentive to retire thus could have a substantial effect on the labor force participation rates that I observe.

Certain provisions in actual plans also imply a large loss in pension wealth from changing jobs. We have compared the pension wealth at normal retirement age of a person who enters a plan at age 31 and remains covered by it until retirement with that of someone who changes jobs (and thus plans) at age 41. Based on nearly 2400 plans in our sample, I find that persons who changed jobs one time have approximately 72 percent of the pension wealth of those who stayed with the same employer. Those who changed jobs twice, at ages 41 and 51, have only about 43 percent of the pension wealth of those who did not change jobs. These differences in pension wealth range from a low of 30 percent in the transportation firms in the sample to approximately 60 percent in the finance and construction firms.

"All of the plans provide a strong incentive to work up to the age of early retirement, then an incentive to leave the labor force that gets stronger every year until the age of retirement."

The federal civil service pension system provides one example of how pension plan provisions actually affect the retirement decision. According to work by Herman Leonard, a typical federal civil servant accrues pension benefits slowly until becoming eligible for early retirement. At that time, typically age 55, pension wealth increases sharply, say from $130,000 to $323,000, in one year. If the same individual continued to work up to age 65, pension wealth would fall by $75,000 to $248,000. Thus, the very large available pension wealth at age 55 and the loss in pension wealth from working 10 more years provide a substantial incentive to retire early. In fact, over 50 percent of federal civil service workers retire before age 60 versus only 7 percent of workers in the private sector.

The U.S. military pension system provides another dramatic example of the effect of pension plan provisions. After 20 years in the military, a person becomes

eligible for pension benefits that equal roughly 50 percent of salary. Moreover, these benefits are indexed to inflation. For example, a colonel who retires from the military at age 42 after 20 years in the service could have $275,000 in accrued pension wealth. In contrast, after working for one employer for the same 20 years, a typical college graduate covered by a private sector plan might have $20,000 in accrued pension wealth. Of course, accrued pension wealth in the military varies by service rank and salary. On average, though, pension wealth is large enough to provide a substantial incentive to leave the service, particularly for individuals whose pension wealth will not increase with future promotions. Although military pension benefits increase with years of service up to a maximum of 75 percent of salary, a large proportion of military personnel retire after 20 years of service, even before the mandatory retirement age.

While these federal pension plans may provide larger incentives for early retirement than most other plans, their effect on retirement decisions is apparently typical. In general, the income replaced by pensions is substantially higher for persons who retire at young ages than for those who retire later. A detailed analysis of California public school teachers also shows that larger pension wealth is associated with earlier retirement.

Social Security benefits tend to affect retirement in the same way. My work with Jerry Hausman suggests that persons who can increase their Social Security benefits by continuing to work are more likely to remain in the labor force. Similarly, persons with increasing accrual rates in private pension plans are likely to remain in the labor force. On the other hand, individuals whose accrued Social Security wealth is high are more likely to retire than those with lower accrued Social Security wealth, just as the pension wealth available to federal civil service workers, and especially to military personnel, provides a substantial incentive for them to retire early. Indeed, increases in Social Security benefits between 1969 and 1979 may explain a substantial proportion of the decline in the labor force participation of older workers in that period.

Structural Adjustment and the Real Exchange Rate in Developing Countries

NBER and the World Bank cosponsored a conference on "Structural Adjustment and the Real Exchange Rate in Developing Countries" in Washington on November 29–December 1. The conference, part of NBER's Program in International Studies, was organized by Faculty Research Fellow Sebastian Edwards and Program Director William H. Branson.

The agenda for the three-day conference was:

Chair: Luis de Azcarate, The World Bank

- Guillermo Calvo, Columbia University, "Welfare, Banks, and Capital Mobility: The Case of Predetermined Exchange Rates"
  - Discussants: Mario Blejer, International Monetary Fund; and Robert P. Flood, Jr., NBER and Northwestern University
- Sweder van Wijnbergen, The World Bank and the University of Warwick, "Exchange Rate Management and Stabilization Policies in Developing Countries"
  - Discussants: James Hanson, The World Bank; and Deepak Lal, University College, London, and The World Bank

Chair: Demetris Papageorgiou, The World Bank

- Maurice Obstfeld, NBER and and Columbia University, "Capital Flows, the Current Account, and the Real Exchange Rate: Consequences of Liberalization and Stabilization" (NBER Working Paper No. 1526)
  - Discussants: Jeffrey D. Sachs, NBER and Harvard University; and Marcelo Selowsky, The World Bank
- Sebastian Edwards, NBER, UCLA, and The World Bank, "Commodity Export Prices and the Real Exchange Rates in LDCs: Coffee in Colombia"
  - Discussants: Sarath Rajapatirana and Armeane Choksi, The World Bank

Chair: William H. Branson, NBER and Princeton University

- Joshua Aizenman, NBER and University of Pennsylvania, and Jacob A. Frenkel, NBER and University of Chicago, "Exchange Rates, External Adjustment, and Wage Rate Indexation"
  - Discussants: Stanley Fischer, NBER and MIT; and Constantino Lluch, The World Bank

Round Table Discussion: "Exchange Rate Policies: Are They Different for Developing Countries than Developed Countries?"

Chair: Manuel Guitian, International Monetary Fund

- Opening Remarks: Carlos F. Díaz-Alejandro, Columbia University; Deepak Lal; and Arnold Harberger, University of Chicago and UCLA

Chair: S. Shahid Husain, The World Bank

- Michael L. Mussa, NBER and University of Chicago, "The Exchange Rate as a Tool of Commercial Policy"
  - Discussants: Jeffrey A. Frankel, NBER and University of California, Berkeley; and Kathie Krumm, The World Bank
- Rudiger Dornbusch, NBER and MIT, "Unconventional Exchange Rate Arrangements"
  - Discussants: Manuel Guitian; and Richard C. Marston, NBER and University of Pennsylvania
- William H. Branson, "Stabilization Programs, Stagflation, and Investment: The Case of Kenya"

Discussants: Jacques R. Artus, International Monetary Fund; and Ravi Gulhati, The World Bank

Chair: Vinod Dubey, The World Bank

Jorge Braga de Macedo, NBER and Princeton University, "Collective Pegging to a Single Currency: The West African Monetary Union"

Discussants: Liaquat Ahamed and Stephen O'Brien, The World Bank

Arnold Harberger, "Balance-of-Payments Crises: Lessons from Experience"

Discussants: Carlos F. Díaz-Alejandro; and Mohsin Khan, International Monetary Fund

Louka T. Katseli, NBER and Center for Planning and Economic Research, Athens, "Crawling versus Discrete Exchange Rate Adjustment"

Discussants: Stanley Black, University of North Carolina; and John Williamson, Institute for International Economics

Closing Remarks: Basil Kavalsky, The World Bank

In his paper, Calvo examines optimal money supply, minimum cash/deposit ratio, and international capital mobility in the context of an overlapping-generations model with fixed exchange rates. Money is assumed to have an explicit transactions role. Calvo's main conclusions are: (1) the first-best optimum cannot be attained by merely controlling money supply, as in Friedman's Optimal Quantity of Money Analysis; (2) when inflation is at the optimal level, a lowering of the cash/deposit ratio always improves welfare; (3) when the government is constrained to collect a given (real) amount of revenue, the associated welfare cost could be reduced by lowering the cash/deposit ratio even when inflation may be higher; (4) many of these findings extend to the case where foreigners demand domestic money; but (5) major distortions in the banking system may be called for when the central bank has to have low-interest-bearing securities to back up the currency.

The paper by van Wijnbergen outlines three channels by which a devaluation has a direct contractionary impact on the *aggregate supply side* of the economy: local currency costs of intermediate imports, wage indexing in the presence of food imports, and reduced volume of real credit to firms. Contractionary effects via the supply side are more damaging than Krugman-Taylor effects via aggregate demand, since a cut in aggregate supply leads to upward pressure on inflation while a cut in aggregate demand tends to abate inflation. Upward pressure on inflation may eventually threaten the increase in competitiveness that a nominal devaluation intends to achieve.

The paper also discusses the implications of a substantial foreign debt. It demonstrates that a successful devaluation raises the real (in terms of domestic goods) debt service burden, causing a Krugman-Taylor-like contractionary effect on aggregate demand. The results do not imply that a devaluation should never be considered. They do suggest, however, that a devaluation is likely to be an ineffective tool for demand management since it may cut aggregate supply as much as or more than demand in the short run.

Obstfeld develops an open-economy macromodel that captures some stylized features of advanced industrializing economies. The model encompasses both perfect international capital mobility and complete capital immobility, so that the effects of opening the capital account can be studied. Liberalization of the capital account leads to an initial rise in the price of home goods relative to tradable goods when prereform domestic interest rates exceed the world interest rate. In the long run, there is a fall in the economy's external wealth and a fall in the relative price of home goods compared to their prereform level. The paper also studies changes in both the *level* of the pegged exchange rate and in its *rate* of devaluation.

"Upward pressure on inflation may eventually threaten the increase in competitiveness that a nominal devaluation intends to achieve."

In his paper, Edwards analyzes the interaction between coffee prices and the real exchange rate in Colombia. He develops a macro model that analyzes the relation between coffee prices, money creation, inflation, and the real exchange rate. The model also assumes that the economy has a crawling peg system, where the economic authorities periodically adjust the rate of devaluation according to the behavior of a set of indicators that include the domestic and foreign rates of inflation and the price of coffee. The model establishes that increases (decreases) in the world price of coffee will result in a real appreciation (depreciation) in Colombia. This change in the real exchange rate will take place through three channels. First, there will be a traditional spending effect resulting from the change in the price of coffee. Second, higher coffee prices will result in a higher rate of money creation and inflation. Third, the change in the price of coffee will affect the nominal rate of devaluation of the crawling peg. Using Colombian data for 1952–80, the results support the model's prediction and indicate that changes in world coffee prices have greatly influenced the rate of money growth and inflation in Colombia. It also finds that the rate of the crawl in Colombia has been inversely related to the behavior of the world price of coffee.

In their paper, Aizenman and Frenkel analyze optimal wage indexation schemes and optimal monetary policies for economies that are subject to such disturbances as supply shocks to imported inputs. In order to evaluate the welfare implications of alternative policies, they first develop a formal measure of welfare losses. This measure represents the welfare loss associated with discrepancies between the equilibrium (undistorted) level of employment and the level of employment that is realized in practice. They show that with

optimal indexation, the adjustment of nominal wages to monetary shocks should differ from the corresponding adjustment to real supply shocks. Specifically, when such a separation is possible, the elasticity of nominal wages with respect to the price level should be unity, while the elasticity of nominal wages with respect to real shocks (that is, shocks to productivity and to the price of imported intermediate inputs) generally differs from unity; its magnitude depends on the elasticities of the supply and the demand for labor.

After deriving the optimal indexation rule, Aizenman and Frenkel consider the optimal monetary policy assuming that optimal wage indexation is not feasible. In this context they determine the precise conditions under which an economy, faced by supply shocks, should adopt an accommodative monetary policy.

Finally, the authors show that indexation to nominal income is preferred to indexation to the domestic value-added price index in the same circumstances under which employment stabilization is preferred to real wage stabilization. Thus, when the elasticity of labor supply is lower than the elasticity of labor demand, indexation to nominal income is preferable to indexation to the domestic value-added price index.

Mussa develops a dynamic version of a two-country, two-commodity model of international trade. It allows for endogenous determination of differences between domestic income and domestic spending and takes account of changes in asset stocks and their associated return flows. The momentary equilibrium value of the real exchange rate (defined as the relative price of domestic goods in terms of foreign goods) depends on weighted averages of present and expected future values of exogenous variables that affect the excess demands for domestic and foreign goods and the desired excess of domestic spending over domestic income. In this model, a variety of government policies can influence the real exchange rate including: temporary shifts in government spending between domestic and foreign goods; temporary general fiscal expansions financed by increases in government debt; controls on international capital flows; and policies that fix a path for the nominal money supply and the nominal exchange rate, supported by official intervention, with occasional large exchange rate adjustments.

The paper by Dornbusch reviews exchange rate arrangements that deviate from unrestricted convertibility at a uniform fixed rate. These practices all amount to multiple exchange rates, explicit or implicit, although the form may vary from black markets to flexible dual rates for capital account transactions, exchange rate guarantees, or special foreign exchange taxes on imports across the board or by commodity class. These exchange rate practices have seen an intense revival in the aftermath of the debt crisis and now are pervasively practiced again all over the world.

The microeconomic arguments against multiple rates for commercial transactions, seen as implicit differentiated tariff structures, are well established. But there remains the issue of multiple rates as an instrument of short-term macroeconomic or external balance stabilization. Compared to broad expenditure-switching and expenditure-reducing policies, a multiple rate structure is more effective in coping with the objectives of employment, income distribution, and sheer efficiency of allocation. Dornbusch shows that deviations from uniform rates are warranted only when disturbances are quite transitory and the political and macroeconomic costs of relative price movements are high. Although multiple rate practices entail obvious resource costs, in limited circumstances they are important tools for improving macroeconomic performance.

"Changes in world coffee prices have greatly influenced the rate of money growth and inflation in Colombia."

Branson's paper analyzes the short-run effects of a stabilization program that includes devaluation and reduced government spending. His model has an inelastic excess supply of exports and imported intermediate inputs used in the production of home goods. By studying stabilization in Kenya in the early 1980s, Branson finds that the overall impact of the program in the short run is stagflationary. Profits in the home goods sector are also reduced. For a given effect on the trade balance, spending cuts tend to reduce profits less than devaluation, but devaluation adds inflation to the results of the program. Thus, for countries with this "rigid" structure, devaluation may be more appropriate for a liberalization or structural adjustment program than for a stabilization program.

The paper by de Macedo analyzes monetary and exchange rate policy in the West African Monetary Union (UMOA) in light of a two-tier macroeconomic model with two large countries (the United States and France) and two small countries (Senegal and Ivory Coast). The stability of the nominal effective exchange rates is partly offset by the volatility of the real effective exchange rates of the two major partners in UMOA. Nevertheless, the development of financial intermediation compares favorably with African countries outside the franc zone. Similarly, the theoretical case for a basket peg (or a basket crawl) is weakened by the advantage of receiving a transfer from the large partner, as has happened since UMOA began drawing from the French treasury in 1979. The accession of Mali in 1983 also suggests the collective pegging to a single currency has been favorable to the member countries.

