

# NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.

SPRING 1982

## Program Report

### Development of the American Economy

Robert W. Fogel

The long-term approach to economic issues figured prominently in NBER research programs conducted between 1930 and the late 1960s, but work on long-term factors was conducted mainly at the macro level and was based on the Bureau's pioneering work in the development of national income accounts and related measures of macroeconomic behavior. The present NBER Program in Development of the American Economy (DAE) is concerned mainly with long-term changes in the U.S. economy that have occurred at the microeconomic level. Many of the major issues that have arisen in recent years have not yielded easily to standard macro analysis. To understand the sources of the long-term decline in saving and investment rates, the factors influencing the rate of technological change, or the long-term shifts in the demographic structure of the population and the labor force, we need to know much more about microeconomic behavior than we now know. Research at the microeconomic level, however, has been inhibited by the absence of suitable data. Attention has therefore turned to the problem of constructing new data sets capable of illuminating the relationship between the current and the past behavior of families and firms.

#### New Data Sets on Microeconomic Behavior

Since 1977, we have been engaged in a series of pilot projects investigating the feasibility of creating several representative data sets consisting of intergenerationally linked families. Such data sets would open up entirely new possibilities for examining the interaction of economic and cultural factors and their mutual influence on such variables as the saving rate, the rate of female entry into the labor force, fertility and mortality rates, the inequality of the wealth distribution, migration rates, and rates of economic and social mobility. These data sets

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This issue of the *Reporter* highlights the Bureau's Program in Development of the American Economy. Next, Harvey S. Rosen discusses his work on taxes, labor supply, and human capital. Then, Robert E. Lipsey describes his studies of multinational firms. After the quarterly Economic Outlook Survey are a section of biographical sketches and news of NBER conferences, the Conference Calendar, and other NBER news and reports. The *Reporter* concludes with short summaries of recent NBER Working Papers.

cannot be created from a single set of records but require the linking of several different types of records, including family histories, probate records, tax records, manuscript schedules of the census, and medical records. The pilot studies have been aimed at determining whether the creation of the projected data sets is economically feasible and whether it is likely that such data sets will yield the desired information. The results to date have been quite encouraging on both counts.

In 1980, we also began to investigate the feasibility of constructing data sets based on firm records that would permit the analysis of the way that firms respond to the changing technological opportunities that are open to them, as well as to the changing institutional and legal environment in which they must operate. To deal with such issues, it is necessary to develop representative sets of firm records stretching over long periods of time

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that not only contain information on the decisionmaking processes of these firms, but also on the economic consequences of the decisions. Preliminary surveys show these records, deposited at various libraries, to be highly promising; in addition, a number of firms have indicated their willingness to open their firm archives.

### The Principal Projects

There are currently eight projects in the development of the American economy program, and six more are scheduled to get under way shortly. These fourteen projects are divided into three subprogram areas. The five that deal with the labor force are in one way or another concerned with the socioeconomic causes of changes in demographic behavior and their effects on the supply and productivity of labor. The three projects on capital formation are directed toward explaining the long-term decline, which extends back to the 1890s, in the percentage of income devoted to capital formation. There are also two projects on the changing nature of technological advances and four on changes in government and industrial organization.

The considerable labor involved in locating, retrieving, processing, and assessing the new data sets on which most of the projects are based has made the gestation period of these projects much longer than is usual. The most advanced of them, Claudia Goldin's study of changes in women's participation in the labor market and of the transformation of the American household, is now nearing completion. (Goldin's findings were summarized in the Winter 1981/82 issue of the *NBER Reporter*.) The remainder of this report describes three of the other projects in the DAE program that are now beginning to yield important results.

### Secular Trends in Nutrition, Labor Welfare, and Labor Productivity

This collaborative project was initiated in 1978 and is now in mid course.<sup>1</sup> Its objectives are: (1) to establish and compare secular trends in the level of nutrition in the United States, and in the main nations from which the U.S. population was drawn, over the period from the early eighteenth century to the present; (2) to measure secular changes in the differences in nutritional levels among various socioeconomic classes; (3) to assess the validity of various real-wage indexes now employed as measures of the improvement in the economic welfare of laboring classes; (4) to assess the impact of improved nutrition on labor productivity; and (5) to assess the impact of nutrition on demographic rates.

The project relies on measures of height as the principal index of the average level of nutrition in a population.

<sup>1</sup>For a more extended summary of the findings of this project, see the forthcoming *NBER Working Paper* by R. W. Fogel et al., "Changes in American and British Stature since the Mid-Eighteenth Century: A Preliminary Report on the Usefulness of Data on Height for the Analysis of Secular Trends in Nutrition, Labor Productivity, and Labor Welfare," which was prepared for presentation at the "Conference on Hunger and History," scheduled to take place in Bellagio, Italy, during June 1982.

Both laboratory experiments on animals and observational studies of human populations have established that anthropometric measurements are reliable indexes of the extent of malnutrition among the various socioeconomic classes of particular populations. Nutritional deficiencies are evident both from the tempo of growth during the adolescent growth spurt and in terminal heights. By combining information on height at different ages, it is possible to distinguish between moderate and severe malnutrition, as well as between short and prolonged periods of malnutrition. Even when reliable indexes of real wages are available, height-by-age measures are a valuable additional source of information since they point to aspects of the standard of living—such as changes in the number of days worked, in the intensity of labor, or in environmental conditions not speedily reflected in prices—that are not adequately captured by real-wage indexes. The effect of nutrition on labor productivity can be measured by including measures of height as arguments in production functions or in regressions relating height to wages and other indexes of productivity. For the pre-World War I period, the height-by-age data provide far more information on differences in the well-being of laboring groups in particular occupations and geographic localities than can be obtained from the scattered data on wages now available.

The project is based on a set of thirteen samples of data containing information on height-by-age and various socioeconomic variables covering the period from 1700 through 1937 for the United States, Trinidad, Great Britain, and Sweden.<sup>2</sup> Cooperative arrangements have been undertaken to obtain comparable data for other nations from which the U.S. population was drawn, including Germany and France. At the present time, observations on some 300,000 individuals (drawn from military records, census manuscripts, ship manifests, and surveys) are in machine-readable form. Where possible, the samples are being linked with other data sets to take account of life-course and intergenerational effects on nutrition.

The findings to date indicate that the rate of improvement in diets and health varied widely among nations and among socioeconomic groups within nations. Native-born Americans reached modern heights as early as the Revolution. In contrast to adult British recruits into the Royal Marines who averaged about 64.4 inches, native-born whites in the colonial militias averaged 68.1 inches, virtually the same as the mean height of their counterparts in the Union Army during the Civil War (68.2 inches) and of native-born whites called by the draft during World War II (68.2 inches). The similarity in the mean final heights for these three wars does not necessarily imply a perfectly flat secular trend between c.1778 and c.1943. Contrary to the popular impression that there have been continuous secular improvements in nutrition

and increases in height, the evidence thus far analyzed in this project indicates that there may actually have been cycles in height of both native-born whites and blacks residing (but not necessarily born) in the United States.<sup>3</sup>

Similar cycles appear to be present in the heights of poor boys in London. The most striking feature of the study of the British data so far is that the adolescent poor of London during the late eighteenth century were so short that only two of eighty-one ethnic groups for which modern height data are available record lower adolescent heights (the Lumi and Bundi of New Guinea, two exceedingly impoverished populations). By 1838 the adolescent poor of London were about four inches taller than their counterparts had been before 1790, but they were still five inches shorter than British boys of the same age today.<sup>4</sup>

Preliminary regression analysis indicates that there were significant differences among the London boys associated with their occupations as well as with those of their parents. However, the occupational differences appear to have been narrower after 1838 than before 1790, suggesting that the nutritional differences between the lower and upper strata of the laboring class were more severe in the earlier stages of the Industrial Revolution. In the U.S. cases, occupational differences widened between the Revolution and the Civil War, a finding that may be related to the apparent downward movement in mean heights during the decades preceding the Civil War.<sup>5</sup>

One of the most important findings to date comes from the analysis of the Trinidad data, which reveals a significant correlation between height and mortality. Short slaves at every age during the life cycle were more likely to die than tall slaves.<sup>6</sup> Analysis of data on slaves from the records of the Union Army revealed a significant correlation between the value of slaves and their height. The elasticity of slave prices with respect to height (keeping weight per inch of height constant) was about 1.0.<sup>7</sup>

<sup>3</sup>K. Sokoloff and G. C. Villalor, "The Early Achievement of Modern Stature in America," and R. A. Margo and R. H. Steckel, "The Heights of American Slaves, 1770-1860: New Evidence on Slave Nutrition and Health." Both of these papers have been prepared for a special issue of *Social Science History*, edited by R. W. Fogel and S. L. Engerman, the codirectors of the nutrition project. This issue, which is cosponsored by the NBER, is scheduled for publication in 1983. Unless otherwise indicated, the balance of the papers listed in this section will also appear in that issue. These papers will soon be available in the NBER Working Papers series.

<sup>4</sup>R. Floud and K. W. Wachter, "Poverty and Physical Stature: Evidence on the Standard of Living of London Boys, 1770-1870."

<sup>5</sup>*Ibid.* and R. W. Fogel et al. (1982), pp. 20-23.

<sup>6</sup>G. Friedman, "The Heights of Slaves in Trinidad."

<sup>7</sup>R. A. Margo and R. H. Steckel. The elasticity is estimated in the neighborhood of the mean height.

<sup>2</sup>The samples are described in *ibid.*, Table 1. The statistical procedures that have been devised to deal with various biases that are present in the data are described briefly in *ibid.*, Appendix B, and at greater length in K. W. Wachter and J. Trussell, "Estimating Historical Heights," forthcoming in the *Journal of the American Statistical Association*.

## The Economics of Increased Longevity and Improved Health

This collaborative project is based on a large sample of genealogical records that can be used to analyze the effect of economic and social variables on the long-term decline in North American mortality rates.<sup>8</sup> Over 80 percent of this decline, which is still unexplained, took place before World War I; that is, before the revolutionary advances in medical technology that began in the late 1930s. Since 1978 we have been engaged in a pilot study evaluating this potential new data base. Data on approximately 50,000 persons who lived in the United States between 1640 and 1910 have been retrieved. Analysis of these data has confirmed the usefulness of the genealogical sources and provided a number of important preliminary findings, mainly of a demographic nature.

One of these findings is that the age of death of the mother had an impact on the risk of death of her child. For example, the risk of death of persons in the age category 20–39 increased about 55 percent if the mother died before age 40. While the early death of a father also increased the risk of death, the increment was only about 20 percent. The cause of the asymmetry is now being investigated. Another finding is that birth order is statistically significant and has a large impact on the probability of dying, not only for infants but throughout the life span, with first and last births having a higher probability of dying than intermediate births (in families of three or more live births). Mother's age at the birth of the person at risk also affects the probability of dying at every age. Still another finding is that there were substantial cycles in life expectation during the eighteenth and nineteenth centuries. Life expectation at birth for native-born whites reached a relatively high level (about 55 years) early in the eighteenth century and then declined by about 15 percent, reaching a low just before the Civil War. What is most intriguing about this finding is that the pattern of the time series on life expectancy coincides closely with what is known about the secular trends in final heights, which is a measure of the trend in nutritional status. Analysis of final heights of native-born U.S. whites (by birth cohorts) indicates that heights were on a high plateau through the end of the eighteenth century. They then declined rather substantially, probably reaching a trough around the time of the Civil War. While the trend in mortality seems to be closely correlated with the pattern of nutrition, it would be premature to conclude that this was the principal factor affecting mortality. Moreover, the previously unsuspected cycle in nutrition itself calls for an explanation.

We are now in the process of adding economic information to the demographic information currently available for the families in the sample. When this phase of the project is completed, we will not only be able to measure the effect of economic factors on the decline in mor-

tality but also to measure the effect of the increase in longevity and health on the distribution of wealth, the level of fertility, and the level of labor productivity. We are also in the process of tripling the size of the pilot sample so that we can look at longer chains of intergenerational effects. At present, we are limited to the effects of parents' characteristics on children. We anticipate that a tripling of the current sample, which should be completed during the coming year, will permit us to go back two additional generations.

## Intergenerational Analysis of the Changing Distribution of Wealth

Despite the wide interest in the size distributions of income and wealth, little is known about the forces that shape them. The literature on the subject has dealt with the trend in inequality, the determinants of the distributions, and the degree of economic mobility. Yet the trend in American inequality has yet to be firmly established, partly because the most reliable measurements of wealth inequality are approximately one century apart (1774, 1860, 1962), and partly because the cross-sectional distributions that have been the focus of attention to date reveal little about the distributional effects of choices made by households with respect to family size, occupations, savings, risk, and other factors that affect the accumulation of wealth. To get at such matters it is necessary to make use of longitudinal data that permit households to be traced over time, at least over the course of the life cycle, but preferably over generations.

The DAE project on the changing distribution of wealth will ultimately be based on the sample of family histories that has been described in the discussion of the mortality project as well as from intergenerational data sets constructed from samples of households obtained from the available manuscript schedules of censuses. The demographic information in the family histories is being linked with information on wealth and income available in censuses, probate records, tax lists, and other sources, thus creating a data set that can be analyzed both intergenerationally and cross-sectionally. The pilot phase of the project has concentrated on a single state, Utah, in order to test the proposition that intertemporal and intergenerational data sets will reveal forces influencing the wealth distribution that have been obscured in the cross-sectional studies. Utah was chosen partly because of the high quality of the record base going back to the initial settlement of the state, and partly because the relatively egalitarian wealth distribution at the time of initial settlement facilitates the study of the increase in cross-sectional inequality.

The work on the Utah study is based on linked samples of households selected from the 1850, 1860, and 1870 manuscript schedules of the censuses. The census data (which give wealth but not income) were combined with demographic records listing the vital events of each household and with church records that allow the estimation of income for each household over the years from 1850 to 1900. With this data set it is possible to create a life profile of each household showing wealth ac-

<sup>8</sup>For a more extensive description of the project see R. W. Fogel et al., "The Economics of Mortality in North America, 1650–1910: A Description of a Research Project," *Historical Methods*, 11 (Spring 1978), pp. 75–108, and NBER Reprint No. 236.

cumulation, income, occupational change, migration, and demographic events.