Harberger explores the issues surrounding the concept and depreciation of the real exchange rate. He shows that in standard comparative-static analysis, the definition of demand for and supply of foreign exchange requires that imports and exports be measured in units, each of which has the world market value of the dollar (or a similar foreign currency measure). This implies that when the dollar price of such tradables

changes, the demand for and supply of funds in foreign exchange also shift, causing the equilibrium exchange rate to change. In particular, a rise in the world price of an export product must, ceteris paribus, lead to a fall in the equilibrium exchange rate. A definition of the real exchange rate as the internal price level of tradables relative to nontradables thus does not correspond to the underlying theoretical structure. Such a definition permits a rise in the real exchange rate when an export price rises or when a uniform tariff is imposed.

To correspond with the theory, imports and exports must also be measured in units with "a dollar" at world market prices. The number of units represented by, say, a barrel of oil, must change when the world price of oil rises. Over time, nominal dollar figures should be deflated by a general index of the dollar price level of tradables in the world market.

The central hypothesis of Katseli's paper is that both the extent and the speed of adjustment of the real exchange rate are affected by the way the central bank manages the nominal exchange rate. Specifically, a large discrete adjustment of the nominal exchange rate is more likely to result in fast adjustment of prices than a policy of smooth and continuous crawling peg.

"Although multiple rate practices entail obvious resource costs, in limited circumstances they are important tools for improving macroeconomic performance."

The channel through which management of the nominal exchange rate influences real exchange rate developments is the process of price adjustment. In the context of a monopolistic price adjustment framework, Katseli shows that exchange rate management affects both the length of existing price contracts between buyers and sellers and the magnitude of price adjustment. A discrete and unexpected devaluation of the exchange rate shortens the implicit price contracts and augments the rate of price adjustment in the nontraded goods sector. This happens because firms tend to strengthen their expectations about an overall increase in costs and about an aggregate as opposed to a local shift in the demand curve for the firm's output.

A discrete change in the exchange rate thus acts as an "information signal" in the market that leads to fast overall adjustment of nontraded goods prices. Katseli tests the hypothesis at the macro, sectoral, and firm levels using macro and micro data on Greek prices prior to and after the January 1983 discrete devaluation. The empirical evidence validates the assumption of sluggish price adjustment and is consistent with the underlying theoretical hypotheses.

Also participating in the three-day conference were: John Cuddington and Vinod Thomas, The World Bank; Kenneth Rogoff, Board of Governors, Federal Reserve System; and Miranda Xafa, International Monetary Fund.

Conference Calendar

Each *Reporter* will include a calendar of upcoming conferences and other meetings that are of interest to large numbers of economists (especially in academia) or to smaller groups of economists concentrated in certain fields (such as labor, taxation, finance). The calendar is primarily intended to assist those who plan conferences and meetings, to avoid conflicts. **All activities listed should be considered to be "by invitation only," except where indicated otherwise in footnotes.**

Organizations wishing to have meetings listed in the Conference Calendar should send information, comparable to that given below, to Conference Calendar, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. Please also provide a short (fewer than fifty words) description of the meetings for use in determining whether listings are appropriate for inclusion. The deadline for receipt of material to be included in the Spring 1985 issue of the *Reporter* is February 15. If you have any questions about procedures for submitting materials for the calendar, please call Kirsten Foss at (617) 868-3900.

February 21-22, 1985
Program Meeting: Financial Markets and Monetary Economics, NBER

February 22-23, 1985
Second Berkeley Conference on Industrial Relations, University of California, Berkeley

March 7-8, 1985
Program Meeting: Taxation, NBER

March 9-16, 1985
19th International Conference, Atlantic Economic Society*

March 9-16, 1985
International Economics of Health Care Conference, International Health Economics and Management Institute*

March 15, 1985
Technical Innovation, Regulation, and the Monetary Economy, Columbia University

March 21-25, 1985
Conference on Pensions, NBER

March 28-29, 1985
U.S. Trade Policies in a Changing World Economy, University of Michigan

March 28-30, 1985
Annual Meeting, Midwest Economics Association

March 29, 1985
Program Meeting: Economic Fluctuations, NBER

April 4-5, 1985
Panel on Economic Activity, Brookings Institution

**Open conference, subject to rules of the sponsoring organization.*

April 19-20, 1985
Public Policy Conference, Carnegie-Mellon/University of Rochester

April 26-27, 1985
Money and Financial Markets Conference, NBER

May 20-21, 1985
Spring Symposium, National Tax Association*

May 22-24, 1985
Konstanz Seminar on Analysis and Ideology, University of Rochester

May 27-31, 1985
Interlaken Seminar on Analysis and Ideology, University of Rochester

June 3-5, 1985
International Meeting, International Association of Energy Economists*

June 23-25, 1985
International Seminar on Macroeconomics, NBER

June 30-July 4, 1985
Annual Conference, Western Economic Association*

July 26, 1985
Program Meeting: Economic Fluctuations, NBER

August 4-7, 1985
Annual Meeting, American Agricultural Economics Association*

fAugust 5-8, 1985
Annual Meeting, American Statistical Association*

August 17-24, 1985
World Congress, Econometric Society

August 20, 1985
Annual Congress, International Institute of Public Finance

August 26-28, 1985
Income and Wealth: Productivity Growth in the United States and Japan, NBER

August 26-30, 1985
Annual Congress, International Institute of Public Finance

September 11-14, 1985
17th CIRET Conference, Center for International Research on Economic Tendency Surveys

September 12-13, 1985
Panel on Economic Activity, Brookings Institution

September 26-27, 1985
Conference on Housing Finance, NBER

September 29-October 2, 1985
Annual Meeting, National Association of Business Economists*

October 1985
Conference, Atlantic Economic Society*

October 13-16, 1985
Annual Conference, National Tax Association*

November 6-8, 1985
North American Meeting, International Association of Energy Economists*

**Open conference, subject to rules of the sponsoring organization.*

November 7-9, 1985
Causes and Consequences of Non-Replacement Fertility, Hoover Institution

November 24-26, 1985
Annual Meeting, Southern Economic Association*

December 28-30, 1985
Annual Conference, American Economic Association*

April 3-5, 1986
Annual Meeting, Midwest Economics Association

June 24-26, 1986
International Seminar on Macroeconomics, NBER

June 25-28, 1986
Summer Meeting, Econometric Society

July 27-31, 1986
Annual Meeting, American Agricultural Economics Association*

August 18-21, 1986
Annual Meeting, American Statistical Association*

September 13-17, 1986
Annual Meeting, National Association of Business Economists*

December 28-30, 1986
Annual Conference, American Economic Association*

August 2-5, 1987
Annual Meeting, American Agricultural Economics Association*

August 17-20, 1987
Annual Meeting, American Statistical Association*

September 27-October 1, 1987
Annual Meeting, National Association of Business Economists*

August 8-11, 1988
Annual Meeting, American Statistical Association*

Bureau News

Carliner Is New Executive Director

On November 1, Geoffrey Carliner replaced David Hartman as executive director of NBER. Hartman left his post at NBER to join Data Resources Inc. as chief international economist. He had served as executive director since 1981; previously, he was a member of Harvard University's economics faculty and a research associate of NBER.

Carliner has taught at Oberlin College and the University of Western Ontario and served on the senior staff of the Council of Economic Advisers. He is the subject of a "Profile" in this issue of the *NBER Reporter*.

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Macro Economists Meet in Chicago

Members of NBER's Program in Economic Fluctuations and about 30 of their invited guests gathered in Chicago on October 19 for the fall program meeting. The following presentations were made:

Terry Marsh and Robert C. Merton, NBER and MIT, "Dividend Variability and Variance Bounds Tests for the Rationality of Stock Market Prices"
Discussant: Robert J. Shiller, NBER and Yale University

Robert F. Lucas, NBER and University of Chicago, and Nancy Stokey, Northwestern University, "Money and Interest in a Cash-in-Advance Economy"
Discussant: Robert E. Hall, NBER and Stanford University

Roger Farmer, University of Pennsylvania, "Cash, Contracts, and Clower Constraints"
Discussant: Sanford J. Grossman, NBER and University of Chicago

Lawrence Christiano, University of Chicago, "A Critique of Conventional Treatments of the Model Timing Interval in Applied Econometrics"
Discussant: Kenneth J. Singleton, NBER and Carnegie-Mellon University

John Moore, London School of Economics, "Contracting between Two Parties with Private Information"
Discussant: Oliver Hart, MIT

In their paper, Marsh and Merton critically examine Shiller's "variance bounds" tests for stock prices. Shiller's results have been interpreted as evidence that U.S. stock markets are not efficient. Marsh and Merton show that, under certain circumstances, Shiller's results are to be expected if the market *is* efficient. These circumstances, which are empirically plausible, involve managers having a target ratio for dividend payout as an objective. They smoothly adjust dividends to meet that objective. In that case, Shiller's results may be interpreted as evidence of market efficiency.

Lucas and Stokey also develop a model of an economy with a cash-in-advance constraint. With some new technical methods, they show that processes that generate money and make output grow interact to determine equilibrium quantities and prices. In particular, they consider how monetary and real shocks interact in their model to determine interest rates. To do that, they show how the Fisher formula needs to be modified in a wide class of stochastic environments. Their model warns against predicting the signs of correlations for movements between money and other variables but does indicate that predictions may be made about the joint distributions of money and other variables.

Farmer's paper develops an overlapping-generations model of an economy in which money is a productive asset for firms because: (1) there is a cash-in-advance constraint on purchases; and (2) firms and

workers have different information. Firms must hold money to convince workers to work for them. Since the quantity of money held by firms depends on the nominal interest rate, the economy's allocation in the model depends on the interest rate. In particular, the deviation of expected employment from an efficient level depends on the nominal interest rate. The natural rate of employment therefore varies with government policy, and what the government does makes a difference in terms of efficiency.

Christiano examines what happens when the timing interval of an econometric model does not coincide with the interval of the data sampling. Using several examples, he shows that the results of empirical analysis can be extremely sensitive to timing specification. He also considers the question of how to treat the length of the timing interval in econometric work.

Finally, Moore described his study of the properties of a contract that is optimal only under certain circumstances. He assumes that the contract will be signed by two risk-averse parties, both of whom are uncertain about the exact payoff they will receive when the trade takes place. Each party is also unable to observe the other's ex post payoff. Under these circumstances a first-best contract cannot be implemented. Therefore, Moore establishes the properties of an optimal second-best contract. These properties may be illustrated in the context of the labor market. An optimal contract allows for: underemployment—workers laid off even though their revenue produced exceeds their reservation wage; involuntary layoffs—workers laid off even though they and the firm would prefer to have them retained; and higher pay for workers whose revenue product or reservation wage is higher.

In addition to the authors and discussants, the following NBER associates participated in the meeting: Robert P. Flood, Jr., Robert H. Gordon, and Robert J. Hodrick, Northwestern University; Jacob A. Frenkel, John Huizinga, Edward P. Lazear, Michael L. Mussa, and Victor Zarnowitz, University of Chicago; Herschel I. Grossman, Brown University; William D. Nordhaus, Yale University; and Christopher A. Sims, University of Minnesota.

Cambridge Is Site of Financial Group Meeting

NBER's Program in Financial Markets and Monetary Economics, led by Director Benjamin M. Friedman of Harvard University, held its fall meeting in Cambridge on November 1 and 2. The group discussed the following papers:

V. Vance Roley, NBER and University of Washington, "Money Demand Predictability"
Discussant: Lawrence H. Summers, NBER and Harvard University

John Y. Campbell, Princeton University, "Bond and Stock Returns in a Simple Exchange Model"
Discussant: James M. Poterba, NBER and MIT

Takatoshi Ito, NBER and University of Minnesota, "Use of (Time-Domain) Vector Autoregressions to Test Interest Parity" (NBER Working Paper No. 1493)
Discussant: Jeffrey A. Frankel, NBER and University of California, Berkeley

Patric H. Hendershott, NBER and Ohio State University, with Stephen Buser and Anthony Sanders, Ohio State University, "Pricing Default-Free Adjustable-Rate Mortgages"
Discussant: Terry Marsh, NBER and MIT

Benjamin M. Friedman and Mark Warshawsky, Federal Reserve Board, "The Costs of Annuities and the Implications for Saving Behavior and Bequests"
Discussant: Laurence J. Kotlikoff, NBER and Boston University

First, Roley examined empirical models of the demand for money. He argued that conventional equations for money demand are plagued by several major problems. First, in conventional specifications estimated with traditional M1 data, the implied equations exhibit unstable coefficient estimates when used to compare pre- and post-1973 samples. Second, the greatly reduced speed of partial adjustment estimated in the latter period, despite the recent emphasis on cash management and other related factors, suggests implausible behavior. Third, even in the pre-1973 sample period, it is not clear that the conventional partial adjustment model should be preferred over specifications simply accounting for serially correlated residuals. Fourth, the neglect of simultaneous equations bias leads to biases in estimated coefficients that are potentially large. Finally, the inclusion of additional variables taking financial innovation and deregulation into account in general does not improve the empirical properties of money demand equations.

Campbell's paper analyzes a simple "representative agent" exchange model of general equilibrium and derives some new propositions about the pricing of stocks and of real and nominal bonds. The model restricts the representative agent's utility function to being time-separable with isoelastic period utility and a constant discount factor. The agent's endowment is conditionally lognormal. These distributional assumptions allow Campbell to examine a general stationary stochastic process for the log of the endowment. He models money and nominal prices by means of a Clower constraint.

Real and nominal discount bonds, and stocks or claims to the random future endowment, are assumed to be in zero net supply. Then risk premiums on these assets can be expressed as simple functions of the coefficient of relative risk aversion, the variance of the innovation to the log endowment, and the weights in the moving average representation of the log endowment.