The preliminary findings confirm the importance of longitudinal analysis. Time of entry into the Utah economy, for example, is an important determinant of the level of wealth. Those households that were recorded in the 1850 census have three times as much wealth in 1870 as households established in Utah after 1860, even though one controls for the effects of age, occupation, birthplace, etc. Further, the inclusion of time of entry as a variable dilutes the effects of variables that may be given a discriminatory interpretation, such as foreign birth or female head of house. Since authors using cross-sectional data often attach significance to foreign birth as a determinant of wealth, the omission of time of entry in a cross-sectional study significantly affects the interpretation of the evidence.<sup>9</sup>

Another finding from the Utah study illustrating the importance of linked data is the surprisingly high level of economic mobility. Comparisons of the position of a household in the wealth distribution of 1860 with that of 1870 suggest that it is only the richest decile that exhibits inflexibility or rigidity over time. Households that are in the wealthiest decile in 1860 have a 0.46 probability of being in that same decile in 1870. In the other deciles the probability of staying in the same decile is only slightly above the 0.1 level that would prevail if the two distributions of wealth were independent. Therefore, it is possible that we may observe quite unequal distributions of wealth at any given time, but we may observe lifetime wealth profiles that are much less unequal.<sup>10</sup>

The initial analysis of intergenerational influences on the distribution of wealth has involved the estimation of the sons' income or wealth with respect to the wealth of their fathers. The estimated elasticities vary between 0.10 and 0.34, depending on the variables held constant (occupation, age, residence, and so on). Elasticities based on observation of the wealth of fathers and sons in the same year were higher than those based on a lagged value of the fathers' wealth. The death of the father prior to observation of the sons' wealth increased the elasticity about threefold. The elasticity between the income of sons and wealth of fathers was low (.09 to .21) but significant even though the sons' incomes were observed fifteen years after the wealth of fathers. In general, the data suggest a persistent relationship between the economic status of parents and their children with substantial regression toward the mean, so that an economic elite was unlikely to be based upon intergenerational transmission of economic success.<sup>11</sup>

<sup>9</sup>J. R. Kearl, C. L. Pope, and L. T. Wimmer, "Household Wealth in a Settlement Economy: Utah, 1850-1870," *Journal of Economic History*, XL (Sept. 1980), pp. 447-496.

<sup>10</sup>J. R. Kearl and C. L. Pope, "Wealth Mobility: The Missing Element," NBER Working Paper No. 692, June 1981.

<sup>11</sup>J. R. Kearl and C. L. Pope, "Intergenerational Effects on the Distribution of Income and Wealth: The Utah Experience, 1850-1900," NBER Working Paper No. 754, September 1981.

## Research Summaries

### Taxes, Labor Supply, and Human Capital

Harvey S. Rosen

The issue of tax-induced changes in labor supply behavior has been receiving increasing attention, but economic theory alone can say little about the impact of income taxation on labor supply because of the well-known conflict between income and substitution effects. Therefore, an enormous amount of effort has been devoted to empirical investigation of this problem, with a focus on the impact of taxes on hours of work and rates of labor force participation.

Econometric studies of taxation and hours of work have become increasingly sophisticated. The more econometrically advanced studies have tended to confirm the substantive results of their predecessors. Although considerable differences inevitably arise in parameter estimates due to differences in samples, time periods, and statistical techniques, I think it would be fair to say that two important "stylized facts" have been isolated: (1) For prime-age males, the substitution effect of changes in the net wage upon hours of work tends to be small in absolute value and often statistically insignificant. This result has emerged from both time-series and cross-sectional studies.<sup>1</sup> (2) The hours of work and labor force participation decisions of married women are quite sensitive to changes in the net wage. Although estimates differ widely, a number of investigators have found elasticities of more than one.<sup>2</sup>

Interestingly, popular debate over the effect of taxes on labor supply often deals with issues much broader than whether or not people will change their hours of work. Substantial concern has been expressed over whether people will fail to upgrade their skills—"invest in human capital"—because any benefits to doing so will just be taxed away.<sup>3</sup>

<sup>1</sup>See, for example, G. Burtless and J. A. Hausman, "The Effect of Taxation on Labor Supply: Evaluating the Gary Negative Income Tax Experiment," *Journal of Political Economy*, December 1978, pp. 1103-30, and H. S. Rosen and R. E. Quandt, "Estimation of an Aggregate Disequilibrium Labor Market," *Review of Economics and Statistics*, August 1978, pp. 371-39.

<sup>2</sup>See R. Gronau, "Leisure, Home Production, and Work—The Theory of the Allocation of Time Revisited," *Journal of Political Economy*, December 1977, pp. 1099-1123, or H. S. Rosen, "Taxes in a Labor Supply Model with Joint Wage-Hours Determination," *Econometrica*, May 1976, pp. 485-507.

<sup>3</sup>Such fears are expressed, for example, by P. C. Roberts, "The Keynesian Attack on Mr. Reagan's Plan," *The Wall Street Journal*, March 19, 1981.

Economists have long understood that the concept "labor supply" is more general than "hours of work." If one individual is healthier, better educated, and more highly motivated than another, then presumably a given number of hours of work will lead to a greater effective labor supply for the former than for the latter. The empirical literature's emphasis on hours of work is easy to understand, because it is an important variable and one that is relatively straightforward to measure. Nevertheless, other dimensions of labor supply are also important.<sup>4</sup> As a participant in the NBER Program on Taxation, I have been trying to add to the rather scanty stock of theoretical and empirical results on the relationship between taxes and human capital.

## Theoretical Considerations

It has been argued that the U.S. tax system lowers incentives for investment in human capital. For example, T. W. Schultz argued that "Our tax laws everywhere discriminate against human capital. Although the stock of such capital has become large and even though it is obvious that human capital, like other forms of reproducible capital, depreciates, becomes obsolete, and entails maintenance, our tax laws are all but blind on these matters."<sup>5</sup> (p. 13)

This view was challenged by Boskin, who pointed out that Schultz's argument regarding the lack of deductibility for expenditures on human capital investment failed to recognize that the most important costs of human capital are foregone earnings rather than tuition payments.<sup>6</sup> If all the costs of human capital investment are foregone earnings, then in a simple model a proportional wage tax has *no* impact whatsoever on the decision to invest in human capital. The logic of this argument is straightforward. The tax reduces the benefits and costs in the same proportion; therefore, if the net present value was positive prior to the tax, it remains positive after the tax is imposed.

Jonathan Eaton and I have shown that even under the assumption that the only costs of human capital accumulation are foregone earnings, the neutrality result does not necessarily follow.<sup>7</sup> There are two reasons for this. First, an important assumption in the simple model is that the supply of hours of work is fixed regardless of the net wage. Now, hours of work can be thought of as the "utilization rate" of human capital: the more the individ-

ual works, the higher is the rate of utilization and, therefore, the higher the return on the human capital investment. With an endogenous hours-of-work decision, then, a wage tax may change the benefits of the investment without an offsetting movement in the costs, and neutrality no longer holds.

A second factor ignored in the simple model is the uncertainty of returns to human capital. When an individual makes an educational investment, he or she does not know for certain that it will increase earnings capacity, or by how much.<sup>8</sup> It can be shown that even when hours of work are independent of the net wage, if the returns to human capital are stochastic, then proportional wage taxation will not in general be neutral in the human capital decision. Rather, the impact of taxation is ambiguous because of two conflicting effects: (1) A proportional tax on wages cuts the riskiness of human capital because, in effect, the Treasury serves as the taxpayer's silent partner, sharing in both gains and losses. To the extent that the individual is risk averse, this insurance effect tends to *increase* human capital accumulation; (2) on the other hand, the proportional tax reduces the individual's wealth. To the extent that the desire to invest in relatively risky assets decreases with wealth, then this effect will tend to *decrease* investment in human capital.

Because the two effects work in opposite directions, in the absence of specific assumptions on how risk aversion varies with wealth, it is impossible to know a priori how a proportional wage tax will change human capital accumulation. Just as in the hours-of-work case, only empirical work can settle the question. However, measurement problems make econometric analysis here even harder than in the hours-of-work case. How does one measure the amount of capital embodied in a human being? What proportion of educational expenditures is consumption and what proportion is investment? How can one estimate the amount of earnings foregone in on-the-job and vocational training programs?

## Taxation and On-The-Job Training Decisions

In an attempt to analyze econometrically the impact of taxes upon decisions to take on-the-job training (OJT), I took advantage of a careful set of questions from the 1975 wave of *A Panel Study of Income Dynamics* to classify individuals as OJT takers or non-OJT takers.<sup>9</sup> I then used Mincer's simple but elegant theory of human capital to estimate pretax internal rates of return to OJT for each individual in the sample.<sup>10</sup> This internal rate of return, along with the individual's marginal federal income tax rate, were used to "explain" the OJT decision in a probit

<sup>4</sup>For a discussion of other types of labor supply decisions that might be affected by taxes, see H. S. Rosen, "What Is Labor Supply and Do Taxes Affect It?" *American Economic Review*, May 1980, pp. 171-176 (also NBER Reprint No. 120).

<sup>5</sup>T. W. Schultz, "Investment in Human Capital," *American Economic Review*, March 1961, pp. 1-17.

<sup>6</sup>M. Boskin, "Notes on the Treatment of Human Capital," NBER, 1975.

<sup>7</sup>See J. Eaton and H. S. Rosen, "Taxation, Human Capital, and Uncertainty," *American Economic Review*, September 1980, pp. 705-715, (also NBER Reprint No. 97).

<sup>8</sup>It is unlikely that the individual can insure himself against such risks because the problems of moral hazard associated with insurance in general are especially pervasive in the case of human capital. In such a situation, the market is unlikely to provide insurance.

<sup>9</sup>H. S. Rosen, "Taxation and On-the-Job Training Decisions," NBER Working Paper No. 733, August 1981.

<sup>10</sup>J. Mincer, *Schooling, Experience, and Earnings*, New York: Columbia University Press for NBER, 1974.

equation. I found that the income tax tends to increase the probability that an individual engages in OJT, a plausible result given the theoretical considerations discussed above. Apparently, the effect that dominates is the one that gives the individual an incentive to substitute human for physical capital as a means for carrying consumption into the future. A decrease in marginal tax rates of one-third would decrease the incidence of OJT among white males by about 2.4 percent.

## Normative Analysis

The welfare implications of the fact that taxation may influence human capital accumulation are not entirely clear. There have recently been claims that increases in federal income tax rates have generated serious decreases in the accumulation of physical capital.<sup>11</sup> Such analyses have ignored human capital accumulation. My results suggest that reductions in physical capital may have been accompanied by tax-induced increases in human capital. Obviously, the two effects do not cancel out—taxation distorts both decisions away from their first best values.

In an attempt to assess the welfare effects of government tax policies when both human and physical capital decisions are made, John Driffill and I constructed a life-cycle model with endogenous human capital and hours of work choices.<sup>12</sup> The model was simulated numerically in order to find out how these decisions and individual welfare would vary under alternative tax regimes. We found that under reasonable assumptions, the failure to take into account distortions of human capital decisions produces substantial underestimates of the excess burden of taxation. For individuals with moderate tax rates, the excess burden is about 2 to 3 percent of tax revenue when human capital is assumed to be exogenous. When human capital is endogenous, the comparable figure is more like 15 percent.

At this stage, there is not enough hard evidence to know for sure how taxes affect human capital, or even if all types of human capital are affected in the same direction. All that can be said to the makers of tax policy is that they should proceed with caution when taxing labor. As evidence accumulates that the income tax and social insurance systems appreciably influence the stock of capital, there may be a temptation to increase relative tax rates on labor because hours of work appear to be inelastic in supply. But hours of work are just the tip of an iceberg that is potentially very deep, and this may be a misguided policy.

<sup>11</sup>See, for example, M. J. Boskin, "Taxation, Saving, and the Rate of Interest," *Journal of Political Economy*, 86, No. 2, April 1978, pp. s3-s28.

<sup>12</sup>E. J. Driffill and H. S. Rosen, "Taxation and Excess Burden: A Life-Cycle Perspective," *NBER Working Paper No. 698*, June 1981.

## Studies of Multinational Firms\*

Robert E. Lipsey

One of the major international developments of the last three decades has been the growth of multinational firms, originating mainly in the United States but increasingly based in other countries as well. Our studies ask several questions: (1) What characteristics of a firm lead to multinational production? (2) What determines where such firms place their production? (3) What effects do the activities of multinationals have on host countries?

### Who Invests Abroad?

Parent firm characteristics presumably enable a multinational to produce in a host country in competition with local firms that may have advantages of being at home: the favor of the government, knowledge of the language and customs of the country, consumer goodwill, and so on. The attributes of the firm include, among others, those associated with its industry or industries, and those specific to the firm. The industry attributes are those common to firms in an industry regardless of national origin, and the firm attributes are those that distinguish the company from others in its own country and industry, such as leadership in innovation or in quality of product.

We have investigated the characteristics of U.S. firms investing abroad using a collection of data for about 1,000 of the larger, publicly owned U.S. companies. We have separated the characteristics of these firms into those that can be ascribed to the industry they are in and those that distinguish these firms from the averages of their industries. The investors spend much more heavily on research and development than do the noninvestors, relative to their size. To some degree this is associated with the industries they come from, but mostly it is a characteristic of the investing firms relative to their own industries. The investors are more capital intensive but in this case the bulk of the difference reflects the industry composition of the two groups. The investors are more profitable by a large margin, and the difference in profitability, partly reflecting the fact that investors come from more profitable industries, mainly reflects the characteristics of the individual firms.

The largest difference between investors and noninvestors is in size. The investors are, on the average, six to nine times as large as the noninvestors. Size is partly an industry variable but, within their industries, investors are also about twice as large as noninvestors. However, among investing firms, the median ratios of foreign affiliate sales to U.S. parent company sales are higher in the smaller parent size groups. Equations fitted across all industries and for five broad industry groups show little

\*The research discussed here has been supported mainly by two grants from the National Science Foundation and also by a grant from the Ford Foundation and a contract with the Agency for International Development.

significant relation of size to the share of assets or employment abroad. In general, for the United States as for Sweden, among firms that invest at all, activities abroad are no more important, relative to activities at home, for larger firms than for smaller firms.

Our general conclusion on the influence of size of firm is to support the belief that it is an important influence, but only as a threshold effect: an effect on the decision to invest abroad but not, once a foreign investment has been established, on the extent of foreign activity. It reflects economies of scale in foreign investing, not in production, and such economies of scale account for the higher frequency of foreign investors among larger firms. However, they seem to be in the nature of indivisibilities that have little or no influence once a firm has surmounted the initial barrier to becoming a foreign investor.

### **Who Invests Where: Parent Firm Characteristics and the Location of Foreign Production**

One determinant of the distribution of the world's production is the selection of a location or locations for overseas operations by U.S. parent firms that have decided to manufacture abroad. We have investigated whether there is some relationship between the characteristics of a country and the type of firm that sets up manufacturing there.<sup>1</sup>

Although there are differences in the ranking of countries by the number of U.S. investors in the six broad industry groups we examined, what is more striking is the consistency of the country ranking from one industry to another. Canada invariably ranks first in the number of U.S. parents operating there; the United Kingdom and Mexico alternate for second and third place; and Germany and France, followed by Australia, have most of the fourth, fifth, and sixth places. Country characteristics by themselves, rather than any interaction between country and industry, seem to dominate these decisions. Proximity to the United States would seem to be the most important consideration, to judge by the high rank of two such different countries as Canada and Mexico. The use of English as the major language also seems to be a factor, probably contributing to the rankings of Canada, the United Kingdom, and Australia. The size of markets also appears to be a factor that would explain some of the rankings.

A possible interpretation of the figures is that there is a regular country order in the establishment of affiliates and that it is mostly identical among industries. The country order does not necessarily imply a timing relationship, although there very likely is one. The country order might simply be that if a company has an affiliate in only one country the affiliate will be in Canada. If it has two, they will be in Canada and in Mexico or the United Kingdom; if it has more than three, they will be in those three countries and Germany and France, or possibly Australia. If

there is a timing relationship, it would be that U.S. companies establish affiliates first in Canada and last in Sweden or the Philippines, among the countries we have investigated. Another possibility is that the country order is associated with the size of the parent. That is, the smallest parents have affiliates only in Canada and only the largest have affiliates in the low-ranking countries.

Aside from size of parent, there may be other characteristics that influence parents' decisions to locate their production in different countries. For example, labor-intensive or low-wage (presumably low-skilled-labor) U.S. firms might go abroad to countries where labor is cheap.

The data suggest some such interactions but in surprising directions. The lowest-wage (or lowest-skilled-labor) U.S. companies tended to be the parents of affiliates in Canada and Sweden, two very high-wage countries. The highest-wage U.S. parents were more likely to be the ones with affiliates in low-wage areas. Thus, within each industry, parents seem to have selected foreign locations with characteristics least like their own. In other words, within each industry, opposites seem to attract.

Parents of affiliates in low-wage areas were not only high-wage countries in their industries but also the most capital intensive. The companies that located in Sweden, a high-wage country, tended to be the least capital intensive in their industries.

Thus, as far as factor prices and factor proportions are concerned, U.S. parent companies do not seem to have sought conditions similar to those they operated under in the United States. The U.S. parents drawn to each area seem to have been at the opposite end of the scale from what we would expect of local firms in that area.

If parents were investing in locations that had attributes unlike the parents' own, affiliate characteristics within industries would not reflect those of their parents; in fact we find almost no relationship. That is, countries in which relatively capital-intensive parents have invested do not have relatively capital-intensive affiliates. There is thus no indication that parents are transmitting technologies that can be characterized by their own capital intensities.

If we correlate payroll per worker of parents with that in affiliates, we find a significant negative relation. Countries in which affiliates pay relatively high wages for their industries have drawn their investment from companies paying relatively low wages in the United States ( $r = -.34$ ). These high affiliate wages are associated with high affiliate capital intensities within industries ( $r = .42$ ), as we would expect. Furthermore, high parent payrolls per worker in the United States appear to be associated with low affiliate capital intensities, rather than high ones.

If these differences between parent and affiliate characteristics represent differences in product lines, they fit with our finding that production by U.S. firms in a host country does not substitute for U.S. exports or parent exports to that country. If anything, production by U.S. firms in the host country is complementary to such exports but does substitute for exports by other countries

<sup>1</sup> This section is based mainly on I. B. Kravis and R. E. Lipsey, "The Location of Overseas Production and Production for Export by U.S. Multinational Firms," *Journal of International Economics*, forthcoming, May 1982, and NBER Working Paper No. 482, June 1980.



to that host country.<sup>2</sup> A possible inference is that the U.S. firm may be producing abroad what it was not likely to export from the United States in any case.

## Country Characteristics and the Location of Production for Export

A theoretical analysis of location choices—based on a model of a firm minimizing the cost of serving both home and foreign markets, and taking demand in each market as exogenous—considered these variables: (1) relative costs of factors (such as labor cost) and materials; (2) interacting with factor proportions (such as capital intensity); (3) transfer costs (such as tariffs and freight rates); and (4) economies of scale, both by themselves and interacting with the other variables.<sup>3</sup>

Partly because we did not have worldwide measures of transfer costs, and partly to reduce the influence of subsidies and other factors for which we had no empirical measure, we concentrated on the location of the presumably more footloose production for export rather than total production. We found that U.S. firms tended to export from countries with large internal markets and relatively open economies, as measured by ratios of trade to output, taking account of country size and population density. We interpret that finding as implying that proximity to markets is a major factor in selecting locations for production and that in these industries there were economies of scale in production that made output cheaper to produce in large markets. The influence of a high degree of openness of an economy may have been due to better access to imported material inputs at low world prices or to better transport, finance, and other facilities for trade. Another possibility, at least for small countries, is that the presence of U.S. affiliates contributed to the high trade ratios.

There was only slight evidence that labor cost, adjusted for labor quality, determined the location of production for export. Moreover, this evidence is not found in any single industry equation but rests only on the predominance of negative signs for the labor cost coefficient in the equations for the twenty industries. U.S. affiliates tended to export from countries with high wages, but the high labor productivity in such countries tended to offset the high wages fully or even a little more than fully. Clearly, however, labor cost, insofar as we have been able to measure it correctly, was not a major influence in the location of export production.

## Effects on Host Countries

One controversial aspect of the operations of multinational firms has been the charge that they carry “inappropriately” capital-intensive methods of production

into less developed countries and thus contribute to the apparent underutilization of the presumably abundant resources of labor, or unskilled labor, in these countries. The explanation usually given is that these firms, having developed their technologies in home countries with high labor costs, find that the cost of altering them to take advantage of low labor costs is too high to be worthwhile.

A long series of case studies has left the validity of the accusation unsettled. Some find evidence of adaptation, at least in ancillary activities if not in the central production process, while others find no such evidence. Some of the studies try to distinguish between choices among technologies and choices of factor proportions within a given technology and between the consequences of choosing a particular scale of production and the response to factor prices.

We have taken the view that it is the factor proportions themselves that are of interest as determinants of labor absorption, that the data are far too crude to distinguish between technology choices and factor proportions choices within a technology, and that even the choice of a particular scale of operations reflects to some degree the factor prices of a location.<sup>4</sup> That is, for example, a small-scale operation that tends to be labor intensive on account of its scale may be viable only in a country with low labor costs and may therefore represent one form of adaptation to such costs. Furthermore, since we are examining factor choices within each multinational firm, we assume that any knowledge about different ways of producing is available to all units of the firm; the technology, in terms of knowledge, is identical across all countries.

Looking at both Swedish and American multinational firms, we found consistently that affiliate capital intensities were positively related to wage levels. The relationship largely involved differences in capital intensities within companies; although there was some adaptation in the form of the selection of industries and the selection of parent firms within industries, the intrafirm variation was the predominant phenomenon.

We also found that scale of operations was strongly related to capital intensity, when the latter was measured as property, plant, and equipment per worker, although not when it was measured as total assets per worker. The larger the scale, the higher the capital intensity, given the wage rate.

In general, we found strong evidence of adaptation by both U.S. and Swedish multinational firms to differences among host countries in the price of labor. Production in low-wage countries was relatively labor intensive, whether or not scale of production was held constant, and production was also relatively labor intensive in small-scale operations, which also tended to be in low-wage countries. Thus both scale and wage-level responses tended to lead to labor-intensive operations in low-wage coun-

<sup>2</sup>R. E. Lipsey and M. Y. Weiss, “Foreign Production and Exports in Manufacturing Industries,” *Review of Economics and Statistics*, November 1981, and NBER Reprint No. 240.

<sup>3</sup>J. Weinblatt and R. E. Lipsey, “A Model of Firms’ Decisions to Export or Produce Abroad,” NBER Working Paper No. 511, July 1980.

<sup>4</sup>R. E. Lipsey, I. B. Kravis, and R. A. Roldan, “Do Multinational Firms Adapt Factor Proportions to Relative Factor Prices?,” in *Trade and Employment in Developing Countries, 2: Factor Supply and Substitution*, ed. by A. O. Krueger, University of Chicago Press for NBER, March 1982.

tries. Furthermore, the response was not primarily in the selection of the industries or firms that chose to produce in low-wage countries. It was in the selection of methods of production within the firm, although that itself may have involved some choice of products by the firm for production in different types of host countries.

Another sensitive issue within host countries, including the United States, has been the effects of takeovers of locally owned firms by foreign companies. There have been several studies comparing foreign-owned with domestically owned firms in host countries, but a question these studies leave open is whether the differences between the two groups represent the characteristics of host-country firms that appeal to foreigners, or the characteristics resulting from foreign ownership itself. The examination of foreign takeovers is a way of distinguishing between the characteristics of firms and industries that encourage takeovers and the effects of foreignness or of takeovers per se.

We are studying the nature and effects of takeovers in Sweden, Canada, Mexico, and Brazil. So far we have results only for Swedish firms taken over between 1960 and 1970.<sup>5</sup> These indicate that foreigners tended to take over Swedish firms that were of above average size within each industry; very few takeovers were in the smallest groups of firms. However, the firms taken over were not the largest either. They were not large compared to Swedish companies of 200 employees or more, the size class in which they were concentrated. In fact, they were well below average size within that group.

The firms taken over were more skill-oriented or technology-oriented than the average Swedish-owned firms in the same industries. However, takeovers were not particularly prevalent in industries in which firms in general were large or skill-oriented or technology-oriented. Thus the selection of firms for takeover was based on firm characteristics, not industry characteristics. After takeover by foreigners, firms grew somewhat faster than Swedish-owned firms in the same industries. The technological characteristics of the firms, by the crude measurements we have been able to apply so far, did not seem to be affected in any consistent way by takeover.

In our studies of Canada we are comparing takeovers by U.S. and other non-Canadian companies, not only comparing them to the rest of their industries but also to takeovers by other Canadian companies. In this way we hope to make a clearer distinction between the effects of foreign ownership and the effects of takeovers in general.

Among other topics related to multinational firms that are included in our program are the role of U.S. multinationals in the exports of host countries, the determinants of the shares of U.S. firms in production in host countries, and the interactions between direct investment and trade.

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<sup>5</sup>R. E. Lipsey and B. Swedenborg, "Foreign Takeovers of Swedish Firms," NBER Working Paper No. 641, March 1981. The data were collected by the Industriens Utredningsinstitut of Stockholm and used in a study by Hans-Fredrik Samuelsson.

## First Quarter 1982

Victor Zarnowitz

According to the median forecast from the latest survey of professional economic forecasters taken by NBER and the American Statistical Association, real GNP will start rising in the spring quarter, but the recovery in the year ahead is projected to be sluggish. The declines in both the economy's total output and the overall rate of inflation turned out to be substantially larger in 1982:1 than most forecasters had predicted three months ago, while the anticipated reductions in interest rates failed to materialize. Accordingly, downward revisions from the previous (December 1981) survey characterize most of the 36 individual sets of forecasts collected in March 1982. However, the participants in the new survey are optimistic on the prospects that the recently achieved lower rates of inflation will persist beyond the period of recession and weak recovery into 1983, a year expected to witness a more satisfactory economic expansion.

### A Shallow Trough and Slow Recovery in the Year Ahead

Real GNP will gain 0.6 of 1 percent (or about 2.4 percent at annual rate) in 1982:2, according to the median survey forecast. Growth is then to accelerate to more than 4 percent annual rate in the second half of the year and then decline again to less than 3 percent in 1983:1. The comparison of annual totals, 1981 to 1982, will show a slight decline of about 0.5 of 1 percent, but between 1982:1 and 1983:1, GNP in constant dollars is expected to increase 3.6 percent; about the same rate of growth is projected for 1983 as a whole relative to 1982.

The estimated probability of decline in the nation's output during 1982:2 is still high by historical standards—the mean of the individual distributions is 42 percent. The average probabilities fall to 20 percent and less in the quarters 1982:3–1983:1.

### Industrial Production and Unemployment

The index of industrial production, a measure of real economic activity limited to the cyclically sensitive areas of manufacturing, mining, and public utilities, is seen as dropping 12 percent in 1982:1, gaining at an average rate of 8.8 percent through the rest of the year, and rising only about 5 percent in 1983:1 (all at annual rates). On the average, the forecasters have this index increase 7.7 percent between 1982:1 and 1983:1, and 5.8 percent between 1982 and 1983.

## Projections of GNP and Other Economic Indicators, 1982-83

	Annual				
	1981 Actual	1982 Forecast	1983 Forecast	Percent Change	
				1981 to 1982	1982 to 1983
1. Gross National Product (\$ billions)	2922.2	3136.0	3464.0	7.3	10.5
2. GNP Implicit Price Deflator (1972 = 100)	193.6	208.0	223.0	7.4	7.2
3. GNP in Constant Dollars (billions of 1972 dollars)	1509.6	1504.0	1556.4	-0.4	3.5
4. Unemployment Rate (percent)	7.9	9.0	8.2	1.1 <sup>1</sup>	-0.8 <sup>1</sup>
5. Corporate Profits After Taxes (\$ billions)	155.8	143.5	164.5	-7.9	14.6
6. Nonresidential Fixed Investment (billions of 1972 dollars)	161.6	156.0	163.0	-3.5	4.5
7. New Private Housing Units Started (annual rate million)	1.1	1.1	1.5	0.0	36.4
8. Change in Business Inventories (billions of 1972 dollars)	8.2	0.3	7.4	-7.9 <sup>2</sup>	7.1 <sup>2</sup>
9. Treasury Bill Rate (3-month, percent)	14.1	12.1	11.8	-2.0 <sup>1</sup>	-0.3 <sup>1</sup>
10. Consumer Price Index (annual rate)	10.4	7.0	6.9	-3.4 <sup>1</sup>	-0.1 <sup>1</sup>

	Quarterly							Percent Change	
	1981 Q4 Actual	Q1	1982			1983 Q1	Change		
			Q2	Q3	Q4		Q4 81 to Q4 82	Q1 82 to Q1 83	
1. Gross National Product (\$ billions)	2984.9	3017.0	3084.0	3170.0	3267.0	3349.5	9.5	11.0	
2. GNP Implicit Price Deflator (1972 = 100)	199.6	203.0	206.1	209.8	213.8	217.5	7.1	7.1	
3. GNP in Constant Dollars (billions of 1972 dollars)	1495.6	1485.0	1494.0	1510.0	1528.0	1538.0	2.2	3.6	
4. Unemployment Rate (percent)	8.4	8.9	9.2	9.0	8.8	8.5	0.4 <sup>1</sup>	-0.4 <sup>1</sup>	
5. Corporate Profits After Taxes (\$ billions)	145.2	133.0	139.0	146.0	156.0	161.5	7.4	21.4	
6. Nonresidential Fixed Investment (billions of 1972 dollars)	159.2	157.0	155.0	156.0	157.0	160.0	-1.4	1.9	
7. New Private Housing Units Started (annual rate million)	0.9	0.9	1.1	1.2	1.3	1.4	44.4	55.6	
8. Change in Business Inventories (billions of 1972 dollars)	8.5	-3.7	-1.0	1.9	4.5	5.7	-4.0 <sup>2</sup>	9.4 <sup>2</sup>	
9. Treasury Bill Rate (3-month, percent)	12.0	12.8	12.0	12.0	12.5	12.0	0.5 <sup>1</sup>	-0.8 <sup>1</sup>	
10. Consumer Price Index (annual rate)	6.4	6.0	6.4	6.8	7.0	7.0	0.6 <sup>1</sup>	1.0 <sup>1</sup>	

SOURCE: National Bureau of Economic Research and American Statistical Association, Business Outlook Survey, March 1982. The figures on each line are medians of thirty-five individual forecasts.

<sup>1</sup>Change in rate, in percentage points.

<sup>2</sup>Change in billions of dollars.