One-period holding premiums on real bonds may be positive or negative, but the limit is positive as maturity

increases. When the money supply is deterministic, so that the nominal price level varies inversely with the endowment, stocks and nominal bonds are perfect substitutes. Their expected returns to maturity are higher than those on real bonds of equal maturity but need not be higher over other holding periods. Nominal interest rates vary positively with prices (the "Gibson paradox") if the coefficient of relative risk aversion is greater than one. Finally, Campbell considers random multiplicative shocks to the agent's period utility function. These shocks may generate risk premiums even when the agent is risk-neutral.

Ito proposes a vector autoregression (VAR) model to test uncovered interest parity (UIP) in the foreign exchange market. He considers a VAR system of the spot yen/dollar exchange rate, the domestic (U.S.) interest rate, and the foreign (Japanese) interest rate, and describes the interdependence of the domestic and international financial markets. UIP is stated as the hypothesis that the current difference between the two interest rates is equal to the difference between the expected future (log) exchange rate and the current (log) spot exchange rate. The VAR system will yield the expected future spot exchange rate as a k-step-ahead, unconditional prediction. Hence the UIP hypothesis is stated as nonlinear, cross-equational restrictions for the three-equation VAR system. Ito uses the Wald test to test UIP between the unrestricted and restricted systems. A test of UIP, against the background of a maintained hypothesis of covered interest parity, becomes a hypothesis test of efficiency without risk premium. That is, the forward interest rate is the unbiased predictor of the future spot exchange rate, and information is used efficiently to predict it. Ito tests the efficient market hypothesis without risk premium using the Japanese domestic asset (Gensaki) and Eurodollar deposit rates and accepts it for the period between 1975 and 1984.

"ARMs have become an important component of housing finance: during the first eight months of 1984, over 60 percent of conventional mortgage loans closed were ARMs, and this portion has been rising, reaching 68 percent in August 1984."

The paper by Hendershott, Busey, and Sanders analyzes adjustable rate mortgages (ARMs). ARMs have become an important component of housing finance: during the first eight months of 1984, over 60 percent of conventional mortgage loans closed were ARMs, and this portion has been rising, reaching 68 percent in August 1984. The vast majority of these loans have caps on how fast and/or how much the rates can rise overall.

Hendershott and his coauthors use numerical procedures to price these features of ARMs. They assume that the short-term interest rate follows a diffusion process into which they introduce a mean-reverting drift. They then compute the sensitivity of the value of interest rate caps to empirically relevant variations in the term structure of interest rates (because of alternative ranges of both the expected drift in rates and risk aversion), the uncertainty of interest rates around the expected path, the specified mortgage amortization schedule, and the level of short-term rates.

Friedman and Warshawsky try to explain the observed reluctance of most individuals in the United States to buy individual life annuities, and the concomitant approximately flat average age-wealth profile. This behavior seems to contradict the standard life-cycle model of consumption-saving behavior. Friedman and Warshawsky's analysis suggests that an intentional bequest motive and annuity prices that are not actuarially fair explain the unpopularity of life annuities.

Premiums charged for individual life annuities in the United States do include a load factor of 32–48¢ per dollar, or 18–33¢ per dollar after allowing for adverse selection, in comparison to actuarially fair annuity values. Load factors in this size are not out of line with those on other familiar (and almost universally purchased) insurance products.

Simulations of an extended model of life-cycle saving and portfolio behavior, allowing explicitly for uncertain lifetimes and Social Security, show that the load factor charged would have to be far larger than this to account for the observed behavior in the absence of a bequest motive. By contrast, the combination of a load factor in this range and a positive bequest motive can do so for some plausible values of the assumed underlying parameters.

In addition to the authors and discussants, participants at the meeting included NBER associates: Andrew B. Abel, Harvard University; Richard H. Clarida, Yale University; Roger H. Gordon, University of Michigan; R. Glenn Hubbard, Northwestern University; Edward J. Kane, Ohio State University; Robert S. Pindyck, MIT; Paul Wachtel, New York University; and James A. Wilcox, University of California, Berkeley.

Labor Group Meeting Held in Cambridge

Members of NBER's Program in Labor Studies met in Cambridge on November 9 and discussed the following papers:

George Johnson and Gary Solon, University of Michigan and NBER, "Pay Differences between Men's and Women's Jobs: The Empirical Foundations of Comparable Worth Legislation" (NBER Working Paper No. 1472)

Frank P. Stafford, University of Michigan and NBER, "Efficient Provision of Employment Service Outputs: A Production Analysis"

Henry S. Farber, MIT and NBER, joint work with Max H. Bazerman, MIT, "The General Basis of Arbitrator Behavior: An Empirical Analysis of Conventional and Final-Offer Arbitration" (NBER Working Paper No. 1488)

Yoram Weiss, SUNY at Stonybrook and Tel Aviv University, and Y. Tauman, Tel Aviv University, "The Effect of Unions on Technological Change"

Johnson and Solon's paper considers the potential effects of comparable worth legislation. Although civil rights legislation of the 1960s made it illegal for an employer to pay men and women on different bases for the same work—or to discriminate against women in hiring, job assignment, or promotion—the ratio of women's to men's earnings has shown little upward movement in the last two decades. Furthermore, major sex differences in occupational distribution persist, with predominantly female jobs typically paying less than predominantly male jobs. This negative relationship between wage rates and the femaleness of the occupation has stimulated efforts, in both the judicial and the political arenas, to establish comparable worth procedures for setting wage rates.

The Johnson/Solon paper estimates the relationship between wages and the femaleness of an occupation. The two authors find that the relationship is indeed negative, even after they control for relevant worker and job characteristics. The size of the relationship, however, implies that a comprehensive comparable worth policy would have a surprisingly small effect. Their estimates indicate that even if comparable worth succeeded in eliminating this negative relationship, the disparity between average male and female wages would be reduced by less than 10 percent. This is because there is segregation of workers by industry as well as by occupation.

The paper by Stafford (and coauthor Edward S. Cavin) focuses on state employment security agencies (SESAs). SESAs have always pursued several goals including total placements, quality placements, and targeting to serve particular labor market groups—for example, youth or minorities. Under the recently enacted Job Training Partnership Act, states have been encouraged further to deploy resources to meet the specific needs of their local labor markets. Therefore, any evaluation of SESAs' efficiency must account for the fact that states are free to choose quite different output targets.

Stafford develops a production-frontier analysis of the employment service and assesses the relative efficiency of the 51 SESAs for the fiscal years 1977–82. He finds there is, in fact, a trade-off among different outputs. In particular, for an efficient program with a given budget, a 1 percent increase in total placements leads to a more than 1 percent reduction in the placement wage. Efforts to achieve a higher placement rate reduce the relative replacement rate for youth. The states also vary substantially in the relative efficiency of their use of resources. The models account for factors in the local program that are outside of management control, such as unemployment, wages of staff, and the fraction of unemployment in service industries.

Farber and Bazerman note that understanding how arbitrators make decisions is central to understanding how arbitration schemes affect collective bargaining. They develop a general model of arbitrator behavior in conventional and final-offer arbitration based on an underlying notion of an "appropriate award" in a particular case. This appropriate award is a function of the facts of the case independent of the offers of the parties.

In conventional arbitration, the final award seems to be a function of both the offers of the parties and the appropriate award. The weight that the arbitrator puts on the appropriate award (relative to the offers) is seen as a function of the quality of the offers as measured by the difference between them. In final-offer arbitration, the arbitrator chooses the offer that is closest to the appropriate award.

Farber and Bazerman empirically implement their model and conclude that the appropriate award is a construct that may be generalized and that offers considerable potential as a basis for judging the relative quality of outcomes in different arbitration schemes.

The paper by Weiss and Tauman asks whether unionization by workers discourages the adoption of labor-saving techniques. It uses the context of an oligopolistic industry with a small number of firms, some of which are unionized. The authors find that unionization can actually encourage the adoption of labor-saving technology if the technological improvement is mild and demand is sufficiently high (or demand elasticity sufficiently low). If there is an effective threat of entry, which causes the union to moderate its wage demands, then unionization may encourage the adoption of new technology even at low levels of demand (if the technological improvement is sufficiently large). A comparison between the U.S. and the Japanese steel industries illustrates the analysis. Weiss and Tauman argue that the combination of weak aggregate demand and high labor costs caused the technological lethargy of the U.S. steel industry. Under conditions of strong aggregate demand, the high-wage (unionized) firms are likely to win the race for advanced labor-saving technologies.

In addition to the authors, the following members of the NBER labor program attended the meeting: John Abowd, Edward P. Lazear, and Sherwin Rosen, University of Chicago; Katharine G. Abraham, MIT; David E. Bloom, Richard B. Freeman (Program Director), Zvi Griliches, and James L. Medoff, Harvard University; George J. Borjas, University of California, Santa Barbara; Charles C. Brown, University of Maryland; William T. Dickens and Jonathan S. Leonard, University of California, Berkeley; Ronald G. Ehrenberg and George Jakubson, Cornell University; Alan L. Gustman, Dartmouth College; and Andrew Weiss, Columbia University. NBER Executive Director Geoffrey Carliner also participated in the day's discussion.

Reprints Available

The following NBER Reprints, intended for nonprofit education and research purposes, are now available. (Previous issues of the *NBER Reporter* list titles 1-526 and contain abstracts of the Working Papers cited below.)

These reprints are free of charge to corporate associates and other sponsors of the National Bureau. For all others there is a charge of $2.00 per reprint to defray the costs of production, postage, and handling. Advance payment is required on orders totaling less than $10.00. Reprints must be requested by number, in writing, from: Reprint Series, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138.

527. "The Structure of Expectations of the Weekly Money Supply Announcement," by Thomas Urich and Paul Wachtel, 1984 (NBER Working Paper No. 1090)

528. "Why Money Announcements Move Interest Rates: An Answer from the Foreign Exchange Market," by Charles Engel and Jeffrey A. Frankel, 1983 (NBER Working Paper No. 1049)

529. "Real Wages and the Terms of Trade: Alternative Indexation Rules for an Open Economy," by Richard C. Marston, 1984 (NBER Working Paper No. 1046)

530. "Trading and the Tax Shelter Value of Depreciable Real Estate," by Patric H. Hendershott and David C. Ling, 1984 (NBER Working Paper No. 1267)

531. "Econometric Models for Count Data with an Application to the Patents-R and D Relationship," by Jerry A. Hausman, Bronwyn H. Hall, and Zvi Griliches, 1984 (NBER Technical Working Paper No. 17)

532. "Estimating Distributed Lags in Short Panels with an Application to the Specification of Depreciation Patterns and Capital Stock Constructs," by Ariel Pakes and Zvi Griliches, 1984 (NBER Working Paper No. 933)

533. "Monetary Information and Macroeconomic Fluctuations," by John F. Boschen and Herschel I. Grossman, 1983 (NBER Working Paper No. 498)

534. "Some Pleasant Monetarist Arithmetic," by Michael R. Darby, 1984 (NBER Working Paper No. 1295)

535. "The Impact of Affirmative Action on Employment," by Jonathan S. Leonard, 1984 (NBER Working Paper No. 1310)

536. "LDC Foreign Borrowing and Default Risk: An Empirical Investigation, 1976-80," by Sebastian Edwards, 1984 (NBER Working Paper No. 1172)

537. "The Demand for International Reserves and Monetary Equilibrium: Some Evidence from Developing Countries," by Sebastian Edwards, 1984 (NBER Working Paper No. 1307)

538. "International Capital Movements under Uncertainty," by Gene M. Grossman and Assaf Razin, 1984 (NBER Working Paper No. 1075)

539. "International Trade, Foreign Investment, and the Formation of the Entrepreneurial Class," by Gene M. Grossman, 1984 (NBER Working Paper No. 1174)

540. "Expectations, Surprises, and Treasury Bill Rates: 1960-82," by Patric H. Hendershott, 1984 (NBER Working Paper No. 1268)

541. "The Forward Exchange Market, Speculation, and Exchange Market Intervention," by Jonathan Eaton and Stephen J. Turnovsky, 1984 (NBER Working Paper No. 1138)

542. "Interindustry Technology Flows and Productivity Growth: A Reexamination," by Zvi Griliches and Frank Lichtenberg, 1984

543. "Technological and Regulatory Forces in the Developing Fusion of Financial Services Competition," by Edward J. Kane, 1984 (NBER Working Paper No. 1320)

544. "Unemployment Insurance and Reservation Wages," by Martin Feldstein and James M. Poterba, 1984 (NBER Working Paper No. 1011)

545. "The Excess Sensitivity of Layoffs and Quits to Demand," by Robert E. Hall and Edward P. Lazear, 1984 (NBER Working Paper No. 864)

546. "Money, Credit, and Prices in a Real Business Cycle," by Robert G. King and Charles I. Plosser, 1984 (NBER Working Paper No. 853)

547. "The Economy of Israel," by Stanley Fischer, with comments by Jacob A. Frenkel, 1984 (NBER Working Paper No. 1190)

548. "Optimal Wage Renegotiation in a Closed and Open Economy," by Joshua Aizenman, 1984 (NBER Working Paper No. 1279)

549. "Housing Tenure, Uncertainty, and Taxation," by Harvey S. Rosen, Kenneth T. Rosen, and Douglas Holtz-Eakin, 1984 (NBER Working Paper No. 1168)

550. "The Effects of Inflation and Money Supply Announcements on Interest Rates," by Thomas Urich and Paul Wachtel, 1984 (NBER Working Paper No. 1313)

551. "Lessons from the 1979-82 Monetary Policy Experiment," by Benjamin M. Friedman, 1984 (NBER Working Paper No. 1272)

552. "The Behavior of U.S. Short-Term Interest Rates since October 1979," by Richard H. Clarida and Benjamin M. Friedman, 1984 (NBER Working Paper No. 1273)

553. "Pension Funding, Pension Asset Allocation, and Corporate Finance: Evidence from Individual Company Data," by Benjamin M. Friedman, 1984 (NBER Working Paper No. 957)

554. "Why Have Short-Term Interest Rates Been So High?" by Richard H. Clarida and Benjamin M. Friedman, 1983

Technical Papers Series

The following study in the NBER Technical Working Papers series is now available (see previous issues of the *NBER Reporter* for other titles). Like NBER Working Papers, these studies may be obtained by sending $2.00 per paper to: Technical Working Papers, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. Prepayment is required for all orders under $10.00.