The overall rate of unemployment will peak at 9.2 percent of the civilian labor force in 1982:2, then decline slowly to 9 percent, 8.8 percent, and 8.5 percent in the three following quarters covered (through 1983:1). The average for 1982 as a whole is 9 percent. What is rather disquieting is that the median prediction for 1983 is still as high as 8.2 percent.

### Inflation Rates Lower, Will Stabilize Near 7 Percent Levels

Both the GNP implicit price deflator (IPD) and the consumer price index (CPI) will rise at annual rates of about 6 percent in 1982:2. Somewhat higher rates, between 7 percent and 7.8 percent for IPD and between 6.4 percent and 7 percent for CPI, are expected to prevail in the following three quarters. Inflation in 1983 as a whole, com-

pared with 1982, will still be 7.2 percent for IPD and 6.9 percent for CPI.

### No Major Reductions in Interest Rates

The 3-month Treasury bill rate will average 12.1 percent in 1982, and the quarterly figures for 1982:2-1983:1 are all close or equal to 12 percent (the actual average for 1981 was 14.1 percent). Even the median forecast for 1983 is still of the same order of magnitude—11.8 percent.

Yields on new issues of high-grade corporate bonds will show but a small decline, from 15.2 percent in 1982:2 to 14.5 percent in 1983:1. The averages for 1982 and 1983 are 15.1 percent and 14.1 percent, respectively (the actual for 1981 was 15.5 percent).

The dispersion of the individual forecasts around the group averages is considerable, but few individuals predict major reductions in the interest rates. Thus, three-

quarters of the distribution of the Treasury bill rate predictions for each of the quarters 1982:2-1983:1 fall into the range of equal to and larger than 11 percent; the lowest forecasts still exceed 9 percent.

The forecasts of interest rates and inflation imply the prevalence of expectations that historically high real interest rates will persist, preventing a more vigorous recovery.

### **Prospects for Consumption and Housing**

Total personal consumption expenditures in 1972 dollars will grow at annual rates of about 2 percent and 4 percent in the first half and second half of 1982, respectively. The average forecasts of the annual increases are 1.5 percent for 1981-82 and 3.4 percent for 1982-83.

New private housing starts are now expected to average 1.1 million units in 1982, the same as in 1981. At annual rates in millions of units, they will increase gradually from 0.9 in 1982:1 to 1.4 in 1983:1. Although this amounts to a gain of 56 percent, even the 1983 median forecast of 1.5 million units is not very high by historical standards (the starts exceeded 1.7 million in six of the past twelve years). Residential fixed investment in 1972 dollars will decline 7 percent in 1982 (to \$42 billion), then rise 21 percent in 1983 (to \$51 billion).

### **Business Investment, Corporate Profits, and Net Exports**

Nonresidential fixed investment in 1972 dollars will be at its lowest level for this cycle in 1982:2 at \$155 billion annual rate. It will reach \$160 billion in 1983:1, up 1.9 percent from 1982:1. The median survey forecasts for this variable show a decline of 3.5 percent in 1981-82 and a rise of 4.5 percent in 1982-83. This suggests fluctuations around an essentially flat trend line since 1979. Business inventory investment in 1972 dollars will turn positive and increase moderately after mid-1982.

Corporate profits after taxes will improve slowly after a sharp drop in 1982:1, but they will still be about 8 percent lower in 1982 than in 1981. Their level in 1983 is predicted to exceed that of 1982 by nearly 15 percent.

Net exports of goods and services in constant dollars will be a source of weakness this year, declining some 8 percent from 1981. The prospects for 1983 look only marginally better according to the average forecast, but this conceals strong differences in views among the survey participants who are divided on the question of whether the dollar will strengthen or weaken.

### **Governmental Purchases and Policies**

Federal government purchases of goods and services, in constant dollars, will rise at an annual rate of about 2.6 percent in the year ending in 1983:1, and the comparisons 1981-82 and 1982-83 yield much the same results. In contrast, state and local government purchases, also in 1972 dollars, are expected to decline 1.8 percent in 1982 and 0.6 percent in 1983.

All but a few forecasters assume that the recently enacted tax legislation will be put in practice, but some anticipate additional excise taxes. A buildup of defense

outlays is generally assumed but the figures vary (the ranges of 4-6 percent and 7-10 percent are about equally represented). Similarly, some forecasters assume M1 growth of 4-5 percent, others—nearly as numerous—think it will be higher: 6-8 percent. Most respondents expect energy prices to be stable or declining.

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*This report summarizes a quarterly survey of predictions by about fifty 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 the Graduate School of Business of the University of Chicago and NBER, assisted by Gregory Tang of NBER, was responsible for tabulating and evaluating this survey.*

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## **NBER Profiles**

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### **Walter W. Heller**

Walter W. Heller, a member of the Bureau's Executive Committee, is a former chairman of NBER and has been one of its directors since 1960. Heller received his Ph.D. in economics from the University of Wisconsin in 1941 and joined the economics faculty at the University of Minnesota in 1946. He was chairman of the department from 1957-60 and is currently Regents' Professor of Economics.



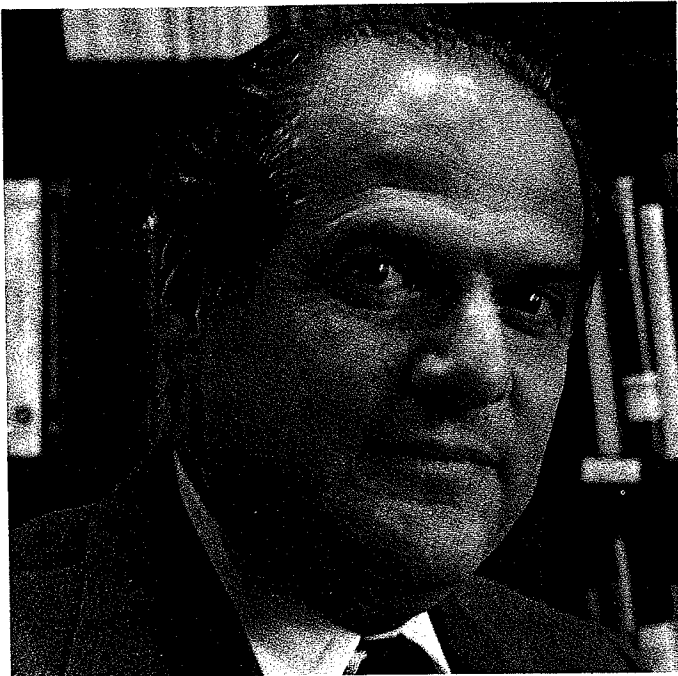
From 1961-64, Heller was chairman of the President's Council of Economic Advisers. He also served as a consultant to the Executive Office of the President from 1965-69 and 1974-77, and to the United Nations, Committee for Economic Development, U.S. Census Bureau, and the Congressional Budget Office (since 1975). A

member of *Time* magazine's Board of Economists and the Board of Contributors of the *Wall Street Journal*, Heller has also served on the Trilateral Commission since 1978.

Heller and his wife, Emily, live in St. Paul. They have three children, Walter, Eric, and Kaaren. In his leisure time, Heller likes to travel; he also enjoys clam digging and woodchopping.

## Richard N. Rosett

Richard N. Rosett, Dean of the Graduate School of Business of the University of Chicago, has been a member of the Executive Committee of NBER's Board of Directors since 1977. Rosett received a Ph.D. in economics from Yale University in 1957 and was a member of the economics faculty at the University of Rochester from 1958-74. In 1974 he became dean and a professor of business economics at the University of Chicago's Business School.



Rosett served as a consultant to the Department of Housing and Urban Development from 1972-74 and to the Department of Health, Education and Welfare from 1970-79. He now serves as a director of a number of corporations and nonprofit organizations, including the Chicago College of Osteopathic Medicine and the Chicago Association of Commerce and Industry.

Rosett and his wife, Madelon, have five children. Away from the business school, Dr. Rosett is an amateur potter.

## Exchange-Rate Theory and Practice

An NBER conference on exchange rates was held at the Rockefeller Foundation's Bellagio Conference Center at Lake Como, Italy, on January 26-28, 1982. Organized by John Bilson of the University of Chicago and Richard Marston of the University of Pennsylvania, research associates in NBER's Program in International Studies, this conference is part of a new major Bureau project on Productivity and Industrial Change in the World Economy.

The program, which brought together twenty-seven of the leading researchers on exchange rates from the United States and Europe, consisted of six sessions:

### SESSION I—RECENT DEVELOPMENTS IN EXCHANGE-RATE THEORY AND POLICY

Chairman: John Bilson

Michael Mussa, University of Chicago and NBER, "Unresolved Issues in Exchange-Rate Theory"

Discussants: Jacob A. Frenkel, University of Chicago and NBER; Rudiger Dornbusch, MIT and NBER; and Pentti Kouri, New York University and NBER

William Branson, Princeton University and NBER, "Exchange-Rate Policy after a Decade of 'Floating'"

Discussants: Peter Kenen, Princeton University; Willem Buiter, London School of Economics and NBER

### SESSION II—SHORT-RUN DETERMINANTS OF THE EXCHANGE RATE

Chairman: Richard Marston

Maurice Obstfeld, MIT and NBER, and Robert Cumby, International Monetary Fund, "International Interest-Rate and Price-Level Linkages under Flexible Exchange Rates: A Review of Recent Evidence"

Discussant: Pentti Kouri

Hans Genberg, Graduate Institute of International Studies, Geneva, "Properties of Innovations in the Spot and Forward Exchange Rates: The Role of Money-Supply Processes and Intervention"

Discussant: Richard Levich, New York University and NBER

John Bilson, "Exchange-Rate Dynamics"

Discussant: Richard Levich

### SESSION III—ASSET DEMANDS AND THE EXCHANGE RATE

Chairman: Peter Kenen

Jorge de Macedo, Princeton University and NBER, "Portfolio Diversification"

Discussant: Bernard Dumas, CESA

Jeffrey Frankel, University of California, Berkeley, "On the Mark, Pound, Franc, Yen, and Canadian Dollar"

Discussant: Alexander Swoboda, Graduate Institute of International Studies, Geneva

Paul Krugman, MIT and NBER, "International Currencies: Future of the Dollar"

Discussant: Alexander Swoboda

#### SESSION IV—FUNDAMENTAL DETERMINANTS OF REAL EXCHANGE RATES

Chairman: Jacob Frenkel

Louka Katseli, Yale University, "The Role of the Real Exchange Rate in Macroeconomic Adjustment"

Discussant: Willem Buiter

Francesco Giavazzi, University of Essex, and Charles Wyplosz, INSEAD, "Simulating the Real Exchange Rate with Sticky Prices"

Discussant: Paul Krugman

#### SESSION V—FOREIGN-EXCHANGE INTERVENTION AND EXCHANGE-RATE ARRANGEMENTS

Chairman: William Branson

Dale Henderson, Board of Governors, Federal Reserve System and NBER, "What Role for Intervention Policy?"

Discussant: Rudiger Dornbusch

Richard Marston, "Exchange-Rate Unions as an Alternative to Floating"

Discussant: Peter Kenen

Giorgio Basevi, University of Bologna, and Michele Calzolari, Prometeia Associates, Bologna, "A Model of Multilateral Exchange-Rate Determination Applied to the EMS"

Discussant: Francesco Papadia, Commissione Delle Comunita Europee

#### SESSION VI—EMPIRICAL EVIDENCE ON FOREIGN-EXCHANGE INTERVENTION AND MONETARY POLICY

Chairman: Dale Henderson

Jacques Artus, International Monetary Fund and NBER, "Effects of U.S. Monetary Restraint on the Deutsche-mark/Dollar Rate and the German Economy"

Discussant: William Branson

Stanley W. Black, Vanderbilt University, "The Relationship between Exchange-Rate Policy and Monetary Policy in Ten Industrial Countries"

Discussant: Paul de Grauwe, Katholieke Universiteit, Leuven

The opening session featured two major papers on exchange-rate practices. Mussa's paper analyzes many of the developments in exchange-rate theory over the past decade. At a previous conference in Sweden in 1975, Mussa, with Dornbusch, Frenkel, and Kouri, had presented alternative models of exchange rates in papers that have been widely cited since that time. The three latter authors served as discussants for Mussa's paper, with the sessions providing a useful forum for their views on future developments in exchange-rate theory.

Branson's paper presents a theoretical and empirical analysis of exchange-rate policy. He uses an asset-market model of the exchange rate, where the current account influences asset accumulation, to show the effects of monetary policy and exchange-market intervention. His empirical analysis, based on vector autoregressions, shows distinct differences in policy as practiced by the United States and several European countries. Branson's paper, with commentaries by Kenen and Buiter, provides a broad perspective on the effectiveness and limitations of exchange-rate policy.

The second session was devoted to empirical models of the exchange rate. Cumby and Obstfeld test two classical parity conditions that are often found in models of the exchange rate: uncovered interest parity and purchasing power parity. They find strong evidence that ex ante real rates of interest are not equalized internationally, that uncovered interest parity fails to hold (except in the case of Germany and the United States), and that there are systematic departures from purchasing power parity. Genberg's paper examines innovations in spot and forward exchange rates, an example of recent research that emphasizes the role of "news" in determining changes in exchange rates. Genberg compares patterns in the term structure of exchange-rate innovations with those in money-supply processes, in each case allowing for changes over time in these processes. Bilson analyzes the correlation and time-series properties of exchange rates to see if they are consistent with the Dornbusch model of exchange-rate dynamics. He finds that two testable hypotheses of the Dornbusch model—negative contemporaneous correlation between exchange rates and domestic interest rates, and negative autocorrelation for both series—are supported only partially by the data.

In the third session, de Macedo's paper presents an analysis of currency diversification, deriving "optimal" portfolios for national and international investors for the 1973-81 period. The empirical evidence suggests that there have been significant changes in the optimal portfolio over time, especially during the first few years of the flexible-exchange-rate period. Frankel's paper reports tests of the monetary and portfolio balance models of the exchange rate. Both models fare poorly in these tests, with the monetary model fitting the data well only when changes in the real exchange rate and shifts in money demand are taken into account. Krugman's paper is concerned not with flexible rates for currencies but with the role of the dollar as an international currency. He examines the three traditional roles played by a currency—as a medium of exchange, unit of account, and store of value—to determine how the dollar emerged as the premier international currency and how likely this role is to continue.

The fourth session consisted of two papers on the real exchange rate. In Katseli's paper, the real exchange rate is defined as the relative price of traded and nontraded goods, while in the paper by Giavazzi and Wyplosz the real exchange rate is equivalent to the terms of trade between domestic and foreign goods. Katseli shows how the real exchange rate and the terms of trade both re-

spond to different types of economic disturbances; then he presents a correlation analysis of recent changes in real exchange rates. Giavazzi and Wyplosz study the effects of external shocks on the terms of trade in a long-run model emphasizing the role of intertemporal investment and consumption decisions.

In the fifth session, Dale Henderson's paper analyzes exchange-rate policy within a rational expectations model where domestic and foreign assets are imperfect substitutes. Of particular interest is his derivation of feedback rules for managed floating and his discussion of the interest rate and exchange rate as information variables. The paper by Marston compares the advantage of flexible exchange rates with those of an exchange-rate union where several countries tie their currencies in a joint float relative to the rest of the world. He shows that factors often cited in support of joining a union, such as the share of trade with union members or the predominance of disturbances from abroad, can actually weaken the case for a union. Basevi and Calzolari report estimates of a multilateral exchange-rate model for the major countries of the European Monetary System. Their paper is an example of recent empirical research that examines the important systemwide behavior of exchange rates.

The final session consisted of two empirical studies of policy behavior. Artus examines the effects of recent U.S. monetary restraint on the DM/\$ rate and the German economy, using a structural model of the German economy estimated previously. He shows that the German authorities were confronted by a difficult choice between significantly higher inflation if they allowed the DM/\$ rate to depreciate, and a substantial decline in output if they matched the U.S. policy of monetary restraint. Black develops a model of monetary policy in an open economy for a country where traditional monetary instruments are replaced with direct restraints on credit such as those found in several European countries. Black's paper is an outgrowth of his major study of financial policy in ten OECD countries.

Financial support for the conference was provided by the Rockefeller Foundation as hosts at the conference center and by a grant from the Ford Foundation. A conference volume, edited by Bilson and Marston, will be published early next year. An announcement of this publication will appear in a future issue of the *NBER Reporter*.

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## Conference Calendar

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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 Summer 1982 issue of the *Reporter* is June 15. If you have any questions about procedures for submitting materials for the calendar, please call Kirsten Foss at (617) 868-3974.

**May 7-8, 1982**

Program Meeting: Financial Markets: NBER

**May 14-15, 1982**

Transfer Payments, NBER (Income and Wealth)

**May 20, 1982**

Policy Forum: Defined Benefit versus Defined Pension Contribution, Employee Benefits Research Institute

**May 21-22, 1982**

Meeting on Trade Relations, NBER

**June 17-18, 1982**

Pension Workshop, NBER

**June 21-22, 1982**

International Seminar in Macroeconomics, NBER

**June 27-July 1, 1982**

Microdata and Public Economics, Social Science Research Council and NBER

**June 28, 1982**

Econometrics and Public Finance, NBER

**June 28-30, 1982**

International Energy Markets/The Changing Structure, International Association of Energy Economists

**July 8-9, 1982**

Program Meeting: Economic Fluctuations, NBER

**July 15-19, 1982**

Annual Conference, Western Economic Association

**August 16-19, 1982**

Annual Meeting, American Statistical Association\*

**August 25-27, 1982**

Taxation in Federal Systems, International Seminar in Public Economics

**September 16-17, 1982**

Panel on Economic Activity, Brookings Institution

**September 22-24, 1982**

Annual Conference, National Association of Business Economists\*

**October 8, 1982**

Corporate Capital Structure in the United States, NBER

**October 15-16, 1982**

Pension/Labor Conference, NBER

**October 16-20, 1982**

Annual Conference, American Bankers Association

**October 20, 1982**

Policy Forum: Pension Asset Management Issues, Employee Benefits  
Research Institute

**October 24-28, 1982**

Annual Conference, National Tax Association\*

**November 5-6, 1982**

Incentive Effects of Government Spending, NBER

**November 17-19, 1982**

Annual Meeting, International Association of Energy Economists

**November 19-20, 1982**

50th Anniversary of Berle and Means's book, *The Modern Corporation  
and Private Property*, Hoover Institution

**December 3-4, 1982**

U.S. Trade Relations, NBER

**December 9-10, 1982**

Research in Labor Economics, NBER

**December 28-30, 1982**

Annual Conference, American Economic Association\*

**January 6-7, 1983**

Corporate Capital Structures in the United States, NBER

**January 20-21, 1983**

Labor Economics, Hoover Institution

**March 24-26, 1983**

Pension/Labor Conference, NBER

**April 21-22, 1983**

Minority Youth Unemployment, NBER

**June 27-28, 1983**

International Seminar on Macroeconomics, NBER

**August 15-18, 1983**

Annual Meeting, American Statistical Association\*

**September 1983**

First Quarter Century of Cliometrics, NBER

**October 2-6, 1983**

Annual Conference, National Tax Association\*

**October 14-15, 1983**

Business Cycle Conference, NBER

**December 28-30, 1983**

Annual Conference, American Economic Association\*

**August 13-16, 1984**

Annual Meeting, American Statistical Association\*

**October 25-29, 1984**

Annual Conference, National Tax Association\*

**December 28-30, 1984**

Annual Conference, American Economic Association\*

**August 11-15, 1985**

Annual Meeting, American Statistical Association\*

**December 28-30, 1985**

Annual Conference, American Economic Association\*

## Incentive Effects of Government Spending: A Call for Papers

On November 5 and 6, 1982, the National Bureau of Economic Research will hold a conference in Cambridge on "Incentive Effects of Government Spending." The program, being organized by Professor David Bradford of Princeton University and the NBER, will consist of seven papers with two formal discussants assigned to each paper.

Appropriate paper topics for the conference include the effects of a broad range of federal, state, and local programs on the behavior of households and firms. Subjects might include the effects of social insurance and other transfer programs; the effects of direct spending programs in areas such as housing, agriculture, science and technology, education etc.; and the impacts of other less direct expenditure programs such as credit guarantees. Other potential topics deal with the effects of federal government programs on the behavior of state and local governments and with the effects of state programs on the behavior of local governments. Our goal is to get a good mix of papers, priority will be given to empirically oriented research, but the submission of theoretical papers on these topics is also welcome.

Papers will be selected on the basis of abstracts of about 500 words or, when possible, completed papers, with preference being given to papers by younger members of the profession. Any research that will not have been published at the time of the conference may be submitted. The deadline for submissions of abstracts and papers is June 18, 1982. Authors chosen to present papers will be notified by July 16. Papers must be ready for distribution to conference participants by October 1, 1982. The NBER will pay the expenses of those chosen to give papers at the conference. Abstracts and papers should be sent to Professor David Bradford, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138.

## Financial Economists Meet

Members and guests of NBER's Program in Financial Markets and Monetary Economics met in Cambridge on January 22 to discuss the following papers:

Paul Wachtel, New York University, "Analysis of Alternative Measures of Inflation Uncertainty"

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



Discussant: John Makin, University of Washington and NBER

Jo Anna Gray, Board of Governors of the Federal Reserve System, "Wage Indexation, Incomplete Information, and the Aggregate Supply Curve"

Carl Walsh, Princeton University and NBER, "The Demand for Money under Uncertainty and the Role of Policy"

Discussant: Robert Shiller, MIT and NBER

David S. Jones, Board of Governors of the Federal Reserve System and NBER, and V. Vance Roley, Federal Reserve Bank of Kansas City and NBER, "Rational Expectations, the Expectations Hypothesis, and Treasury Bill Yields: An Econometric Analysis"

Discussant: Lawrence Summers, MIT and NBER

Patric H. Hendershott, Purdue University and NBER, and Kevin E. Villani, Purdue University, "The Call Premium in Mortgage and Bond Markets" (NBER Working Paper No. 738R)

Wachtel's paper examines the hypothesis that inflation uncertainty leads to reduced real output. His preliminary empirical results indicate that increases in the variance of inflationary expectations do have a detrimental effect on output. Using a model of the unemployment rate based on the natural rate hypothesis, Wachtel finds an elasticity of about one-fourth with respect to inflation uncertainty.

Gray's paper explores the macroeconomic effects of wage indexation using a framework that combines two popular types of output determination models: those with a contractually fixed nominal wage and those with information confusion. She shows that 100 percent indexation does not completely insulate the real sector from monetary shocks; the degree of insulation provided by indexation does, however, increase with increased monetary variability. This result reinforces the existing arguments for a positive correlation between the variance of monetary disturbances and the incentive to index.

Walsh's paper looks at a simple model in which the probability distribution of asset returns depends upon the policy rule followed by the monetary authority. In a rational expectations equilibrium, the probability distribution of returns (upon which investors base their asset demands) must equal the actual distribution of returns. Hence, changes in the policy rules that determine the money supply result in shifts in the asset demand equations. Using this simple framework, Walsh suggests that money demand functions will not be policy invariant.

In their paper, Jones and Roley assess the joint hypothesis of rational expectations and the expectations model of the term structure. They seek to improve on previous work by: (1) measuring yields more precisely; (2) including all available yield data; and (3) specifying a more nearly complete list of potential determinants of time-varying term premiums. The relationships among various previously proposed tests of the joint hypothesis are also considered, with the finding that most of these tests are asymptotically equivalent. The empirical results indicate that a statistically significant time-varying

term premium does exist for six-month Treasury bills, and that it accounts for about one-third of the variance of the spread between the respective holding-period yields on six-month bills and three-month bills.

The Hendershott and Villani paper asks: how much have mortgage coupon rates risen relative to the return on a portfolio of Treasury securities of comparable maturity, and to what extent is the increase attributable to a rising call premium caused by increased uncertainty in interest rates? They calculate the call premiums implied by coupon rates and prices of GNMA securities over the last several years and find that "the measured premia are, indeed, terminations premia...the market for GNMA pools is fully integrated with bond markets."

In addition to the authors and discussants, the following NBER associates and guests attended the meeting: Andrew Abel, Richard Clarida, Benjamin Friedman, David Hartman, and Christopher Piros, Harvard University; Edward Kane, Ohio State University; Stewart Myers, MIT; William Silber, New York University; and Robert van Order, Department of Housing and Urban Development.

## Posner to Federal Bench

Former Research Associate Richard A. Posner was appointed United States Court of Appeals judge for the Seventh Circuit (Chicago) on December 4, ending a decade-long affiliation with NBER. Posner, an authority on antitrust and other economic aspects of the law, had been a member of the Bureau's Program in Law and Economics.



A 1962 graduate of Harvard Law School, Posner graduated first in his class and clerked for U.S. Supreme Court Justice William Brennan from 1962-63. From 1963-68, Posner was on the staff of the Federal Trade Commission and the U.S. Solicitor General and served as general

counsel to the President's Task Force on Communications Policy.

Posner taught at Stanford Law School in 1968-69 and has been a professor of law at the University of Chicago since 1969. His most recent book, *The Economics of Justice*, was published in 1981.

## Economics Fluctuations Meeting Held

Members and guests of NBER's Program on Economic Fluctuations convened at Princeton University on March 5 and 6 to discuss current research. The two-day program was:

Andrew Abel and Olivier Blanchard, Harvard University and NBER, "Cyclical Variability of Investment"  
Discussant: Robert Lucas, University of Chicago and NBER

Ben Bernanke, Stanford University and NBER, "Permanent Income, Liquidity, and Expenditures on Automobiles"

Discussant: Alan Blinder, Princeton University and NBER

Behzad Diba, Brown University, and Herschel Grossman, Brown University and NBER, "Rational Asset Price Bubbles"

Discussant: Bennett McCallum, Carnegie-Mellon University and NBER

Robert Hall, Stanford University and NBER, and Edward Lazear, University of Chicago and NBER, "Excess Sensitivity of Layoffs and Quits to Demand"

Discussant: Joseph Stiglitz, Princeton University and NBER

Jo Anna Gray, Board of Governors of the Federal Reserve System, "Wage Indexation, Incomplete Information, and the Aggregate Supply Curve"

Discussant: Martin Baily, Princeton University and NBER

Robert Gordon, Northwestern University and NBER, and Stephen King, University of Rochester and NBER, "Output Cost of Disinflation in Traditional and Vector-Autoregressive Models"

Discussant: Stanley Fischer, MIT and NBER

Julio Rotemberg, MIT and NBER "Sticky Prices in the United States"

Discussant: Thomas Sargent, University of Minnesota and NBER

Abel and Blanchard compute the expected, present discounted value of marginal profits for manufacturing and examine its relation to investment. They obtain the expected values of marginal profits and the cost of capital by estimating a vector autoregression that includes marginal profits and the cost of capital. Their two main conclusions are that cyclical movements in the present

discounted value series are due at least as much to movements in the cost of capital as to movements in marginal profits, and that the series explain only a small proportion of movements in investment.

Several recent papers have tested the permanent-income hypothesis under rational expectations using data on nondurables; Bernanke shows how this approach can be extended to the case of durables. He examines panel data on automobile expenditures and finds no evidence against the permanent-income hypothesis. He then conducts further analysis to check the robustness of his conclusion. He finds, in particular, that the result is unchanged in subsamples separated by family holdings of liquid assets.

Grossman and Diba study the properties of the solutions for market-clearing prices that can arise in linear models where supply or demand depend on rational expectations of future prices. They show that the solution can involve three parts, which they call the fundamental component, the deterministic bubble component, and the stochastic bubble component. The stochastic component may explain why the markets for assets such as gold, common stocks, and foreign exchange exhibit excessive volatility.

The paper by Hall and Lazear argues that excessive layoffs in bad times and excessive quits in good times stem from the fact that the worker-firm relationship is essentially a bilateral monopoly with incomplete information. They find that simple employment rules based on predetermined or indexed wages are in many cases the most desirable among the class of reasonable employment arrangements. More complicated contracts that seem to deal more effectively with excessive layoffs and quits are either infeasible because of informational requirements or because they create adverse incentives.

Gray's model combines two popular classes of models of output determination where monetary shocks can have real effects: models in which a contractually fixed nominal wage rate is the central feature, and models in which information confusion is the central feature. At the time one-period contracts are signed, firms and workers cannot disentangle industry-specific shocks from aggregate demand shocks. Gray shows that the slope of the aggregate supply curve that summarizes the response of outputs to an aggregate demand shock depends not only on the extent to which wages are indexed, but also on the stochastic structure of the economy. Her paper also shows that full indexing does not completely insulate outputs from aggregate demand shocks.

The paper by Gordon and King estimates a traditional Phillips-curve type of model allowing for effects from the supply side and contrasts it with a less restrictive vector autoregressive model. These models are then used to study the output costs of different disinflationary policies. The discussion at the meeting focused on the role of expectations in the inflation process and the corresponding costs of disinflation policy.

Rotemberg presents a theory that justifies price stickiness: firms, fearing to upset their customers, attribute a cost to price changes. The resulting model, estimated

with postwar U.S. data, supports the hypothesis that prices are sticky. The discussion focused on the micro foundations for the cost of price adjustment, since there are different macroeconomic implications, depending on the way price stickiness is modeled.

In addition to the authors and discussants, the following NBER program members attended the meeting: Joseph Altonji, Columbia University; Jorge de Macedo, Don Fullerton, Stephen Goldfeld, Gene Grossman, Peter Hartley, and John Taylor, Princeton University; Peter Garber and Robert King, University of Rochester; Frederic Mishkin and Laurence Weiss, University of Chicago; Bureau President Martin Feldstein, Harvard University; Robert Flood, Board of Governors of the Federal Reserve System; Fumio Hayashi, Northwestern University; Robert Litterman, Federal Reserve Bank of Minneapolis; Michael Rothschild, Mathematica; and Lawrence Summers, MIT. Also participating were: Orley Ashenfelter, Gregory Chow, David Germany, Albert Kyle, Mark Machina, Richard Quandt, and Carl Shapiro, Princeton University; Costas Azariadis, University of Pennsylvania; Guillermo Calvo, Columbia University; Larry Christiano and Lars Hansen, University of Chicago; Roman Frydman, New York University; Jean Grossman, Mathematica; Kenneth Singleton, Carnegie-Mellon University; and Mark Watson, Harvard University.