42. "New Econometric Techniques for Macroeconomic Policy Evaluation," by John B. Taylor, November 1984 (JEL Nos. 300 and 210)

Bruno/Sachs Volume Published

The Economics of Worldwide Stagflation, an NBER monograph by Michael Bruno and Jeffrey D. Sachs, is now available from Harvard University Press at a cost of $25.00. The book includes both a theoretical and an empirical analysis of stagflation, the combination of high unemployment, slow growth, and high inflation that has plagued the advanced industrial nations over the last fifteen years. Bruno and Sachs explain that the stagflation problem is a result of the supply shocks of the 1970s, including but not limited to OPEC increases in oil prices, and of contractions in demand that were induced by policies designed to combat inflation. Their analysis differs from others by taking account of differences in the labor markets of various countries; this helps to explain why adjustment in the United States was different from Europe's in the same period.

Bruno and Sachs are both NBER research associates. Bruno is professor of economics at Hebrew University, Jerusalem. Sachs is professor of economics at Harvard University.

This monograph may be ordered from Harvard University Press, 79 Garden Street, Cambridge, MA 02138, (617) 495-2600.

Current Working Papers

Correction

Several inadvertent errors were made in the abstract of Working Paper No. 1454, which appeared on page 48 of the Fall 1984 *NBER Reporter*. The abstract, with the corrections made, is reprinted below.

Patents and R and D: Is There a Lag?

Bronwyn H. Hall, Zvi Griliches, and **Jerry A. Hausman**
Working Paper No. 1454
September 1984

This paper extends earlier work on the relationship between R and D and patents (Pakes-Griliches, 1980, and Hausman, Hall, and Griliches, 1984) to a larger, but shorter (in time) panel of firms. The paper focuses on solving a number of econometric problems associated with the discreteness of the dependent variable and the shortness of the panel in the time dimension. We compare weighted, nonlinear least squares as well as Poisson-type models as solutions to the first problem. In attempting to estimate a lag structure on R and D in the absence of a sufficient history of the variable, we take two approaches: first, we use the conditional version of the negative binomial model; and second, we estimate the R and D variable itself as a low-order stochastic process and use this information to control for unobserved R and D. R and D itself turns out to be fairly well approximated by a random walk. Neither approach yields strong evidence of a long lag. The available sample, although numerically large, turns out not to be particularly informative on this question. It does reconfirm, however, a significant effect of R and D on patenting (with most of it occurring in the first year) and the presence of rather wide and semipermanent differences among firms in their patenting policies.

Working Papers Series

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Journal of Economic Literature (JEL) subject codes, when available, are listed after the date of the Working Paper. Abstracts of all Working Papers issued since September 1984 are presented below. For previous Working Papers, see past issues of the *NBER Reporter*. The Working Papers are intended to make results of NBER research available to other economists in preliminary form to encourage discussion and suggestions for revision before final publication. Working Papers are not reviewed by the Board of Directors of NBER.

Wealth and Portfolio Composition: Theory and Evidence

Mervyn A. King and **Jonathan I. Leape**
Working Paper No. 1468
September 1984

In this paper we examine a new survey of 6010 U.S. households and estimate a model for the allocation of total net worth among different assets. The paper has three main aims. The first is to investigate the extent to which a conventional model of portfolio choice can explain the differences in portfolio composition among households. Our survey data show that most households hold only a subset of the available assets. Hence we analyze a model in which investors choose to hold incomplete portfolios. We show that the empirical specification of the joint discrete and continuous choice that characterizes portfolio behavior of households is a switching-regressions model with endogenous switching.

The second aim is to examine the impact of taxes on portfolio composition. The survey contains a great deal of information on taxable incomes and deductions. This enables us to calculate rather precisely the marginal tax rate facing each household.

The third aim is to estimate wealth elasticities of demand for a range of assets and liabilities. We test the frequently made assumption of constant, relative risk aversion.

Expected Future Tax Policy and Tax-Exempt Bond Yields

James M. Poterba
Working Paper No. 1469
September 1984
JEL Nos. 313, 324, 521

This paper tests several competing models of equilibrium in the municipal bond market. It analyzes the influence of changes in both personal and corporate taxes on the yield spread between interest rates on taxable and tax-exempt securities. The findings suggest that changes in personal income tax rates have pronounced effects on long-term interest rates on municipals but small effects on short-maturity yields. Corporate tax reforms, however, affect both long- and short-term yields. These results are inconsistent with the view that the relative yields on taxable and tax-exempt bonds are set by banks and insurance companies that are taxed at the corporate rate. They support the more traditional view that banks are the primary holders of short-term municipal securities, while households are the principal investors in the long-term municipal market. This view suggests that proposals to reform municipal financing policies by increasing the use of short-term borrowing, or issuing long-term, floating-rate debt, could reduce the real cost of municipal borrowing.

Developing Country Debt and the Market Value of Large Commercial Banks

Steven C. Kyle and **Jeffrey D. Sachs**
Working Paper No. 1470
September 1984
JEL Nos. 312, 440, 441

What effect exposure to large amounts of developing countries' debt has on commercial banks has been a topic of increasing concern in recent years. Fear of default on the part of debtor countries has led to fears for the solvency of the creditor banks since, in many cases, the total of outstanding exposure to risky debtors exceeds the entire capital base of the banks involved. This paper presents a first effort toward measuring the effects of exposure to LDC debt on the market value of large commercial banks in the United States. Our results indicate that exposure to developing countries' debt has exerted a measurable and negative effect on the ratio of market to book value for these banks.

Comparable Worth in the Public Sector

Ronald G. Ehrenberg and **Robert S. Smith**
Working Paper No. 1471
September 1984
JEL No. 820

Proponents of comparable worth assert that, within a firm, jobs can be valued in terms of the skill, effort, and responsibility they require and the working conditions they offer; jobs that are of comparable worth to the firm should receive equal compensation, After the first section of this paper documents the major push for comparable worth that has occurred in the state and local sector, the second section discusses the case for and against comparable worth from the perspective of analytical economists.

The remainder of the paper is empirical in nature and focuses on issues that arise when one attempts to implement comparable worth. Section III addresses attempts by various states to infer whether comparable worth "wage gaps" are revealed in job evaluation studies they have conducted. It also tests how sensitive the states' results are to the statistical methods used to infer discrimination. Section IV estimates whether comparable worth wage gaps between males and females may in part be compensating differentials for differences in opportunity for occupational mobility. Finally, Section V presents estimates of systems of demand curves for state and local government employees. It tests whether, within occupational groups, male/female substitution occurs as male/female wage rates change and whether substitution occurs across occupations as occupational wages change. These estimates are then used to simulate what the likely effect of a comparable worth wage policy would be on employment of females in the state and local sector.

Pay Differences between Women's and Men's Jobs: The Empirical Foundations of Comparable Worth Legislation

George Johnson and **Gary Solon**
Working Paper No. 1472
September 1984
JEL No. 820

Civil rights legislation of the 1960s made it illegal for an employer to pay men and women on different bases for the same work or to discriminate against women in hiring, job assignment, or promotion. Two decades later, however, the ratio of women's to men's earnings has shown little upward movement. Furthermore, major sex differences in occupational distribution persist with predominantly female jobs typically paying less than predominantly male jobs. This negative relationship between wage rates and "femaleness" of occupation has stimulated efforts, in both the judicial and political arenas, to establish "comparable worth" procedures for setting wage rates.

This paper estimates the relationship between wages and femaleness of occupation and finds that it is indeed negative even after controlling for relevant worker and job characteristics. The magnitude of the relationship, however, implies a surprisingly small effect for a comprehensive comparable worth policy. The estimates indicate that, even if comparable worth succeeded in eliminating this negative relationship, the disparity between mean male and female wages would be reduced by well under 10 percent of its current magnitude.

Rules versus Discretion

Robert J. Barro
Working Paper No. 1473
September 1984
JEL No. 310

Under a discretionary regime, the monetary authority makes no commitments about future money and prices. Then, if surprise inflation conveys economic benefits, and if people form expectations rationally, it turns out that the equilibrium involves high and variable monetary growth and inflation. Moreover, since the high rate of inflation is anticipated, there are no benefits from inflation surprises. The implementation of an enforced rule can lower the mean rate of inflation while delivering the same average amount of inflation surprises, namely zero. Using these results as a background, the paper discusses alternative monetary rules, including quantity-versus-price rules and a prescription for stabilizing nominal GNP. This discussion touches on the distinction between positive and normative economics, which leads to a pessimistic appraisal of the role for economists' policy advice.

Part-Time Employment of Married Women and Fertility in Urban Japan

Tadashi Yamada and **Tetsuji Yamada**
Working Paper No. 1474
September 1984
JEL No. 913

Previous studies of female labor force participation in Japan often show that the estimates of female wage

rates are "negative" in their single-equation models of labor supply. Based on the common belief that the substitution effect dominates the income effect for female labor supply, it is therefore necessary to disentangle the problem of the inconsistency in order to predict the behavior of female labor supply and to guide policy actions.

In this paper, we have estimated a logit model of married women's part-time employment and a fertility equation in the context of a simultaneous-equation model. By specifically differentiating married women employed part time from married women employed full time, we find that the structural coefficients of the part-time labor supply are significantly different from those of the full-time labor supply in terms of elasticity. However, contrary to the result of married women's full-time employment, we find little interdependency between married women's decisions to work as part-time employees and their fertility in urban Japan.

Testing Deviations from Purchasing Power Parity (PPP)

Joshua Aizenman
Working Paper No. 1475
October 1984
JEL No. 430

This paper analyzes how the presence of transportation costs in a model of deviations from PPP affects the procedure for testing the PPP hypothesis. It shows that in the presence of transportation costs, traditional regression analysis will tend to reject the PPP hypothesis even if goods markets are well arbitraged. This is because the values of the regression coefficients are affected systematically by considerations that are independent of the degree to which markets are arbitraged. Thus, the content of the PPP approach cannot be tested satisfactorily without considering the systematic effects of transportation costs and other costs of goods arbitrage.

Brothers and Sisters in the Family and the Labor Market

John Bound, Zvi Griliches, and **Bronwyn H. Hall**
Working Paper No. 1476
October 1984
JEL Nos. 824, 851, 917

This paper investigates the relationship between earnings, schooling, and ability for young men and women who entered the labor force during the late 1960s and 1970s. The emphasis is on controlling for both observed and unobserved family characteristics, extending a framework developed earlier by Chamberlain and Griliches (1975) to the analysis of mixed-sex pairs of siblings. Using the National Longitudinal Surveys of Young Men and Young Women, which drew much of the sample from the same households, we were able to construct a sample containing roughly 1500 pairs of siblings. For several reasons, particularly the need to have data on two siblings from the same family, only one-third of these pairs had complete data. Thus, we developed new methods of estimating factor models, which combine the data for several "unbalanced" covariance matrixes. We use the data on different kinds of sibling pairs (male-male, female-female, and male-female) with these new methods to investigate the question of whether family background, ability, or IQ mean the same thing for males and females, in the sense that they lead to similar consequences for success in schooling and in the marketplace. With a simple, two-factor model to explain wages, schooling, and IQ scores, we are able to test whether these factors are the same for siblings of different sexes and whether the loadings on the two factors are similar. We conclude that the unobservable factors appear to be the same and to play the same role in explaining the IQ and schooling of these siblings. However, there remains evidence of differences once the siblings enter the labor market.

Pension Inequality

Edward P. Lazear and **Sherwin Rosen**
Working Paper No. 1477
October 1984
JEL Nos. 800, 824

Pensions may contribute to inequality between males and females or blacks and whites to the extent that white males are more likely than other groups to receive pensions. For those who do receive pensions, the value of the benefits will vary because white males have the highest level of expected tenure at retirement. Using the Current Population Survey and the 1980 Bankers Trust Corporate Pension Plan Study, we find that the existence of pension plans contributes to inequality between blacks and whites but leaves inequality between white males and females unchanged. Even though females are less likely to receive pensions than males, those females who do receive pensions enjoy generous ones. Among blacks, pensions exacerbate sex differences because black women are only about 75 percent as likely to receive pensions as are black males.

Change and Progress in Contemporary Mortgage Markets

Edward J. Kane
Working Paper No. 1478
October 1984
JEL No. 313

Changes in political attitudes toward subsidizing mortgage loans, and in the technology of transacting such loans and pooling and refinancing individual mortgage contracts, portend major shifts in the U.S. mortgage markets. This paper focuses on the benefits in economic efficiency embodied in narrower interest rate spreads. It also looks at the distributional effects on different participants in the market created by three types of changes: (1) changing strategies used to control implicit federal guarantees; (2) continuing evolution in the character of mortgage-backed securities; and (3) expanding electronic networks for mortgage application. These effects can be classified further according to whether they are transitional or permanent in nature and whether they are technologically driven or filtered through the political process.

My analysis emphasizes that technological change is reducing the ability to control aggregate subsidies that have long been associated with implicit and explicit federal guarantees for the liabilities of important participants in the mortgage market. I discuss several proposals for bringing the market value of these guarantees back under administrative control.

A Dynamic, Specific-Factors Model of International Trade

Jonathan Eaton
Working Paper No. 1479
October 1984
JEL No. 411

In a dynamic economy, land and capital serve not only as factors of production but also as assets used by individuals to transfer income from working years to retirement. However, static models of international trade based on the specific-factors model incorporate only the first of these used. Once the second function is recognized, one can derive the supply of capital and the value of land from underlying intertemporal optimization behavior.

Changes in the terms of trade and in the endowments of fixed factors do not necessarily affect factor prices and the composition of output as they do in the static, specific-factors model. Changes in these variables affect both total savings and the amount of savings that is diverted toward investment in land. Predictions of the traditional static model are more likely to be true when the sector using land as a factor of production has a higher labor share than the sector using capital. In this case, the land-using sector dominates factor markets more than asset markets.