## Two New Reports Issued

An NBER Summary Report, *Conferences on Inflation*, and the 1981 *Annual Research Conference Report* were published this spring and are available from the Bureau's Cambridge office. *Conferences on Inflation* briefly summarizes the twelve papers presented at two conferences in Washington, D.C., in the fall of 1980 and the winter of 1981, by members of the NBER Project on Inflation. These concise, nontechnical papers will also be issued in their entirety in an NBER conference volume to be published by the University of Chicago Press late this year.

The 1981 *Annual Research Conference Report* is a brief synopsis of the papers and discussions presented to NBER corporate supporters in New York this past October. (See *NBER Reporter*, Winter 1981/2, page 18, for details of the conference.) Both reports may be obtained free of charge from the Publications Department, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138.

## Reprints Available

The following NBER Reprints, intended for nonprofit education and research purposes, are now available. (Previous issues of the *NBER Reporter* list titles 1-235 and contain abstracts of the Working Papers cited below.)

236. "The Economics of Mortality in North America, 1650-1910: A Description of a Research Project," by Robert W. Fogel, Stanley L. Engerman, James Trussell, Roderick Floud, Clayne L. Pope, and Larry T. Wimmer, 1978
237. "Pareto Optimality and Competition," by Joseph E. Stiglitz, 1981
238. "Variations in Infant Mortality Rates among Counties of the United States: The Roles of Public Policies and Programs," by Michael Grossman and Steven Jacobowitz, 1981 (NBER Working Paper No. 615)
239. "Exchange Rates in the 1920s: A Monetary Approach," by Jacob A. Frenkel and Kenneth W. Clements, 1981 (NBER Working Paper No. 290)
240. "Foreign Production and Exports in Manufacturing Industries," by Robert E. Lipsey and Merle Yahr Weiss, 1981 (NBER Working Papers Nos. 87 and 131)
241. "The Impact of Wages and Unemployment on Youth Enrollment and Labor Supply," by Alan L. Gustman and Thomas L. Steinmeier, 1981 (NBER Working Paper No. 415)
242. "The Federal Minimum Wage, Employment, and Inflation," by John F. Boschen and Herschel I. Grossman, 1981 (NBER Working Paper No. 652)
243. "The Real Interest Rate: An Empirical Investigation," by Frederic S. Mishkin, 1981 (NBER Working Paper No. 622)
244. "Staggered Wage Setting with Real Wage Relativities: Variations on a Theme of Taylor," by Willem H. Buiter and Ian Jewitt, (NBER Working Paper No. 545)
245. "Labor Supply," by Jerry A. Hausman, 1981
246. "Does the Investment Interest Limitation Explain the Existence of Dividends?" by Daniel Feenberg, 1981 (NBER Working Paper No. 530)
247. "Explanations of Exchange-Rate Volatility and Other Empirical Regularities in Some Popular Models of the Foreign Exchange Market," by Robert P. Flood, 1981 (NBER Working Paper No. 625)
248. "The Effect of Unionism on Fringe Benefits," by Richard B. Freeman, 1981 (NBER Working Paper No. 292)
249. "Price Level Determinacy with an Interest Rate Policy Rule and Rational Expectations," by Bennett T. McCallum, 1981 (NBER Working Paper No. 559)
250. "On Functions, Quality, and Timeliness of Economic Information," by Victor Zarnowitz, 1982 (NBER Working Paper No. 608)
251. "Monetary Policy and International Competitiveness: The Problems of Adjustment," by Willem H. Buiter and Marcus Miller, 1981 (NBER Working Paper No. 591)

252. "Prices and Market Shares in the International Machinery Trade," by Irving B. Kravis and Robert E. Lipsey, 1982 (NBER Working Paper No. 521)
253. "Stochastic Prices and Tests of Efficiency of Foreign Exchange Markets," Jacob A. Frenkel and Assaf Razin, 1980
254. "Inventories, Rational Expectations, and the Business Cycle," by Alan S. Blinder and Stanley Fischer, 1981 (NBER Working Paper No. 381)

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## Bureau Books

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### Second Krueger Volume Available

*Factor Supply and Substitution*, the second in a three-volume study entitled *Trade and Employment in Developing Countries*, edited by NBER Research Associate Ann O. Krueger, is now available from the University of Chicago Press. Krueger is professor of economics at the University of Minnesota and was a director of the NBER Study on Foreign Trade Regimes and Economic Development.

This volume extends the analysis of trade regimes and employment in depth for single countries and through cross-country analyses. In so doing, it provides important new evidence of the effects of different trade policies and of the various factors that make up these policies: exchange rates, wages, social insurance and other taxes, prices, and credit.

All six studies reflect a carefully coordinated research strategy carried out by a first-rate team. The researchers combine technical expertise and specialized knowledge of the individual countries. According to Professor Krueger, this work "is a major step forward in understanding the substitution relations between factors of production in developing countries."

The first contributor, James M. Henderson, provides a model for estimating the changes likely to result from shifting trade strategies with or without removal of distortions from the factor market. T. Paul Schultz, in a study based on Colombia, contributes the first empirical demonstration of the ways effective protection affects the incomes of the domestic owners of the factors of production. In fact, Professor Krueger remarks, "Schultz presents the first systematic evidence that I know of that tariff protection helps employers more than employees and probably worsens the income distribution." Jose Carvalho and Claudio Haddad estimate the response of Brazilian exports to changes in incentives. Papers by Jere Behrman and by Vittorio Corbo and Patricio Meller both address the question of the substitution between

labor and capital, Behrman using a data set for seventy countries and twenty-seven industries, Corbo and Meller using data from over eleven thousand establishments in eighty-five Chilean industries. The final paper, by Robert Lipsey, Irving Kravis, and Romualdo Roldan, examines the adaptation of multinational firms to altered relative factor prices in developing countries. Professor Krueger notes that this paper shows "that multinationals *do* respond to differences in wages, both by substituting between factors and by locating production processes in suitable countries."

The Krueger volume, at a cost of \$29.00, may be ordered directly from the University of Chicago Press, Order Department, 11030 South Langley Avenue, Chicago, IL 60628. An academic discount of 10 percent for individual volumes and 20 percent for standing orders for all NBER books published by the University of Chicago Press are available to university faculty; orders must be sent on university stationery.

### Youth Employment Study Released

*The Youth Labor Market Problem, Its Nature, Causes, and Consequences*, an NBER conference volume edited by Richard B. Freeman and David A. Wise, is now available from the University of Chicago Press. This volume brings together a massive body of much-needed research information on a problem of crucial importance to labor economists, policy makers, and society in general: unemployment among the young. The thirteen studies detail the ambiguity and inadequacy of our present standard statistics as applied to youth employment, point out the error in many commonly accepted views, and show that many critically important aspects of this problem are not adequately understood. These studies also supply a significant amount of raw data, furnish a platform for further research and theoretical work in labor economics, and direct attention to promising avenues for future programs.

Two background papers open the book and provide a nontechnical overview of the youth unemployment situation that should be of wide general interest. They are followed by eleven empirical studies that deal with such topics as the role of job tenure, vocational education, and parents' or siblings' occupation in labor force activity; changes over time in the magnitude and character of youth unemployment; differences among geographic labor markets; movement into and out of the labor force; unemployment among young women; and differences between British and U.S. youth unemployment.

These empirical studies offer a range of *new* substantive findings. For example, it appears that joblessness is concentrated among a relatively small group of youth. Also, the employment position of young blacks has deteriorated at the same time that their relative earnings

have been increasing. A strong relationship is also found between early employment, particularly during high school, and later employment and wages.

Other findings—such as the high turnover within the labor force and individual jobs, the impact of the minimum wage on teenage unemployment, and the sensitivity of youth joblessness to economic or business cycles—are not new. However, the evidence presented here confirms the need for policy makers to focus on these issues in the future.

Richard Freeman, director of NBER's Program in Labor Studies, is a professor of economics at Harvard University. David Wise, a research associate in the Bureau's labor studies program, is Stanbough Professor of Political Economy at Harvard's John F. Kennedy School of Government. Other contributors to the volume include: James L. Medoff, Michael L. Wachter and Choongsoo Kim, Kim B. Clark and Lawrence H. Summers, Linda S. Leighton and Jacob Mincer, Robert H. Meyer, David Ellwood, Mary Corcoran, Charles C. Brown, Albert E. Rees and Wayne Gray, Robert E. Hall, and Richard Layard.

The volume, priced at \$45.00, should be ordered directly from the University of Chicago Press, Order Department, 11030 South Langley Avenue, Chicago, IL 60628. An academic discount of 10 percent for individual volumes and 20 percent for standing orders for all NBER-U. Chicago Press books are available to university faculty; orders must be sent on university stationery.

## Health Study Available

*Economic Aspects of Health*, an NBER conference volume edited by Victor R. Fuchs, codirector of the Bureau's Program in Health Economics, is now available from the University of Chicago Press. Unlike earlier work in medical economics, which has focused on medical care, the ten papers in this volume stress the production and consequences of health itself. They reveal a serious concern with real-world health problems, investigating such subjects as infant mortality, life expectancy, morbidity, and disability.

These papers are also unusual in that they bring to bear new and powerful theoretical and statistical tools not commonly used in the study of health and disease. Moreover, they draw on, and in some cases comprise, original sources for new bodies of data. As such, *Economic Aspects of Health* represents a blend of relevance and rigor that will be of major interest to economists, epidemiologists, physicians, and anyone else interested in health policy.

Four of the papers included in the volume report the results of empirical studies of the determinants of health status; four consider the consequences of ill health; and two are theoretical treatments of health in relation to public policy. Fuchs's introductory essay provides summaries of the ten papers and relates them to each other and to ongoing work in the field.

This particular volume is unique in its empirical application of new theory to actual data. Professor Mark Pauly of Northwestern University has said of this work, "It is an excellent example of what economics and econometrics can contribute to an understanding of the causes and impacts of ill health."

*Economic Aspects of Health* may be ordered for \$32.00 from the University of Chicago Press, Order Department, 11030 South Langley Avenue, Chicago, IL 60628. An academic discount of 10 percent for individual volumes and 20 percent for standing orders for all NBER-U. Chicago Press books are available to university faculty; orders must be sent on university stationery.

## Technical Papers Series

Additional studies in the NBER Technical Working Papers series are now available (see previous issues of the *NBER Reporter* for other titles). Like NBER Working Papers, these studies may be obtained by sending \$1.50 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.

### **Saddlepoint Problems in Continuous-Time Rational Expectations Models: A General Method and Some Macroeconomic Examples**

**Willem H. Buiter**

Technical Working Paper No. 20

February 1982

JEL Nos. 213, 130, 430

This paper presents a general solution method for rational expectations models that can be represented by systems of deterministic, first-order, linear differential equations with constant coefficients. It is the continuous-time adaptation of the method of Blanchard and Kahn. To obtain a unique solution there must be as many linearly independent boundary conditions as there are linearly independent state variables. Three slightly different versions of a well-known, small, open-economy macroeconomic model were used to illustrate three fairly general ways of specifying the required boundary conditions. The first represents the standard case in which the number of stable characteristic roots equals the number of predetermined variables. The second represents the case where the number of stable roots exceeds the number of predetermined variables by the number of "backward-looking" but nonpredetermined variables whose discontinuities are linear functions of the discontinuities in the forward-looking variables. The third represents the case where the number of unstable roots is less than the number of forward-looking state variables. For the last case, boundary conditions are suggested that involve linear restrictions on the values of the state variables at a future date.

The method of this paper permits the numerical solution of models with large numbers of state variables. Any combination of anticipated or unanticipated, current or future, and permanent or transitory shocks can be analyzed.

### **Predetermined and Nonpredetermined Variables in Rational Expectations Models**

**Willem H. Buiter**

Technical Working Paper No. 21

March 1982

JEL Nos. 023, 213, 130

The distinction between predetermined and nonpredetermined variables is a crucial one in rational expectations models. I consider and reject two definitions, one proposed by Blanchard and Kahn and one by Chow. Both definitions lead to possible misclassifications. Instead I propose the following definition: a variable is nonpredetermined if and only if its *current* value is a function of *current* anticipations of future values of endogenous and/or exogenous variables. This definition focuses on the essential economic property of nonpredetermined variables: unlike predetermined variables they can respond instantaneously to changes in expectations due to "news." The new definition also fits the structure of rational expectations models solution algorithms such as the one proposed by Blanchard and Kahn.

### **The Roles of Money and Credit in Macroeconomic Analysis**

**Benjamin M. Friedman**

Working Paper No. 831

December 1981

JEL No. 310

This paper considers the implications, for macroeconomic modeling and for monetary policy, of the interrelationships among money, credit, and nonfinancial economic activity. Data for the United States since World War II show that the volume of outstanding credit is as closely related to economic activity as is the stock of money and, moreover, that neither money nor credit is sufficient to account fully for the effect of financial markets in determining real economic activity. Instead, what appears to matter is an interaction between money and credit. This result is consistent with a macroeconomic modeling strategy that deals explicitly with both the money market and the credit market, and with a monetary policy framework based on the joint use of a money-growth target and a credit-growth target.

### **Exchange Rate Dynamics and the Overshooting Hypothesis**

**Jacob A. Frenkel and Carlos A. Rodriguez**

Working Paper No. 832

January 1982

JEL No. 430

In this paper, we analyze the determinants of the evolution of exchange rates in the context of alternative models of exchange-rate dynamics. We examine the overshooting hypothesis in two types of models: those that emphasize size differential speeds of adjustment in asset and goods markets, and those that emphasize portfolio balance considerations. We show that exchange-rate overshooting is not an intrinsic characteristic of the foreign exchange market; it depends on a set of specific assumptions. We also show that overshooting is not a characteristic of the assumption of perfect foresight, nor does it depend in general on the assumption that goods and asset markets clear at different speeds. As long as the speeds of adjustment in the various markets are less than infinite, the key factor determining the short-run effects of a monetary expansion is the degree of capital mobility. When capital is highly mobile, the exchange rate overshoots its long-run value; when capital is relatively immobile, the exchange rate undershoots its long-run value. Within the context of the portfolio-balance model, we show that the effects of a monetary expansion on the dynamics of exchange rates, and in particular on whether exchange rates overshoot or undershoot their equilibrium path, depend critically on the specification of asset choice, the degree of substitution among assets, and the quality of the various assets as inflation hedges. Specifically, when internationally traded goods are a

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## **Current Working Papers**

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better inflation hedge than nontraded goods, the nominal exchange rate overshoots the domestic price level (and vice versa).

## **Can We Sterilize? Theory and Evidence**

**Maurice Obstfeld**

Working Paper No. 833

January 1982

JEL No. 431

This paper is a highly selective review of our knowledge about the scope for sterilized intervention in foreign exchange markets under alternative exchange-rate regimes. Section I demonstrates the potential importance of simultaneous-equations bias in single-equation econometric studies of the capital-account offset to monetary policy under fixed exchange rates. The empirical record suggests that, in the case of West Germany, sterilization was a feasible short-run monetary strategy in the 1960s. Section II notes that there is considerable recent evidence of imperfect asset substitutability under the managed float. While limited substitution between bonds of different currency denomination is a precondition for the efficacy of sterilized foreign-exchange intervention, it is no guarantee of efficacy. Whether limited substitutability can in fact be exploited in a predictable manner by central banks is a distinct, and unanswered, question.

## **Transitory Terms-of-Trade Shocks and the Current Account: The Case of Constant Time Preference**

**Maurice Obstfeld**

Working Paper No. 834

January 1982

JEL Nos. 411, 431, 441

This paper uses an intertemporal, perfect-foresight, optimizing model to analyze the effect of transitory terms-of-trade shocks on a small open economy's current-account and utility time profiles. An adverse terms-of-trade shift known to be temporary induces the economy to run down its stock of external assets in the period before the terms of trade revert to their initial level. Subsequently, the assets consumed during this period are reaccumulated. The current-account response is due only in part to a desire to smooth out the future consumption stream. In addition, households know that the real value of any debt incurred while the terms of trade are unfavorable will be reduced sharply when the terms of trade improve. This opportunity for intertemporal price speculation causes the time path of instantaneous utility to be discontinuous.

## **Expectations, Life Expectancy, and Economic Behavior**

**Daniel S. Hamermesh**

Working Paper No. 835

January 1982

JEL Nos. 026, 840, 915, 913

Unlike price expectations—which are central to macroeconomic theory and have been examined extensively using survey data—the formation of individuals' horizons, which are central to the theory of life-cycle behavior, have been completely neglected. This is especially surprising since life expectancy of adults has increased especially rapidly in countries in the West during the past ten years. This study presents the results of analyzing responses by two groups—economists and a random sample—to a questionnaire designed to elicit subjective expectations and probabilities of survival. It shows that people do not extrapolate past improvements in longevity when they determine their subjective horizons, although they are fully aware of levels of and movements within today's life tables. They skew subjective survival probabilities in a way that implies that the subjective distribution has greater variance than its actuarial counterpart; and the subjective variance decreases with age. They also base their subjective horizons disproportionately on their relatives' longevity, and long-lived relatives increase uncertainty about the distribution of subjective survival probabilities.

As one example of the many areas of life-cycle behavior to which the results are applicable, the study examines the consumption-leisure choices of the optimizing consumer over his lifetime. It finds that shortfalls in utility in old age, which occurred because people's ex ante horizons had to be updated as average longevity increased, are relatively small. This implies that large subsidies to retirees under today's Social Security system cannot be justified as compensation for an unexpectedly long retirement for which they failed to save.

## **The Nonadjustment of Nominal Interest Rates: A Study of the Fisher Effect**

**Lawrence H. Summers**

Working Paper No. 836

January 1982

This paper critically reexamines theory and evidence on the relationship between interest rates and inflation. It concludes that there is no evidence that interest rates respond to inflation in the way that classical or Keynesian theories suggest. For the period 1860–1940, it does not appear that inflationary expectations had any significant impact on rates of inflation either in the short or in the long run. During the postwar period, interest rates do appear to be affected by inflation. However, the effect is

much smaller than any theory that recognizes tax effects would predict. Furthermore, all the power in the inflation/interest rate relationship comes from the 1965-71 period. Within the 1950s or 1970s, the relationship is both statistically and substantively insignificant.

I consider various explanations for the failure of the theoretically predicted relationship to hold. The relationship between inflation and interest rates remains weak even at the low frequencies. This is taken as evidence that cyclical factors, or errors in measuring expectations of inflation, cannot account for the failure of the results to bear out Fisher's theoretical prediction. Rather, comparison of real interest rates and stock market yields suggests that Fisher was correct in pointing to money illusion as the cause of the imperfect adjustment of interest rates to expected inflation.

### **The Impact of Collective Bargaining: Can the New Facts Be Explained by Monopoly Unionism?**

**Richard B. Freeman and James L. Medoff**  
Working Paper No. 837  
January 1982  
JEL No. 832

In this paper we focus our attention on the question of whether union/nonunion differences in nonwage outcomes can, in fact, be explained in terms of standard price-theoretic responses to real wage effects, as opposed to the real effect of unionism on economic behavior.

We reach three basic conclusions. First, unions and collective bargaining have real economic effects on diverse nonwage variables that cannot be explained either in terms of price-theoretic responses to union wage effects or by the poor quality of our econometric "experiments." Second, while sensitivity analyses of single-equation results and longitudinal experiments provide valuable checks on cross-sectional findings, multiple-equations approaches produce results that are too sensitive to small changes in models or samples to help resolve the questions of concern. Finally, on the basis of these findings, we conclude that the search for an understanding of what unions do requires more than the standard price-theoretic "monopoly" model of unionism. New (and/or old) perspectives based on institutional or industrial relations realities, contractarian or property rights theories, or other potential sources of creative views are also needed.

### **Consumption, Asset Markets, and Macroeconomic Fluctuations**

**Robert J. Shiller**  
Working Paper No. 838  
January 1982

In this paper, a broad, exploratory analysis of data is used to assess the type of model in which long-term asset

prices change through time primarily due to consumption-related changes in the discount rate. Ex-post marginal rates of substitution are inferred from aggregate consumption data; prices of stocks, bonds, short debt, land, and housing for the period 1890 to 1980 are also used. Methods of evaluating this kind of model in the absence of accurate data on consumption are also explored.

### **Structural Differences and Macroeconomic Adjustment to Oil Price Increases in a Three-Country Model**

**Nancy P. Marion and Lars E. O. Svensson**  
Working Paper No. 839  
January 1982  
JEL No. 431

In this paper, a three-country model based on intertemporal maximizing behavior is constructed in order to analyze the effects of oil price increases on welfare levels and trade balance positions. The model can also be used to assess the effects of oil price increases on: the world interest rate; the terms of trade in final goods between oil importers (sometimes called the real exchange rate); output, investment, and savings levels; and oil imports, wages, and consumption at each date.

The analysis highlights the role of structural asymmetries between oil importers in accounting for differences in trade balance responses. A number of structural differences are isolated in turn in order to determine their influence on the terms of trade in final goods, which is the key factor affecting relative trade balance positions.

### **A Comparison of Tournaments and Contracts**

**Jerry Green and Nancy L. Stokey**  
Working Paper No. 840  
January 1982  
JEL Nos. 022, 821

Tournaments, reward structures based on rank order, are compared with individual contracts in a model with one risk-neutral principal and many risk-averse agents. Each agent's output is a stochastic function of his effort level plus an additive shock term that is common to all the agents. The principal observes only the output levels of the agents. It is shown that in the absence of a common shock, using optimal independent contracts dominates using the optimal tournament. Conversely, if the distribution of the common shock is sufficiently diffuse, using the optimal tournament dominates using optimal independent contracts. Finally, it is shown that for a sufficiently large number of agents, a principal who cannot observe the common shock but uses the optimal tournament, does as well as one who can observe the shock and uses independent contracts.



## **Two Notes on Indeterminacy Problems: Collapsing Exchange-Rate Regimes and the Indeterminacy Problem**

**Robert P. Flood and Peter M. Garber**

Working Paper No. 841A

January 1982

JEL No. 430

In this paper we show that the arbitrary behavior that results in indeterminacy in the time path of a flexible exchange rate, associated with "badly behaved" speculation, is also manifested under fixed rates by indeterminacy in the time path of the government's holding of international reserves. Thus, to the extent that arbitrariness is characteristic of agents' behavior, it is not resolved but merely masked by the fixing of exchange rates.

## **Two Notes on Indeterminacy Problems: Further Evidence on Price-Level Bubbles**

**Robert P. Flood, Peter M. Garber, and Louis O. Scott**

Working Paper No. 841B

January 1982

JEL No. 430

In this note we study means of testing for price-level bubbles in inflationary situations. Our results contradict the outcomes of some tests reported in Flood and Garber's (1980) paper on bubbles in that the hypothesis of price-level bubbles cannot be rejected using likelihood ratio tests.

## **International Risk Sharing and the Choice of Exchange-Rate Regime**

**David A. Hsieh**

Working Paper No. 842

January 1982

JEL No. 431

This paper examines the argument that the fixed-exchange-rate regime is preferable to the flexible-rate regime because the former allows risk sharing across countries while the latter does not. The analysis is performed in a two-country, overlapping-generations model, where markets are incomplete under either exchange regime. In this second-best world, it is demonstrated that the ability to share risk across countries in the fixed-rate regime does not necessarily lead to higher welfare than the inability to share risk in the flexible-rate regime.

## **Tests of Rational Expectations and No Risk Premium in Forward Exchange Markets**

**David A. Hsieh**

Working Paper No. 843

January 1982

JEL No. 431

This paper tests the hypothesis that traders have rational expectations and charge no risk premium in the forward exchange market. It uses a statistical procedure consistent with a large class of heteroscedasticity, and a set of data that takes into account the institutional features of the forward exchange market. The results show that inferences using this procedure are very different from those using the standard assumption of homoscedasticity.

## **The Labor Market Impact of Federal Regulation: OSHA, ERISA, EEO, and Minimum Wage**

**Olivia S. Mitchell**

Working Paper No. 844

January 1982

JEL No. 800

This paper critically evaluates the contribution of research in labor economics and industrial relations to our understanding of the impact of government labor market regulation. Recent theoretical and empirical literature is analyzed for four major policies: (1) workplace safety and health; (2) employer-provided pensions; (3) wage minimums; and (4) employment and pay practices with regard to women and minorities. Studies on EEO and OSHA reforms find small but positive impacts on the outcomes they seek to alter; the minimum-wage literature indicates that low-skilled workers were not benefited much by wage floors; and no analysis exists yet on whether ERISA improved pension security. Directions for future analysis are suggested, including the role of research in policymaking, whether and how regulatory policy affects labor productivity, and the distributional impact of different forms of regulation on various labor market groups.

## **Expectations and Forecasts from Business Outlook Surveys**

**Victor Zarnowitz**

Working Paper No. 845

January 1982

JEL No. 130

Each quarter since 1968 the National Bureau of Economic Research (NBER), in collaboration with the American Statistical Association (ASA), has been collecting a

large amount of information on the record of forecasting in the U.S. economy. This paper is a progress report on a comprehensive study of the distribution of individual predictions from these surveys. It covers forecasts of quarterly developments in the year ahead for six variables representing inflation, real growth, unemployment, business inventory investment, and percentage changes in GNP and spending on consumer durables. The 79 respondents who participated in at least 12 of the 42 surveys constitute a broadly based and diversified group of experts and agents, mostly from the world of corporate business and finance—executives, analysts, economic consultants, and some government and academic forecasters. The data are in certain respects uniquely rich.

The first part of the paper briefly reviews the models of economic expectations and discusses the potential and problems of using survey data for testing these models. The second part offers a comparative analysis of the individual prediction series from the NBER-ASA as well as some earlier surveys. There are gains from combining predictions from different sources; e.g., the group mean forecasts are on the average, over time, more accurate than most of the corresponding sets of individual forecasts or expectations. But there is also a moderate degree of consistency in the relative performances of individual forecasters, some of whom score well above average with respect to several variables and predictive horizons.

The third section presents the distributions of an array of absolute accuracy measures for the survey respondents, regressions of actual on predicted values, and associated tests of bias and autocorrelation of error. The marginal forecast errors tend to increase, and the correlations between predictions and realizations tend to decrease, as the target quarter recedes into the future. The tests of the joint null hypothesis that the regressions have zero intercepts and unitary slope coefficients are very unfavorable to expectations of inflation, but they show the forecasts of the other variables generally in a much better light. Inflation has been largely underestimated, with the predicted rates lagging behind the actual rates. On the other hand, real growth has been overestimated on the average. The incidence of autocorrelation in the prediction errors was also much higher for inflation than for the other variables.

A summary of findings is provided. The fifth and last section lists some additional questions raised by this study, to be dealt with in another paper.

## **The Effect of the Minimum Wage on Employment and Unemployment: A Survey**

**Charles Brown, Curtis Gilroy, and Andrew Kohen**

Working Paper No. 846

January 1982

JEL No. 824

In this paper, we survey theoretical models of the effect of the minimum wage and evidence of its effect on employment and unemployment. Our discussion of the

theory emphasizes recent work using two-sector and heterogeneous-worker models. We then summarize and evaluate the literature on employment and unemployment effects of the minimum on teenagers. Finally, we survey the evidence of the effect of the minimum wage on adult employment, and on employment in low-wage industries and areas.

## **Wages and Prices Are Not Always Sticky: A Century of Evidence for the United States, United Kingdom, and Japan**

**Robert J. Gordon**

Working Paper No. 847

January 1982

JEL Nos. 110, 310, 830

Arthur M. Okun's last book, *Prices and Quantities*, contributes a theory of universal wage and price stickiness but provides no explanation at all of historical and cross-country differences in behavior. The core of this paper provides a new empirical characterization of price and wage changes over the last century in the United States, United Kingdom, and Japan, in order to demonstrate the wide variety of historical responses that have occurred. Equations for changes in the GNP deflator, in the hourly manufacturing wage rate, and in the real wage rate are estimated, with attention to the influence of both demand and supply disturbances. Because of the long sample period involved, extending back to 1875 for the United Kingdom and to 1892 for the other two countries, there is extensive attention to shifts in parameters.

My description of U.S. data differs from Okun's framework by rejecting his wage-wage formulation of the postwar U.S. inflation inertia process, by allowing the impact of demand disturbances to depend on both the level and rate of change of aggregate demand, by allowing demand to influence price-setting as well as wage-setting behavior, and by stressing the fact that inertia in the U.S. adjustment process is purely a postwar phenomenon rather than the universal fact implied by Okun. The results for the United Kingdom and Japan compound the conflict with Okun's analysis, since in these two countries wages have been far from sticky, even in postwar years. Prices and wages were particularly flexible in the United States during World War I and its aftermath, in Japan since 1914, and in the United Kingdom since the mid-1950s.

The last half of the paper provides an analysis of behavior in labor markets and product markets. The unique nature of the U.S. postwar adjustment reflects its unique institution of three-year staggered wage contracts, and the analysis attempts to explain why we do not observe perfect insulation of nominal wages from shifts in nominal demand. The section on the product markets examines the factors that explain why prices are often preset, and why the speed of adjustment to demand shocks is sensitive to the nature of aggregate information available.

## **The New Economics of Accelerated Depreciation**

**Alan J. Auerbach**

Working Paper No. 848

January 1982

JEL No. 323

The Economic Recovery Tax Act of 1981 included the largest business tax cut in U.S. history, embodied in the Accelerated Cost Recovery System (ACRS). This paper describes in detail the provisions of the new treatment of depreciable property and analyzes in a fairly nontechnical way its economic impact. Particular attention is paid to a novel part of ACRS that creates a "safe harbor" for a wide range of sale-leaseback arrangements, effectively permitting the sale of depreciation deductions by investors without taxable income.