Money Growth Variability and Money Supply Interdependence under Interest Rate Control: Some Evidence from Canada

Michael D. Bordo, Ehsan U. Choudhri, and **Anna J. Schwartz**
Working Paper No. 1480
October 1984
JEL Nos. 311, 432

Canada, like many other countries, has recently experienced difficulties in achieving stability of money growth and independence of the money supply. Based on the buffer-stock view of money-holding and the credit-market approach to the money supply, this paper suggests that the problems have arisen from the Bank of Canada's use of an interest rate control mechanism. The paper argues that: (1) The short-run behavior of Canadian money growth is influenced by demand shifts in the Canadian credit market. (2) Movements in U.S. interest rates relative to controlled Canadian interest rates are a key source of these shifts. The paper then presents evidence on Canadian money supply and demand functions that is consistent with the foregoing explanation.

The New View of the Property Tax: A Reformulation

Peter M. Mieszkowski and **George R. Zodrow**
Working Paper No. 1481
October 1984

We reformulate the "new view" of the property tax in the context of a model with: (1) competition between jurisdictions; (2) local public services that are endogenous; (3) individuals who are segregated into homogeneous communities according to their tastes for local public services; (4) a simple form of zoning on land use; and (5) a political or constitutional constraint on the use of head taxes by local governments. We then derive expressions for the "profits tax" and "excise tax" effects of the property tax. Finally, we examine the effects of a "consumption distortion" away from government services caused by local reluctance to tax mobile capital.

Money, Credit, and Interest Rates in the Business Cycle

Benjamin M. Friedman
Working Paper No. 1482
October 1984
JEL No. 311

Fluctuations of business activity in the United States clearly have their monetary and financial sides. But these two aspects of U.S. economic fluctuations exhibit few quantitative regularities that have persisted unchanged over the time in which the nation's financial markets have themselves undergone significant change.

The evidence on monetary and financial aspects of U.S. business cycles assembled in this paper shows major differences among the pre-World War I, interwar, and post-World War II periods, and between the first and second halves of the postwar period. Evidence suggesting changes from one period to another repeatedly emerges, regardless of whether the method of analysis is simple or sophisticated, regardless of whether the underlying data are annual or quarterly, and regardless of whether the relationships under study are bivariate or multivariate. Moreover, the differences between one period and another are significant not just statistically but also economically, in the sense of major differences in the magnitude and timing of cyclical movements.

The paper's main message, therefore, is a warning against accepting too readily—either as a matter of positive economics or for policy purposes—the appearance of simple and eternal verities in much of the existing literature of monetary and financial aspects of business fluctuations. More complicated models involving many variables and/or nonlinear relationships may have remained stable, but the evidence clearly shows that simple linear relationships among only a few such variables have not.

The Inflationary Process in Israel: Shocks and Accommodation

Stanley Fischer and **Michael Bruno**
Working Paper No. 1483
October 1984

The rate of inflation in Israel increased from 8 percent in 1965 to 300–400 percent in the first half of 1984. The inflationary process until 1977 was not qualitatively different from that in the OECD countries, but after the financial liberalization of 1977 the economy appeared to move into a new era in which the inflation rate seemed capable only of rising. Our explanation of the inflationary process is that, because of institutional adaptations, and as a result of accommodating monetary and fiscal policies, the stabilizing forces in the economy are so weak that the inflation rate is in a metastable equilibrium. We ascribe the apparent asymmetry of the inflation to the expansionary underlying thrust of monetary and fiscal policy.

We develop an analytical framework that assigns roles to indexation, to the financial structure, and to the exchange rate system in determining the dynamics of the economy. We place very little blame for the inflation on wage indexation, which has been incomplete. However, we regard the extensive indexation of the returns on financial assets, and the steady shift out of nominal assets, as major contributing factors, for the economy is now left with virtually no nominal anchor. The paper concludes with a brief discussion of alternative stabilization plans, arguing that a successful stabilization program will have to be comprehensive and rapid.

A Stochastic Model of Investment, Marginal *Q*, and the Market Value of the Firm

Andrew B. Abel
Working Paper No. 1484
October 1984
JEL No. 022

This paper presents closed-form solutions for the investment and valuation of a competitive firm with a Cobb-Douglas production function and a constant elasticity adjustment cost function in the presence of stochastic prices for outputs and inputs. The value of the firm is a linear function of the capital stock. The optimal rate of investment is an increasing function of the slope of the value function with respect to the capital stock (marginal q).

A mean preserving spread of the distribution of future price increases investment. An increase in the scale of the random component of a price can increase, decrease, or not affect the rate of investment depending on the sign of the covariance of this price with a weighted average of all prices.

The Incidence of the Local Property Tax: A Reevaluation

Peter M. Mieszkowski
Working Paper No. 1485
October 1984

This paper identifies the key assumptions that underlie competing theories of the incidence of the local

property tax. It concludes that the "benefit view," which maintains that the property tax system is equal to a set of nondistortionary user charges, is correct only under very restrictive assumptions. Only when communities adopt a set of exact, binding zoning requirements will a distortionary tax be transformed into a lump-sum tax.

We argue that within jurisdictions, heterogeneity of houses and type of firms is very unlikely. The burden of a property tax that is distortionary at the margin falls on the owners of capital.

Rational and Self-Fulfilling Balance-of-Payments Crises

Maurice Obstfeld
Working Paper No. 1486
November 1984
JEL No. 431

The recent literature on the balance of payments shows that speculative attacks on a pegged exchange rate must occur sometimes if the path of the rate is not to offer abnormal profit opportunities. Such attacks are fully rational, as they reflect the market's response to a regime breakdown that is inevitable. This paper shows that, given certain expectations about policy, balance-of-payments crises can also be purely self-fulfilling events. In such cases even a permanently viable regime may break down, and the economy will possess multiple equilibriums corresponding to different subjective assessments of the probability of collapse. The behavior of domestic interest rates and foreign reserves will naturally reflect the possibility of a speculative attack.

Work on foreign exchange crises derives from the natural resource literature initiated by Salant and Henderson (1978), in which the definition of "abnormal" profit opportunities is straightforward. Because the definition is not always straightforward in a monetary context, this paper also shows how crises occur in a discrete-time, stochastic monetary model when an eventual breakdown is inevitable.

The Value of Intermediate Targets in Implementing Monetary Policy

Benjamin M. Friedman
Working Paper No. 1487
November 1984
JEL No. 311

This paper reports empirical results that indicate that there is no compelling evidence in favor of singling out any one variable as "the intermediate target" of monetary policy. If the variables considered here—including money (M1), credit, a long-term interest rate, and whichever of either reserves or a short-term interest rate the Federal Reserve System does not set directly by open-market operations—most do contain at least some statistically significant information about the future growth of nominal income, real income, or prices. In most cases, however, this information is significant statistically but not economically. In other words, the reduction in forecasting error gained from using this information is typically too small to be of great moment in a policy context.

The paper's principal conclusion, therefore, is to cast doubt on the practice of designating specific financial variables as intermediate targets of monetary policy. To the extent that such targets are necessary for independent reasons, however, the strength of this conclusion varies from one potential intermediate target to another. Among the variables considered here, credit growth and the long-term interest rate appear to offer the best prospects of providing information that would be useful in formulating and implementing monetary policy.

Although the empirical results reported here rely on an econometric model that is extremely compact and simple, the method of analysis suggested in this paper is more general. Its key contribution is to use a structural model to address questions for which the previous literature has relied on nonstructural methods. The application of this method of analysis to one small, simple model here need be no more than an illustration. Applying it to a larger and more complex model would be a straightforward extension of this research.

The General Basis of Arbitrator Behavior: An Empirical Analysis of Conventional and Final-Offer Arbitration

Henry S. Farber and **Max H. Bazerman**
Working Paper No. 1488
November 1984

We develop a model of arbitrator behavior in conventional and final-offer arbitration that is based on an underlying notion of an appropriate award in a particular case. This appropriate award is defined as a function of the facts of the case independent of the offers of the parties. In conventional arbitration, the award is argued to be a function of both the offers of the parties and the appropriate award. The weight that the arbitrator puts on the appropriate award relative to the offers is hypothesized to be a function of the quality of the

offers as measured by the difference between the offers. In final-offer arbitration it is argued that the arbitrator chooses the offer that is closest to the appropriate award.

We implement the model empirically using data gathered from practicing arbitrators about their decisions in 25 hypothetical cases. The estimates of the general model strongly support the characterizations of arbitrator behavior in the two schemes. No substantial differences were found in the determination of the appropriate award implicit in the conventional arbitration decisions and the determination of the appropriate award implicit in the final-offer decisions.

Using the Longitudinal Structure of Earnings to Estimate the Effect of Training Programs

Orley Ashenfelter and **David Card**
Working Paper No. 1489
November 1984
JEL No. 811

In this paper we set out some methods that utilize the longitudinal structure of earnings of trainees and a comparison group to estimate the effectiveness of training for the 1976 cohort of CETA trainees. By fitting a components-of-variance model of earnings to the control group, and posing a simple model of program participation, we are able to predict the entire earnings histories of the trainees. The fit of these predictions to the pretraining earnings of the CETA participants provides a test of the model of earnings generation and program participation and a simple check on the corresponding estimate of the effectiveness of training.

Two factors appear to have a critical influence on the size of the estimated training effects: the time of the decision to participate in training and the presence or absence of individual-specific trends in earnings. We find considerable evidence that trainee earnings contain permanent, transitory, and trendlike components of selection bias. We are less successful in distinguishing empirically between alternative assumptions on the timing of the participation decision. If earnings in the year prior to training are the appropriate selection criterion, however, our estimate of the training effect for adult male CETA participants is about $300 per year. Our estimates for female CETA participants are larger and less sensitive to alternative models of program participation.

Credibility and Monetary Policy

Bennett T. McCallum
Working Paper No. 1490
November 1984
JEL Nos. 131, 311

The purpose of this paper is to describe and evaluate the most important existing ideas concerning credibility of monetary policy, with special emphasis given to matters pertaining to the U.S. economy and the practices and procedures of the Fed. The main discussion begins with Fellner's hypothesis that the costs of a disinflationary episode will be smaller when the public believes that the disinflation will in fact be carried out. This hypothesis has been challenged recently by several writers; I attempt an evaluation of their evidence and present some new results. Next, the discussion turns to positive analyses of the process of making monetary policy. I examine models developed by Barro and Gordon and others, attempting to understand why certain features of monetary policy tend to prevail. The paper uses the main implications of this analysis to consider various strategies for obtaining a type of policy behavior that might produce better macroeconomic results—less inflation with no more unemployment—than the United States has experienced in the recent past. Among the proposals touched upon by my paper are the adoption of a commodity-money standard, a balanced-budget amendment, a legislated monetary rule, a nominal GNP target, and the absorption of the Fed into the Treasury.

Improvements in Macroeconomic Stability: The Role of Wages and Prices

John B. Taylor
Working Paper No. 1491
November 1984
JEL No. 210

This paper compares macroeconomic performance in the United States from 1891 through 1914 with the period after World War II by estimating reduced-form autoregressions for prices, wages, and output, by looking at representations of their moving averages, and by giving them simple structural interpretations. The results show that the impulses to the economic system are smaller in the later period, but the propagation mechanisms are much slower and more drawn out. The smaller shocks are therefore translated into larger and more prolonged fluctuations in output and inflation than would occur if the earlier dynamics were applicable in the later period. A tentative explanation for the changes in the dynamics is a slower speed of wage and price adjustment combined with a different accommodative stance for the monetary system.

Looking for the News in the Noise—Additional Stochastic Implications of Optimal Consumption Choice

Laurence J. Kotlikoff and **Ariel Pakes**
Working Paper No. 1492
November 1984
JEL No. 023

In neoclassical models of consumption choice, when earnings are uncertain, changes in programs of consumption from one period to the next depend on new information received about future earnings over the period. This suggests that a test of the neoclassical model would be to ascertain whether new information on earnings explains consumption choice through time. It also suggests that actual consumption choices involve information that is extractable about the extent and time resolution of earnings uncertainty.

This paper derives a fairly general theoretical relationship between properly defined innovations in consumption (noise) and revisions in expectations of lifetime earnings (news). It also clarifies the relationship between testing for the theoretical determinants of consumption and standard Euler tests that focus on theoretical nondeterminants of consumption. The chief prediction of the paper's theoretical results, that noise exactly equals news, is tested using aggregate time-series data on consumption and earnings. We find that new earnings information explains only a very small fraction of the variance of aggregate consumption innovations. On the other hand, the extent of suboptimal consumption choice appears to be of little economic significance.

Use of (Time-Domain) Vector Autoregressions to Test Uncovered Interest Parity

Takatoshi Ito
Working Paper No. 1493
November 1984
JEL Nos. 210, 430

In this paper, I propose a vector autoregression (VAR) model to test uncovered interest parity (UIP) in the foreign exchange market. Consider a VAR system of the spot exchange rate (yen/dollar), the domestic (U.S.) interest rate, and the foreign (Japanese) interest rate, that describes the interdependence of the domestic and international financial markets. UIP is stated as a null hypothesis: the current difference between the two interest rates is equal to the difference between the expected future exchange rate and the current spot exchange rate. The VAR system will yield the expected future spot exchange rate as a k-step-ahead, unconditional prediction. Hence, the null hypothesis is stated as nonlinear, cross-equational restrictions for the three-equation VAR system. Then UIP is tested by the Wald test between the unrestricted and restricted systems. A test of UIP, with a maintained hypothesis of covered interest parity, becomes a hypothesis test of efficiency without risk premium. That is, the forward exchange rate is the unbiased predictor of the future spot exchange rate, and information is used efficiently in its prediction. I then compare my results to the efficiency test with a single equation using the Hansen-Hodrick procedure for the same data set.

Imports as a Cause of Injury: The Case of the U.S. Steel Industry

Gene M. Grossman
Working Paper No. 1494
November 1984
JEL Nos. 422, 631

Recently, the U.S. International Trade Commission conducted a Section 201 or "escape clause" hearing to determine whether imports have been the most significant cause of injury to the U.S. steel industry. This paper suggests a methodology for conducting the necessary analysis for such determinations and applies it to the case of the steel industry.

First, I derive a reduced-form equation for employment in the steel industry and estimate it. The equation specifies employment in the industry as a function of the price of imported steel, the price of energy, the price of iron ore, a time trend, real income, and (in one variant) the wage rate in the steel industry. I use the estimated coefficients to perform counterfactual simulations, which allow me to attribute changes in industry employment to their proximate causes. The analysis reveals that for the period from 1976 to 1983, a secular shift away from employment in the steel industry has been the most important cause of injury. For the shorter period from 1979 to 1983, the secular shift and import competition are roughly equal in importance, with the latter being entirely the result of the substantial appreciation of the U.S. dollar during this period.

The Costs of Worker Displacement

Daniel S. Hamermesh
Working Paper No. 1495
November 1984

This study defines the nature of worker displacement. It also develops a mechanism for inferring the amount of losses caused by displacement in a way that is tied to economic theory.

First I use data from the Panel Study of Income Dynamics (PSID) to identify the characteristics of displaced workers. After demonstrating that the usual methods of evaluating workers' losses cannot provide correct measures of the cost to society, I develop a game-theoretic model to determine the amount of firm-specific investment in workers. As workers' and firms' horizons decrease, such investment will be reduced; this is exhibited in a flattening of the wage-tenure profile as the date of displacement approaches. Examination of the profile thus provides a test of whether firms and workers have good information about impending displacement.

Using the PSID data for workers displaced between 1977 and 1981, this paper shows that there is no significant flattening of the wage-tenure profile in the entire sample. (However, some flattening does occur among unionized workers and also among workers who are laid off permanently from a plant that remains open.) This suggests that workers are surprised by displacement, for they continue to invest in firm-specific human capital up to the time of displacement. The present value of the worker's share of the lost returns on this investment is around $7000 (1980 dollars) under intermediate assumptions about the real rate of discount, depreciation on such investment, and the effect of tenure on the rate of voluntary separation.

Real Balances, the Exchange Rate, and Indexation: Real Variables in Disinflation

Stanley Fischer
Working Paper No. 1497
November 1984

The recent appreciation of the dollar is widely believed to have reduced the output costs of the disinflation. But there remains the question of whether those early gains have to be repaid when the exchange rate depreciates.

The first question I take up is how the appreciation of the real exchange rate affects the sacrifice ratio, or output cost, of disinflation. There is no unambiguous presumption that exchange rate appreciation reduces the sacrifice ratio. The direct favorable effects of cheaper imports on consumer prices, on the prices of imported inputs, and on wage demands, may be outweighed by the unemployment resulting from the reduced demand for exports.

In the second part of the paper I examine the effects of wage indexation on the sacrifice ratio. Economists have argued that wage indexation speeds up disinflation; policymakers take the opposite view. The distinction between ex ante and ex post indexing, defined in the paper, explains these different views. Ex ante wage indexation speeds up disinflation. With ex post indexation, the real wage automatically rises when the inflation rate falls. Even so, ex post indexing may speed up disinflation. But there has to be subsequent downward adjustment of the wage if long-term unemployment is to be prevented.

Planned and Unplanned Bequests

Daniel S. Hamermesh and **Paul L. Menchik**
Working Paper No. 1496
November 1984
JEL Nos. 918, 840

We distinguish between bequests that are planned as part of some lifetime optimization that stems from a bequest motive and those that are unplanned and result when one's date of death differs from his or her forecast. Lifetime optimization should lead to a negative effect, or no effect, of the expected horizon on the size of the bequest, and to a negative relation between unexpectedly long life and the bequest.

Using data on wealthy decedents and their parents, we measure the expected horizon based on parents' longevity. There is no relation between unexpectedly early or late death and the bequest, but there is significant positive relation between the bequest and the length of the horizon. We offer several explanations for this unforeseen result, including the inference that uncertainty about length of life is important in studying bequest behavior.

Exchange Rates and Economic Recovery in the 1930s

Barry J. Eichengreen and **Jeffrey D. Sachs**
Working Paper No. 1498
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JEL Nos. 044, 432

Currency depreciation in the 1930s is almost universally dismissed or condemned. It is credited with providing little if any stimulus for economic recovery in the depreciating countries and blamed for transmitting harmful beggar-thy-neighbor impulses to the rest of the world economy. In this paper we argue for a radically different interpretation of exchange rate policy in the 1930s. First we document that currency depreciation was beneficial for the initiating countries. It worked through both the standard supply- and demand-side channels suggested by modern variants of the Keynesian model. Next we show that there can in fact be no presumption that currency depreciation in the 1930s

was beggar-thy-neighbor policy. Rather, an empirical analysis of the historical record is needed to determine whether the impact on other countries was favorable or unfavorable. On the basis of this analysis we conclude provisionally that the foreign repercussions of individual devaluations were in fact negative—that the depreciations considered were beggar-thy-neighbor. As we point out, however, this finding does not support the conclusion that competitive devaluations taken by a group of countries were without benefit for the system as a whole. To the contrary, we argue that similar policies, had they been even more widely adopted, would have hastened recovery from the Great Depression.

Rent-Seeking and Trade Policy: An Industry Approach

Robert E. Baldwin
Working Paper No. 1499
November 1984

This paper presents a model of rent-seeking that is consistent with the observation that an industry's labor and management almost always adopt the same position about the desirability of import protection versus trade liberalization. It also discusses: the size of the returns to rent-seeking relative to the costs of lobbying; the factors influencing the type of government assistance sought by an industry; and the ways in which benefits and costs of protection can be made more widely known to both the industries concerned and the general public.

Macroeconomic Analyses and Microeconomic Analyses of Labor Supply

Orley Ashenfelter
Working Paper No. 1500
November 1984
JEL Nos. 821, 211

This paper reports on the current status of microeconomic research on labor supply behavior. It directs attention to research that may help in the continuing evaluation of aggregate models designed to explain the dynamic behavior of wages, employment, and unemployment. The approach is empirical; the emphasis throughout is on models specified completely enough to allow confrontation with the kind of data actually available.

The first part of the paper is addressed to microeconomists. It attempts to provide a sketch of the stylized facts that aggregate models of the labor market are meant to address. These include: (1) the serial persistence in the change in unemployment (or employment); (2) the absence of persistence in the change in the real wage rate; and (3) the continued existence of a negative correlation between nominal price changes and unemployment rates.

The microeconomic (longitudinal) data turn out to be difficult to square up with the simplest life-cycle models of labor supply. Contrary to the predictions of the models, the data indicate that: (1) average hours and average real wages move in the same direction only some of the time; and (2) the within-life-cycle, person-specific correlation between hours and wages is negative. The microeconomic (experimental) data indicate other puzzles. More elaborate models incorporating measurement error, nonseparable preferences, and unanticipated wage movements may explain these findings, but they are also likely to contain parameters that are not easily identified with the kind of data actually available.

Perhaps an alternative approach would be more fruitful in reconciling the long-run determination of hours worked by worker preferences with the short-run interaction of observed employment and earnings.

His and Hers: Gender Differences in Work and Income, 1959–79

Victor R. Fuchs
Working Paper No. 1501
November 1984
JEL No. 824

This paper describes changes in hours of work and income between 1959 and 1979 for women and men ages 25–64. It includes attempts to measure and place value on nonmarket production and leisure as well as market work, to take account of possible income-sharing within households, and to allow for economies of scale in household production. The most important empirical result is that, relative to men, women's access to goods and services and leisure was lower in 1979 than in 1959. Changes in hourly earnings, hours of work, and household structure contributed to this result. I explore the sex differential in hourly earnings in detail.

The Analysis of Union Behavior

Henry S. Farber
Working Paper No. 1502
November 1984

There is now a substantial body of economic research that models the behavior of labor unions as maximization of a well-defined objective function. This paper presents a selective critical survey of this literature and a preliminary consideration of some important problems that have not been addressed to date. It places particular emphasis on work that is operational in the sense that it has an empirical component or is amenable to empirical implementation. Topics surveyed include: (1) the general economic modus operandi of labor unions in the U.S. economy; (2) the structure of bargaining and the efficiency of labor contracts; (3) the bargaining process as it relates to the identification of union objectives; and (4) empirical studies of union objectives.

While there is much to learn from the existing literature, I argue that a more general political/economic model of union behavior is needed. This model would derive the objective function of the union in a consistent fashion from the preferences of the workers and union leaders through a well-defined political process. I address three important issues that are central to the development of such a model: (1) the determination of the size of the union and the rules used for the allocation of scarce union jobs; (2) the aggregation of preferences when workers are heterogeneous; and (3) the union leadership as an entity capable of pursuing its own goals.

Recent Work on Business Cycles in Historical Perspective: Review of Theories and Evidence

Victor Zarnowitz
Working Paper No. 1503
November 1984
JEL No. 130

This survey outlines the evolution of thought leading to the recent developments in the study of business cycles. The subject is almost coextensive with short-term macrodynamics and has a large interface with economics of growth, money, inflation, and expectations. Therefore, the coverage is both very extensive and selective.

The paper first summarizes the "stylized facts" that ought to be explained by the theory. This part discusses the varying dimensions of business cycles; their timing, amplitude, and diffusion features; some international aspects; and recent changes.

The next part is a review of the literature on "self-sustaining" cycles. It notes some of the older theories and proceeds to more recent models driven by changes in investment, credit, and price-cost-profit relations. These models are mainly endogenous and deterministic.

Exogenous factors and stochastic elements gain importance in the part on the modern theories of cyclical response to monetary and real disturbances. The early monetarist interpretations of the cycle are followed by the newer equilibrium models with price misperceptions and intertemporal substitution of labor. Monetary shocks continue to be used, but the emphasis shifts from nominal demand changes and lagged price adjustments to informational lags and supply reactions. Various problems arise, revealed by intensive testing and criticisms. This prompts new attempts to explain the persistence of cyclical movements and the roles of uncertainty and financial instability, real shocks, and gradual price adjustments.

One conclusion is that business cycle research will profit most from: (1) the updating of findings from the historical and statistical studies; and (2) using the results to eliminate inconsistencies with the evidence and to move toward a realistic synthesis of the surviving elements of the extant theories.

The Resolution of the Labor Scarcity Paradox

John A. James and **Jonathan S. Skinner**
Working Paper No. 1504
November 1984
JEL Nos. 040, 123

This paper reconciles the apparently contradictory evidence about American and British technology in the first half of the 19th century. Past studies have focused on the writings of a number of distinguished British engineers who toured the United States during the 1850s and commented extensively on the highly mechanized state of the manufacturing sector. Other studies, however, have marshaled evidence that the interest rate was higher, and the aggregate manufacturing capital stock was lower, in the United States than in Britain. We resolve this paradox by noting that British engineers were most impressed by only a few industries that relied on skilled workers. Using the 1849 Census of Manufactures, we estimate separate production functions for the skilled sector and for the remaining, less skilled manufacturing sector. We find strong relative complementarity between capital and natural resources in the skilled sector, and relative substitutability between skilled labor and capital. Using these parameters in a computable general equilibrium model of the U.S. and British economies indicates greater capital intensity (or labor scarcity) in the skilled manufacturing sector, but overall capital scarcity and higher interest rates, in the United States relative to Britain.

Seigniorage, Inflation, and Reputation

Herschel I. Grossman and **John B. Van Huyck**
Working Paper No. 1505
November 1984
JEL No. 311

This paper derives a reputational equilibrium for inflation in a model in which the government obtains valuable seigniorage by issuing fiat money in exchange for real resources. One result is that, with contemporaneous perception of actual government behavior and immediate adjustment of real cash balances to new information, the Friedman elasticity solution for maximal seigniorage is the reputational equilibrium. More generally, the analysis shows that the objective of maximal seigniorage produces an equilibrium inflation rate equal either to a generalization of the Friedman elasticity solution or to the rate at which the government discounts future seigniorage adjusted for the growth rate, whichever is larger. Thus the model formalizes the conjecture that episodes of inflation rate in excess of the Friedman solution are attributable to high discount rates for future seigniorage. Adding aversion to high expected inflation to the model, this analysis also rationalizes the observation that inflation rates are usually less than Friedman's elasticity solution.

International Coordination in the Design of Macroeconomic Policy Rules

John B. Taylor
Working Paper No. 1506
November 1984
JEL No. 430

This paper examines international issues that arise in the design and evaluation of rules for macroeconomic policy. It begins with a theoretical investigation of the effects of fiscal and monetary policy in a two-country, rational expectations model with staggered wage and price setting and with perfect capital mobility. The results indicate that with the appropriate choice of policies and with flexible exchange rates, demand shocks need not give rise to international externalities or coordination issues. Price shocks, however, do create an externality, and this is the focus of the empirical part of the paper. Using a simple seven-county model—consisting of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States—I calculate optimal cooperative and noncooperative (Nash) policy rules to minimize the variance of output and inflation in each country. I compute the cooperative policies using standard, dynamic, stochastic programming techniques, and I compute the noncooperative policies using an algorithm developed by Finn Kydland. The central result is that the cooperative policy rules for these countries are more accommodative to inflation than are the noncooperative policy rules.

The Order of Liberalization of the Current and Capital Accounts of the Balance of Payments

Sebastian Edwards
Working Paper No. 1507
November 1984
JEL Nos. 410, 420, 430

An economy's opening to the rest of the world has generally been considered an integral part of economic reform aimed at increasing the role of markets. Until recently, however, very little discussion was devoted to the order in which the capital and current account should be liberalized in developing countries.

This paper deals with several aspects of the order of liberalization. It critically reviews the different arguments usually given to advocate a particular ordering. Then it uses a three-good, two-factor model to analyze the effects of alternative ordering on production and income distribution. It also uses a two-period model of a small economy to investigate the welfare effects of opening the capital account in the presence of distortions. While the discussion does not yield a theorem regarding the appropriate order of liberalization, there are strong presumptions that it is more prudent to liberalize the current account first.

A Defense of Traditional Hypotheses about the Term Structure of Interest Rates

John Y. Campbell
Working Paper No. 1508
November 1984
JEL Nos. 213, 313, 521

Expectations theories of asset returns may be interpreted as stating either that risk premiums are zero or that they are constant through time. Under the former interpretation, different versions of the expectations theory of the term structure are inconsistent with one another. I show that this does not necessarily carry over to the constant risk premium interpretation of the theory. Furthermore, I argue that differences among expectations theories are of "second order" in a precise mathematical sense. I present an approximate linearized framework for analysis of the term structure in which these differences disappear, and I test its accuracy in practice using data from the CRSP government bond tapes.

Bond and Stock Returns in a Simple Exchange Model

John Y. Campbell
Working Paper No. 1509
November 1984
JEL Nos. 023, 313, 521

In this paper, I analyze a simple "representative agent" exchange model of general equilibrium and derive closed-form solutions for returns on stocks and real and nominal bonds.

The model restricts the representative agent's utility function to be time-separable with isoelastic period utility and the endowment to be conditionally lognormal. These assumptions allow me to examine a general stationary stochastic process for the log of the endowment. I model money and nominal prices by means of a Clower constraint.

Risk premiums on stocks and real and nominal discount bonds are simple functions of the coefficient of relative risk aversion, the variance of the innovation to the log endowment, and the weights in the moving average representation of the log endowment. One-period holding premiums on real bonds may be positive or negative but, as maturity increases, the limit is positive. When the money supply is deterministic, stocks and nominal bonds are perfect substitutes. Their expected returns to maturity are higher than those on real bonds of equal maturity but need not be higher over other holding periods. Nominal interest rates vary positively with prices (the "Gibson paradox") if the coefficient of relative risk aversion is greater than one.

In the last section of the paper, I consider random shocks to the agent's utility function. These shocks may generate risk premiums even when the agent is risk-neutral.

The Incentive Effects of Private Pension Plans

Laurence J. Kotlikoff and **David A. Wise**
Working Paper No. 1510
December 1984
JEL No. 820

The proportion of U.S. workers covered by pensions has increased very substantially over the past two or three decades and, in particular, the number of older workers with pensions continues to increase. During this same period, and especially in the past decade, the labor force participation of older workers has declined dramatically. These two trends may well be related.

This paper examines the incentive effects of private pensions. We find that the provisions of pension plans create very substantial incentives for terminating work at one's current job after the age of early retirement and even greater incentives to leave after the age of normal retirement. It is not unusual for the reduction in accrual of pension benefits after these retirement ages to be roughly equal to a 30 percent reduction in wage earnings. In addition to having a potentially large impact on labor force participation of older workers, pension plan provisions are likely to have important effects on labor mobility of younger workers.

Life-Cycle Annuity Valuation

B. Douglas Bernheim
Working Paper No. 1511
December 1984
JEL No. 915

In this paper, I argue that actuarial valuation of streams of annuity benefits is theoretically inconsistent with the assumption of pure life-cycle motives. Instead, I show that the simple discounted value of future benefits (ignoring the possibility of death) is often a good approximation to the relevant concept of value. This observation motivates a reexamination of existing empirical evidence concerning the effects of Social Security on personal savings, retirement, and the distribution of wealth, as well as the proper computation of age-wealth profiles. The conceptual points raised here are also relevant for evaluating the relative merits of wage and consumption taxes. In each case, I argue that the use of simple, rather than actuarial, discounting of survival-contingent income streams dramatically alters the conclusions of previous studies.

Foreign-Owned Land

Jonathan Eaton
Working Paper No. 1512
December 1984

Land and capital serve not only as factors of production but also as assets that represent stores of value for households. Standard trade models typically recognize only the first role. But in its role as an asset, land reduces the amount of national savings available for capital investment.

Foreign investment affects the national economy through both asset and factor markets. When the share of labor in the land-using sector is large relative to the labor share in the capital-using sector, factor-market effects are likely to dominate. In this case a drop in the price of the agricultural good, or a rise in the land-labor ratio, attracts foreign investment; a drop in the world interest rate raises the welfare of a capital-importing country. If the share of labor in the land-using sector is smaller, however, asset-market effects dominate. These results are then likely to be reversed. Even when trade in claims on land equalizes the domestic and world interest rates, a tax on land raises steady-state welfare.

R and D Activities and the Technology Game: A Dynamic Model of U.S.-Japan Competition

Ryuzo Sato
Working Paper No. 1513
December 1984

This paper presents an international comparison of R and D activities in basic and applied research. The commonly held view that Japan is not spending much on development of basic technology cannot be substantiated empirically from the study of the historical trends. However, the fact that in the United States the largest proportion of R and D expenditures is spent on the defense- and aerospace-related industries (60 percent), while Japan is spending the largest proportion (60 percent) on the chemical, electronics, communication, and automobile industries, may indicate that in effect Japan emphasizes the development of applied technology.

The second part of the paper shows how two countries, one with heavy R and D activities in basic technology (the United States) and the other with heavy R and D activities in applied technology (Japan), can compete in the world market with their productivity differences in basic and applied fields. I present a simple model of a differential game to explain how Japan can increase the market share by utilizing both the informational and the productivity efficiencies.

Pricing and Location of Physician Services in Mental Health

Richard G. Frank
Working Paper No. 1514
December 1984
JEL No. 913

The literature reports puzzling results of a positive association between the number of physicians per capita and the level of fees for physician services. These results may be caused by misspecification of econometric models and use of data that is aggregated across medical specialties. I hypothesize that the unusual results would not persist with a carefully specified econometric model for a single medical specialty. By applying a general model of pricing and location of physicians' services to the market for psychiatrists' services, my results imply that this market operates in a manner consistent with the predictions of the competitive model.

The Impact of Assimilation on the Earnings of Immigrants: A Reexamination of the Evidence

George J. Borjas
Working Paper No. 1515
December 1984
JEL No. 800

This paper reexamines the empirical basis for two "facts" that seem to be found in most cross-section studies of immigrant earnings: (1) the earnings of immigrants grow rapidly as they assimilate into the United States; and (2) this rapid growth leads to many immigrants overtaking the earnings of the native-born within 10–15 years after immigration. Using the 1970 and 1980 U.S. Censuses, this paper studies the earnings growth experienced by specific immigrant cohorts during 1970–80. I find that within-cohort growth is significantly smaller than the growth predicted by cross-section regressions for most immigrant groups. This differential is consistent with the hypothesis that there has been a secular decline in the "quality" of immigrants admitted to the United States.

The Distribution of Prizes in a Match-Play Tournament with Single Eliminations

Sherwin Rosen
Working Paper No. 1516
December 1984

This paper begins to study the reward-incentive structure in sequential knockout or elimination tournaments with matched, pairwise comparisons among players at each stage. The prize structure required to elicit constant expected quality of play in all matches throughout the tournament is characterized for competition among equally talented (or perfectly handicapped) players. The incentive-maintaining prize structure is shown to concentrate extra weight on the top-ranking prize, a phenomenon observed in most tournaments. Moreover, prizes that maintain performance incentives at all stages award a constant increment for each match won, up to the last stage, and an amount greater than this for the player who wins the final match. Players' incentives to perform in early rounds are propelled by the probability of achieving higher ranks and surviving to later stages where rewards are larger. These continuation options are played out in the final match, so it is only the difference between winning prizes and losing in the finals that controls incentives there.

Many athletic tournaments are structured in the manner analyzed here, but the general framework ultimately may apply to certain career games as well. More

generally, a tournament structure may be viewed as a statistical, experimental design problem. The prize structure interacts with the design in providing incentives for the best players to survive to the finals and win the top prizes.

Trade and Financial Interdependence under Flexible Exchange Rates: The Pacific Area

Jorge Braga de Macedo
Working Paper No. 1517
December 1984
JEL No. 432

This paper analyzes policy interdependence under flexible exchange rates and considers its implications for middle-income countries in the Pacific area. In the first part of the paper, with a simple diagram, I illustrate the consequences of strategic behavior among industrial countries. I argue that, in the absence of incentives to coordinate macroeconomic policies among major countries, exchange rates will tend to be volatile. I then present and interpret evidence on the world value of the dollar in the flexible rate period.

The second part of the paper describes exchange rate policies in the Pacific area. I find that the widespread policy of pegging to the U.S. dollar has implied occasional large devaluations against the numeraire (Korea, Taiwan, Thailand, Philippines, and Indonesia). An alternative, which requires higher Pacific trade and financial interdependence than the one prevailing during the last decade, would be a joint float along the lines of the policies seemingly pursued by Malaysia and Singapore.

The two-country macroeconomic model presented in the appendix can be used to assess the costs and benefits of policy coordination both at the world and at the regional level.

Anticipated Budget Deficits and the Term Structure of Interest Rates

Daniel Valente Dantas and **Rudiger Dornbusch**
Working Paper No. 1518
December 1984

This paper investigates the implications of government deficits in an overlapping-generations, consumption loan model with long-term assets. The only asset in the economy is a real consol issued by the government and serviced by lump-sum taxes on the young. We explore the time path of short and long-term interest rates following the announcement of a future, transitory budget deficit under two alternative assumptions. In one case the deficit arises from transitory government spending; in the other case it arises from a transfer.

We show that a deficit policy ultimately raises long-term interest rates and lowers consol prices. The exact shape of the path of short-term rates depends on the source of the deficit and on the saving response to interest rates. In general, though, the term structure will be v-shaped.

What is interesting in the model is the fact that the prices of long-term assets link the current generations to future disturbances. Because future disturbances affect future interest rates, they also affect the current value of debt outstanding and hence equilibrium short-term rates. The exact manner in which the disturbances are transmitted to prior periods depends on the extent to which consumers substitute easily across time or, on the contrary, have a strong preference for consumption smoothing.

The Economic Effects of the Corporate Income Tax: Changing Revenues and Changing Views

Alan J. Auerbach
Working Paper No. 1519
December 1984
JEL No. 323

This paper reviews recent empirical research on the impact of the U.S. corporate income tax on the behavior of firms. I discuss four areas: (1) the extent to which dividend taxation imposes a "double tax" on corporate source earnings; (2) the historical impact of tax incentives to invest and the value of corporate equity; (3) the effects of limited loss offset provisions on the incentives to invest in risky assets; and (4) the determinants of corporate leverage.

Implications of Government Deficits for Interest Rates, Equity Returns, and Corporate Financing

Benjamin M. Friedman
Working Paper No. 1520
December 1984
JEL No. 313

How the financing of government budget deficits affects the structure of expected asset returns depends on assets' relative substitutabilities in investors' aggregate portfolios. These substitutabilities in turn depend on how investors perceive the risks associated with the respective assets' returns. The empirical results reported in this paper, based on three different ways of representing investors' perceptions of risk, consistently indicate that government deficit financing raises expected debt returns relative to expected equity returns,

regardless of the maturity of the government's financing. More specifically, financing government deficits by issuing short-term debt lowers the return on long-term debt and lowers the return on equity by even more, relative to the return on short-term debt. Financing deficits by issuing long-term debt raises the return on long-term debt but lowers the return on equity, again in comparison to the return on short-term debt.

The indicated magnitudes of these effects differ according to the method used to represent investors' perceptions of risk, but the qualitative results are consistent throughout. Moreover, many of the indicated magnitudes are large enough to matter economically. These results imply that continuing large government deficits at full employment lead to market incentives for individual business corporations to emphasize reliance on equity (including retentions) and reduce reliance on debt, in comparison with the composition of corporate financing that would prevail in the absence of the need to finance the government budget deficit.

Debt and Equity Returns Revisited

Patric H. Hendershott
Working Paper No. 1521
December 1984
JEL No. 313

This paper examines semiannual, ex post returns on corporate equities and bonds and on six-month Treasury bills over the 1953–84 period. There is special emphasis on whether returns so far in the 1980s have been usual relative to the previous quarter-century. The performance of the equity and bond markets in the 1980s has not been at all unusual, with equity returns being driven by the business cycle and bond returns by unexpected changes in new-issue Treasury bond rates. Real six-month Treasury rates have averaged 5½ percentage points, far above the 2 percentage point average since 1953 but about the same as in the 1926–30 period. On an aftertax (roughly 40 percent) basis, however, real bill rates have been in line with the 1950s and 1960s, but significantly above the abnormally low rates in the 1970s.

Valuing Financial Flexibility

Scott P. Mason
Working Paper No. 1522
December 1984

Two facts that corporations, underwriters, and investors have been forced to confront are increased volatility in the capital market and increased complexity in the design of securities. However, these two facts are not unrelated. Virtually all of the complexity in securities can be viewed as the inclusion of different options in a straight debt contract. Given the fact that the value of options is driven most significantly by volatility, the advantage of including options in securities, that is, financial flexibility, has increased with increased volatility in the market. This would appear to explain why corporate issuers and institutional investors have shown substantial interest in securities that improve their flexibility in volatile markets. Therefore, techniques that can consistently reflect the role of volatility in the value of options or flexibility should be of interest to issuers, underwriters, and investors.

This paper summarizes the results of some research by Jones, Mason, and Rosenfeld (MR), (1984). It also presents some new results that test the ability of a CCA model, based on Black and Scholes's option pricing principles, to predict the market price of callable corporate debt and therefore the price of such common debt covenants as call provisions and call protection. In addition, I report some numerical CCA results that demonstrate the impact of changing interest rate volatility on the value of call provisions and call protection.

Have U.S. Corporations Grown Financially Weak?

Robert A. Taggart, Jr.
Working Paper No. 1523
December 1984
JEL No. 521

There is a widespread feeling that the financial strength of U.S. corporations has eroded over the past 20 years. This trend is often blamed on some combination of the tax system, inflation, and overly optimistic assessments of business risk.

This paper examines recent corporate financing developments from a long-run perspective. I conclude that these developments appear less dangerous when viewed within the context of the 20th century as a whole than when viewed in the context of the post-World War II years. My second major conclusion is that powerful corrective mechanisms are at work to keep corporate financial positions from becoming too risky. These forces have been particularly noticeable over the past ten years. Third, the effects of business financing of the tax system, inflation, and business risk are difficult to trace in the aggregate data, and these effects may be less straightforward than has commonly been thought. Finally, I argue that the degree of economic instability and the relative level of federal government borrowing will be key determinants of future corporate financing patterns.

Tax Reform and Housing

Patric H. Hendershott and **David C. Ling**
Working Paper No. 1524
December 1984
JEL Nos. 323, 932

Current tax law provides tax advantages to owner-occupied housing that increase with a household's income. This well-understood fact has led to periodic proposals to substitute a tax credit, equal to, say, 25 percent of housing-related expenses, for their current deductibility. Because all of the tax reforms considered in this paper (Hall-Rabushka, Kemp-Kasten, and Bradley-Gephardt) move toward a flat rate schedule, they all will sharply reduce the tax advantages of owner-occupied housing to higher-income households relative to lower-income households. In fact, our analysis suggests that all reforms will lower the price of obtaining housing services from owner-occupied housing for these households and will raise it for higher-income households. The "breakeven" income at which the price of these housing services would be unchanged is about $55,000 for Kemp-Kasten and Hall-Rabushka, and probably $10,000 less for Bradley-Gephardt.

The price of renting housing should rise under all reforms, probably by 5 to 10 percent. In combination with the decline in the price of obtaining housing services for middle- and lower-income households, this should give a significant boost to homeownership. Under Kemp-Kasten, ownership rates will rise for four-member households with AGI (as renters) of under $60,000; for higher-income households could decline marginally. The breakeven income level is roughly $40,000 for Bradley-Gephardt and $35,000 for Hall-Rabushka.

Pricing Rate Caps on Default-Free, Adjustable-Rate Mortgages

Stephen A. Buser, Patric H. Hendershott, and **Anthony B. Sanders**
Working Paper No. 1525
December 1984
JEL No. 313

This paper develops and uses a model to value a life-of-loan interest rate cap on an adjustable-rate mortgage (ARM) that reprices monthly. The value of the cap depends on both the slope of the term structure and the variance of the one-month rate. However, the cap's value is not sensitive to the source of the slope of the term structure—that is, the precise combination of interest rate expectations and risk aversion that determine the slope. This is fortunate, because it is very difficult to know at any given time why the term structure is what it is.

Given the variation in the slope of the term structure and the variance of the one-month rate that occurred between 1979 and 1984, we find that lenders should have charged from 5 to 40 basis points in addition to the coupon rate on a one-month ARM for a 5 percent life-of-loan cap.

Capital Flows, the Current Account, and the Real Exchange Rate: Consequences of Liberalization and Stabilization

Maurice Obstfeld
Working Paper No. 1526
December 1984
JEL No. 431

This paper develops a framework in which to study macroeconomic liberalization and stabilization measures of the type recently seen in Latin America. The model is sufficiently general to cover both polar cases of a closed capital account and free private capital mobility, in order to consider the effects of liberalizing external asset trade. Capital account liberalization leads to an initial period of real appreciation, but real depreciation in the long run; the economy passes through alternating phases of boom and slump in the process. Devaluation appears nonneutral, even in the long run, and is possibly contractionary in the short run. In contrast, a change in the *rate* of exchange depreciation is neutral, even with sticky prices, when capital is fully mobile. When capital is immobile, a disinflationary reduction in the rate of exchange rate crawl has effects that are the opposite of those arising from capital account opening. The model suggests that capital account liberalization, rather than disinflation, played a part in causing the massive real exchange rate appreciation that accompanied recent Latin American programs of economic reform.

The International Transmission of Fiscal Expenditures and Budget Deficits in the World Economy

Jacob A. Frenkel and **Assaf Razin**
Working Paper No. 1527
December 1984
JEL Nos. 431, 320

This paper analyzes the effects of fiscal policies on rates of interest and wealth in the world economy. Un-

certainty concerning the length of life yields an equilibrium in which private and social rates of discount differ and budget deficits exert real effects. We show that a current budget deficit (resulting from a tax cut) raises world rates of interest. On the other hand, the direction of the effect of an expected future deficit on the short-term rate of interest depends on whether the country is having a surplus or a deficit in its current account of the balance of payments. If it runs a deficit in the current account, then the short-term rate of interest rises. If it runs a surplus, the short-term interest rate drops. The future rate of interest, however, must rise. We also show that budget deficits raise domestic wealth and lower foreign wealth and thus result in a negative transmission. In the long run, a higher steady-state value of government debt raises the steady-state world rate of interest, but its effect on the long-run value of foreign wealth is ambiguous.

The effects of changes in government spending depend on both the timing and the patterns of spending. A transitory (balanced-budget) rise in current government spending raises the current rate of interest and lowers domestic and foreign wealth. A transitory future rise in government spending lowers the current rate of interest, lowers domestic wealth, and raises foreign wealth. A permanent rise in government spending lowers the rate of interest if the current account of the balance of payments is in deficit and increases the rate of interest if the current account runs a surplus. Finally, the model is generalized to a multicommodity world, and the impact of policies are shown to depend on comparison among various spending and saving propensities of private sectors and of governments.

Causal Relationships between Infant Mortality and Fertility in Developed and Less Developed Countries

Tadashi Yamada
Working Paper No. 1528
December 1984
JEL No. 913

This paper studies the dynamic relationships between two demographic variables—the infant mortality rate and the fertility rate—using time-series methodology. Infant mortality and fertility are not independent but rather are jointly determined. Also, a decline in infant mortality resulting from an increase in per capita real income triggers a subsequent decline in fertility. This dynamic nexus between changes in infant mortality and fertility lies at the heart of the so-called "demographic transition."

Discrete Devaluation as a Signal to Price Setters

Louka T. Katseli
Working Paper No. 1529
December 1984
JEL No. 430

The central hypothesis of this paper is that both the extent and the speed of adjustment of the real exchange rate are affected by the way the central bank manages the nominal exchange rate. Specifically, a large discrete adjustment of the nominal exchange rate is more likely to result in fast adjustment of prices than a policy of smooth and continuous crawling peg. In the context of a monopolistic price adjustment framework, a discrete and unexpected devaluation of the exchange rate shortens implicit price contracts and increases the rate of price adjustment in the nontraded goods sector. This occurs because firms tend to strengthen their expectations about an overall increase in costs and about an aggregate, not a local, shift in the demand curve for the firm's output. A discrete change in the exchange rate acts as an "information signal" that leads to fast overall adjustment of nontraded goods prices. I test the hypothesis, using macro and micro data on Greek prices before and after the January 1983 discrete devaluation, and cannot reject it at the macro, sectoral, and firm levels.

Asset Returns, Discount Rate Changes, and Market Efficiency

Michael Smirlock and **Jess B. Yawitz**
Working Paper No. 1530
December 1984

This paper reconciles the previous findings of discount rate endogeneity with the presence of discount rate announcement effects in securities markets. The crux of this reconciliation is the distinction between "technical" discount rate changes that are endogenous and "nontechnical" changes that contain some informative policy implications. In essence, we attempt to separate expected discount rate changes from unexpected changes, or equivalently, the expected component of discount rate changes from the unexpected component. If markets are efficient, the former should have no announcement effects while the latter may be associated with an announcement effect. Accordingly, the focus of the empirical analysis is on the interaction between discount rate exogeneity, the specific monetary policy regime, and announcement effects. In addition, we consider whether the behavior of these markets in the post-announcement period is consistent with the rapid price adjustment implied by market efficiency.

Interest Rate Determination in Developing Countries: A Conceptual Framework

Sebastian Edwards and **Mohsin S. Khan**
Working Paper No. 1531
January 1985
JEL No. 400

As a number of developing countries move toward more liberalized financial systems, the question of how interest rates respond to foreign influences and domestic policies is one that policymakers in these countries have started to face. Most existing studies of interest rates typically treat only the extreme cases of either a fully open economy, where some form of interest rate arbitrage holds, or a completely closed economy, in which interest rates are determined solely by domestic monetary factors. Developing countries, however, generally fall somewhere between these two extremes, so that the standard models of interest rate determination would not seem to be relevant to their case.

This paper outlines a theoretical framework that can serve as a starting point for analyzing interest rate determination in those developing countries that are in the process of removing controls on the financial sector and restrictions on capital flows. The approach combines elements of the closed-economy and open-economy models and thus is able to incorporate the influences of foreign interest rates, expected changes in exchange rates, and monetary developments on domestic interest rates. An interesting feature of the resulting model is that the approximate degree of financial openness, defined as the extent to which domestic interest rates are linked to foreign interest rates, can in fact be ascertained from the data of the particular country.

To illustrate the empirical validity of the proposed model, we applied it to two countries—Colombia and Singapore. These two countries are quite different in terms of levels of financial development and degrees of openness and thus provide a useful first test of the general nature of the model. The model is able to represent both these cases quite adequately. The estimates indicate that in Colombia both foreign and domestic factors are important, while domestic interest rates in Singapore are fully determined by foreign interest rates and variations in the exchange rate. This is precisely what would have been expected, given the characteristics of the respective financial systems in the two countries.

On the Interest Rate Elasticity of the Demand for International Reserves: Some Evidence from Developing Countries

Sebastian Edwards
Working Paper No. 1532
January 1985
JEL No. 400

Contrary to what is suggested by the theory, most empirical studies of the demand for international reserves have failed to find a significant (negative) coefficient for the opportunity cost of holding reserves. This paper argues that the reason for this is that the opportunity cost of holding international reserves has been measured incorrectly. In my empirical analysis, the spread between the interest rate at which countries can borrow from abroad and LIBOR is used as a proxy for the net opportunity cost for holding reserves. Using data for a group of developing countries for 1976–80, the results show that when this net opportunity cost is used, the regression coefficient is significantly negative.

Tax Aversion, Deficits, and the Tax Rate-Tax Revenue Relationship

Roger N. Waud
Working Paper No. 1533
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JEL Nos. 025, 300

This paper offers one possible explanation for the existence of continual government budget deficits such as those experienced in a number of industrialized countries in recent years. I assume that higher tax rates cause more intensive tax-aversion behavior (tax avoidance and tax evasion) and that the time horizon relevant for political decisionmakers is shorter than that required for complete private sector response to tax rate changes. Because of tax aversion, an inverse relationship between tax rates and tax revenues may exist at low levels of the tax rate. Consequently, determined attempts to eliminate or reduce deficits can become self-defeating, almost certainly so when there is a structural deficit. My analysis suggests that if an economy is on the downward sloping portion of a stylized Laffer curve, political expedience coupled with uncertainty about the shape of the curve and a common wisdom that tax rate increases reduce deficits, can all conspire to keep the budget trapped in deficit. Finally, contrary to conventional wisdom, in the presence of inflation, deficit growth may be less if there is indexation of income tax rates to inflation.

Macroeconomic Policies in the OECD and LDC External Adjustment

Jeffrey D. Sachs and **Warwick McKibbin**
Working Paper No. 1534
January 1985
JEL Nos. 130, 430

In this paper, we describe a simulation model for analyzing the effects of macroeconomic policies in the OECD on global macroeconomic equilibrium. We pay particular attention to the effects on developing countries of alternative mixes of monetary and fiscal policies in the OECD. Although the model is quite small, it has several properties that make it attractive for policy analysis. First, the important stock-flow relationships and intertemporal budget constraints are carefully observed, so that the model is useful for short-run and long-run analysis. Budget deficits, for example, cumulate into a stock of public debt that must be serviced, while current account deficits cumulate into a stock of foreign debt. Second, the asset markets are forward looking, so that the exchange rate is conditioned by the entire future path of policies rather than by a set of short-run expectations. Third, the model is amenable to policy optimization exercises and in particular can be used to study the effects of policy coordination versus noncoordination in the OECD, on global macroeconomic equilibrium.

Tariffs versus Quotas with Endogenous Quality

Kala Krishna
Working Paper No. 1535
January 1985
JEL No. 422

This paper analyzes the effects of trade restrictions (such as tariffs, quotas, and quality controls) and their desirability when the quantity of the imported good is endogenous and the foreign producer is a monopolist. It uses a fairly general model based on the work of Spence and Sheshinski.

A crucial determinant of the direction of these effects is the valuation of increments in quality by marginal consumers, relative to all consumers on average. I develop a way to compare infinitesimal equivalent policies and use it to compare import-equivalent policies. For reasonable characterizations of demand, tariffs dominate quotas on the basis of their revenue effects alone, while quotas dominate tariffs based on their quality effects alone. Also, quality controls dominate both tariffs and quotas on the basis of revenue effects alone (for reasonable characterizations of demand). I also analyze some special cases, including the case in which demand is modeled along the lines of Swan and only services of the good produced matter to consumers.

On the Economic Interpretation and Measurement of Optimal Capacity Utilization with Anticipatory Expectations

Catherine J. Morrison
Working Paper No. 1536
January 1985
JEL Nos. 640, 620

This study builds on recent research that gives the notion of capacity utilization a clearer economic foundation. Optimal output (Y^*) is defined as the minimum point on the firm's short-run average total cost curve. Capacity utilization (CU) is then computed as Y/Y^*, where Y is actual output. I extend these concepts to include adjustment costs resulting from changes in the stock of capital, and nonstatic expectations of future output demand and input prices. The more general notion of CU depends on the shadow values of the firm's quasi-fixed inputs and is decomposed to isolate the effects of anticipatory expectations. I then empirically compare traditional indexes to alternative economic CU measures, using annual U.S. manufacturing data, 1954-80. The calculated indexes exhibit plausible patterns that can be interpreted as the effects of nonstatic expectations and adjustment costs.

Protection and the Product Line: Monopoly and Product Quality

Kala Krishna
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This paper makes three points. First, the choice of a product line by a monopolist is structurally similar to other problems of adverse selection and can be analyzed in an elementary way by adapting techniques recently developed for such problems. The first section develops such an analysis.

Second, when a foreign monopolist produces a product line, protection will change the composition of the entire product line. The second section studies the nature of such effects; this analysis is greatly simplified by the results of the first section. In line with empirical work on the subject, quotas are shown to raise the average quality of imports, while the effects of tariffs are ambiguous.

Third, the possibility of profit shifting protection increases welfare. The third section analyzes the welfare consequences of protection that are shown to depend crucially on the distribution of consumers.

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