## **The Effects of the Minimum Wage on the Employment and Earnings of Youth**

**David A. Wise and Robert H. Meyer**

Working Paper No. 849

January 1982

JEL Nos. 824, 212

The employment and earnings effects of the minimum wage are estimated by assigning parameters to a hypothesized relationship between underlying market employment and wage relationships versus observed wage and employment distributions in the presence of a legislated minimum. If there had been no minimum during the 1973-78 period, we estimate that employment among out-of-school men aged 16 to 24 would have been approximately 4 percent higher than it in fact was. Among young men aged 16 to 19, employment would have been about 7 percent higher, and among those aged 20 to 24, 2 percent higher. Employment among black youth aged 16 to 24 would have been almost 6 percent higher than it was, as compared with somewhat less than 4 percent for white youth. Although it is sometimes argued that the adverse employment effects of the minimum wage are offset by increased earnings, we find virtually no earnings effect. Had the minimum not been raised over the 1973-78 period, inflation would have greatly moderated the adverse employment effects of the minimum, with approximately two-thirds of the potential employment gains from elimination of the minimum attained. The weight of our evidence is inconsistent with a general increase in youth wage rates through increases in the real minimum. Our findings support the hypothesis that the effects of the minimum are concentrated on youth with subminimum market wage rates.

## **R and D and Productivity at the Industry Level: Is There Still a Relationship?**

**Zvi Griliches and Frank Lichtenberg**

Working Paper No. 850

February 1982

JEL No. 621

This paper reexamines the relationship between research and development (R and D) activity and total factor productivity (TFP) at the industry level during the period from the early 1960s to the mid-1970s. The data base consists of National Science Foundation data on applied R and D expenditures by product class, matched to TFP indexes derived from the detailed Census-Penn-SRI data file on manufacturing.

A hypothesis suggested by previous research on the R and D-productivity relationship is that, due perhaps to the depletion of scientific opportunities, the "potency" of R and D as a source of technological progress has declined in recent years. Our findings indicate, however, that the relationship between an industry's R and D intensity and its productivity growth did not disappear; if anything, the relationship was stronger in recent years. The overall deceleration in productivity in recent years has affected R and D-intensive industries, but to a lesser extent than it has other industries. What cannot be found in the data is strong evidence of the differential effects of the slowdown in R and D itself. The time series appear to be too noisy and the period too short to detect what the major consequences of the retardation in the growth of R and D expenditures may yet turn out to be.

## **Input Price Shocks and the Slowdown in Economic Growth: The Case of U.K. Manufacturing**

**Michael Bruno and Jeffrey Sachs**

Working Paper No. 851

February 1982

JEL Nos. 131, 133

This paper provides a theoretical and empirical analysis of the effects of shocks in input prices on economic growth, with a focus on U.K. manufacturing in the 1970s. The theoretical model predicts a discrete decline in output and productivity after a rise in input prices and a longer-run slowdown in productivity growth, real wage growth, and capital accumulation. These features characterize the United Kingdom and most other OECD economies after 1973. The empirical results confirm the important role of input prices in recent U.K. adjustment but also point to an important role for other supply and demand factors.

## **Energy and Resource Allocation: A Dynamic Model of the "Dutch Disease"**

**Michael Bruno and Jeffrey Sachs**

Working Paper No. 852

February 1982

JEL Nos. 430, 410

It is well known that discovery of a domestic resource gives rise to wealth effects that cause a squeeze in the tradable good sector of an open economy. The decline of the manufacturing sector following an energy discovery has been termed the "Dutch disease" and has been investigated in many recent studies. Our model extends the principally static analyses to date by allowing for: (1) short-run capital specificity and long-run capital mobility; (2) international capital flows; and (3) farsighted intertemporal optimizing behavior by households and firms. The model is solved by numerical simulation.

## **The Behavior of Money, Credit, and Prices in a Real Business Cycle**

**Robert G. King and Charles I. Plosser**

Working Paper No. 853

February 1982

JEL Nos. 130, 310

This paper analyzes the interaction of money and the price level with a business cycle that is fully real in origin, adopting a view that differs sharply from traditional theories that assign a significant causal influence to monetary movements. The theoretical analysis focuses on a banking system that produces transaction services on demand and thus reflects market activity. Under one regime of bank regulation and fiat money supplied by the monetary authority, the real business cycle theory predicts that: (1) movements in external monetary measures should be uncorrelated with real activity; and (2) movements in internal monetary measures should be positively correlated with real activity. Preliminary empirical analysis provides general support for this focus on the banking sector since much of the correlation between monetary measures and real activity is apparently with inside money.

## **Severance Pay, Pensions, and Efficient Mobility**

**Edward P. Lazear**

Working Paper No. 854

February 1982

This paper argues that pensions are used as severance pay devices in an efficient compensation scheme. The major points of the study are: (1) Severance pay, which

takes the form of higher pension values for early retirement, is widespread. (2) A major reason for the existence of pensions is the desire to provide an incentive mechanism that can also function as an efficient severance pay device. It is incorrect to think of pensions merely as a tax-deferred savings account. (3) The wage rates that older workers receive exceed their marginal products. This is evidenced by the fact that employers are willing to buy them out with higher pensions if they retire early.

These conclusions are based upon examination of a data set that was generated as part of this study. That data set contains detailed information on 244 of the largest pension plans in the country, covering about 8 million workers.

## **Speculative Hyperinflations in Maximizing Models: Can We Rule Them Out?**

**Maurice Obstfeld and Kenneth Rogoff**

Working Paper No. 855

February 1982

JEL No. 134

Knife-edge stability is a common property of dynamic monetary models that assume perfect foresight or rational expectations. These models can be closed with the assumption that the economy's equilibrium lies on the unique convergent path (the saddlepath). While this empirically plausible assumption yields sensible results, aggregative models are not specified in sufficient detail to allow one to *prove* that the saddlepath is the unique equilibrium path. Brock (1974, 1975) and Brock and Scheinkman (1980) have advanced models in which individual preferences are more fully specified and in which, under certain conditions, the uniqueness and stability of equilibrium can be rigorously demonstrated. This paper shows that these uniqueness conditions are economically unreasonable. Therefore, the question addressed in these maximizing models remains unresolved.

## **New Methods for Analyzing Structural Models of Labor Force Dynamics**

**James J. Heckman and Christopher J. Flinn**

Working Paper No. 856

February 1982

JEL Nos. 821, 210

This paper takes a first step toward developing econometric models for the structural analysis of labor force dynamics. Our analysis is presented in continuous time, although most of the points raised here can be applied to discrete time models. We show that in previous attempts to estimate "structural" models of job search, a key source of information necessary to identify certain structural parameters has been neglected.

We discuss the conditions under which structural search models can be estimated. In particular, the distribution of wage offers must be *recoverable*—that is, it must be the case that the parameters of the untruncated distribution of wage offers be estimable from the truncated distribution of accepted wages. The distribution of wage offers must be assumed to belong to a parametric family. Estimates of structural parameters are shown to be sensitive to the distributional assumption made.

A partial-equilibrium, two-state model of employment dynamics is estimated, using data from the National Longitudinal Survey of Young Men. We find employment and nonemployment rates implied by the estimates of structural parameters to be generally consistent with those observed for the population of young males.

## **Models for the Analysis of Labor Force Dynamics**

**James J. Heckman and Christopher J. Flinn**  
Working Paper No. 857  
February 1982  
JEL Nos. 821, 210

This paper presents new econometric methods for the empirical analysis of individual labor market histories. The techniques developed here extend previous work on continuous time models in four ways: (1) A structural economic interpretation of these models is presented. (2) Time-varying explanatory variables are introduced into the analysis in a general way. (3) Unobserved heterogeneity components are permitted to be correlated across spells. (4) A flexible model of duration dependence is presented that accommodates many previous models as a special case and that permits tests among competing specifications within a unified framework.

We contrast our methods with more conventional discrete-time and regression procedures. The parameters of continuous-time models are invariant to the unit of sampling time used to record observations. Problems plague the regression approach to analyzing duration data that do not plague the likelihood approach advocated in this paper. The regression approach cannot be readily adopted to accommodate time-varying explanatory variables. The functional forms of regression functions depend on the time paths of the explanatory variables. Ad hoc solutions to this problem can make exogenous variables endogenous to the model and so can induce simultaneous equations bias.

Two sets of empirical results are presented. A major conclusion of the first analysis is that the discrete-time Markov model widely used in labor market analysis is inconsistent with the data. The second set of empirical results is a test of the hypothesis that “unemployment” and “out of the labor force” are behaviorally different labor market states. For our sample of young men, we find that, contrary to recent claims, they are separate states.

## **New Methods for Estimating Labor Supply Functions: A Survey**

**James J. Heckman and Thomas E. MaCurdy**  
Working Paper No. 858  
February 1982  
JEL No. 821

This paper surveys new methods of estimating labor supply functions. A unified framework of analysis is presented. All recent models of labor supply are special cases of a general index function model developed for the analysis of dummy endogenous variables.

## **Aspects of the Current Account Behavior of OECD Economies**

**Jeffrey Sachs**  
Working Paper No. 859  
February 1982  
JEL Nos. 431, 441

This essay examines some aspects of capital flows within the OECD and outlines a framework for analyzing current-account movements. In both the theoretical and empirical sections, I argue for the importance of including investment and growth in analyses of the current account. I present empirical evidence confirming that shifts in investment rates explain a large part of recent OECD current-account behavior. In addition, the links in theory and practice between exchange rates and the current account are scrutinized. A link between current-account deficits and depreciation is evident for the large OECD economies, but not for many smaller European economies. It appears that the exchange-rate behavior in the smaller economies can be explained by specific exchange-rate policies.

## **Labor Supply under Disability Insurance**

**Frederic P. Slade**  
Working Paper No. 860  
February 1982  
JEL No. 913

There has been significant recent growth in the Social Security Administration's Disability Insurance (DI) program, both in the number of covered workers under the program and in the amount of monthly benefits. One possible factor causing this growth has been labor supply disincentives under the program. The labor supply decision by an individual involves the effect of the disability benefit structure (potential benefits) on labor force participation. Probit estimates from the 1969 original sample of the Longitudinal Retirement History Study (LRHS) indicated an elasticity of participation with respect to benefits of  $-.031$  for married men aged 58–63,

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and  $-.023$  for all men of the same age group. The magnitude of these estimates are much less than those found by authors such as Parsons, and suggest relatively insignificant efficiency losses in terms of reduced work effort.

## **LDC Debt in the 1980s: Risk and Reforms**

**Jeffrey Sachs**

Working Paper No. 861

February 1982

JEL Nos. 121, 430, 441

With the rapid increase in LDC indebtedness in the recent decade, the issues of creditworthiness and country risk have gained new importance. This paper offers a theoretical and historical analysis of international capital markets in the presence of risk of default. The theoretical model suggests the possibility of a prisoner's dilemma in the loan market, in which a country's dominant non-cooperative strategy is to default, although a welfare-improving, cooperative strategy is also available. The historical analysis suggests that the IMF may play a key role in guiding creditors and debtor nations to reach cooperative solutions.

## **Stabilization Policies in the World Economy: Scope and Skepticism**

**Jeffrey Sachs**

Working Paper No. 862

February 1982

JEL Nos. 131, 133

Throughout the industrialized world, macroeconomic performance since the mid-1970s has been very poor, and the prospects in the near term remain bleak. While there is no consensus among macroeconomists regarding the diagnosis (or cure) of these ills, the major competing schools of thought have focused most of their blame on macroeconomic policy. This paper summarizes a series of studies, in collaboration with Michael Bruno, suggesting that supply shocks coupled with real wage rigidities are a central source of the poor macroeconomic performance. Various hypotheses are mentioned as a source for the resistance to real wage cuts, and some illustrations of the policy implications of supply shocks are provided.

## **Rational Expectations and the Foreign Exchange Market**

**Peter Hartley**

Working Paper No. 863

February 1982

JEL No. 431

Many models of exchange-rate determination imply that movements in the supplies and demands for money

should result in movements in exchange rates. Hence, if rational agents are attempting to forecast movements in exchange rates, they should first forecast movements in the supplies of and demands for money balances. Furthermore, if these underlying variables follow some stable autoregressive process, agents should use such processes to make their forecasts. If we identify the forward rate with the market's expectation of the future spot rate, rationality of expectations will imply testable, cross-equation restrictions in a joint model of the autoregressions and exchange-rate forecasting equation. This strategy is implemented in the paper using data on the £UK/\$US and DM/\$US exchange rates from the recent floating rate period.

## **The Excess Sensitivity of Layoffs and Quits to Demand**

**Robert E. Hall and Edward P. Lazear**

Working Paper No. 864

February 1982

JEL Nos. 023, 824

Excessive layoffs in bad times and excessive quits in good times both stem from the same weakness in practical employment arrangements: the specific nature of worker-firm relations creates a situation of bilateral monopoly. Institutions that have arisen to avert the associated inefficiency cannot mimic the separation decisions of a perfect-information, first-best allocation rule. Simple employment rules based on predetermined or indexed wages are in many cases the most desirable among the class of feasible employment arrangements. More complicated contracts that seem to deal more effectively with turnover issues are either infeasible because of informational requirements or they create adverse incentives on some other dimension.

## **A Reexamination of Purchasing Power Parity: A Multicountry and Multiperiod Study**

**Craig S. Hakkio**

Working Paper No. 865

March 1982

JEL No. 431

This paper presents a systematic analysis of the purchasing power parity (PPP) hypothesis. This hypothesis states that the exchange rate is equal to the ratio of the domestic price level to the foreign price level. It has recently been argued that PPP performed poorly in the

1970s. This paper examines several possible explanations for this poor performance. I examine PPP in the 1920s and the 1970s, using monthly and quarterly data, to see if the relationship has changed over time. I also examine PPP in a multi-exchange-rate world, allowing a quite general error process so that deviations from PPP may be autocorrelated and correlated across currencies. I am then able to examine the degree to which the world has become more interdependent. I also provide evidence that deviations from PPP may follow a random walk. Finally, I examine the role of the U.S. dollar as base currency. I find, in general, that PPP holds quite well as a long-run proposition, but that the deviations from PPP tend to persist.

### **Effects of Regulation on Utility Financing: Theory and Evidence**

**Robert A. Taggart, Jr.**  
Working Paper No. 866  
March 1982  
JEL Nos. 521, 613

This paper examines the financing decisions of regulated public utilities. It is argued that the regulatory process affects utility financing choices both by conditioning the environment in which these choices are made and by creating opportunities for firms to influence the regulated price through strategic financing behavior. The nature of this regulatory effect continually changes, however, as economic conditions change and as regulators, firms, and consumers adapt to one another's decisions. The direction of the impact on utility financing, therefore, may differ both over time and across regulatory jurisdictions.

This theory of regulatory influence is tested by examining several episodes in the financing experience of U.S. electric utilities from 1912 to 1979. Evidence of a regulatory effect on utility financing is found particularly for the early years of state commission regulation. Examples of an adaptive response pattern on the part of regulators, firms, and consumers are also cited.

### **Comment on T. J. Sargent and N. Wallace: "Some Unpleasant Monetarist Arithmetic"**

**Willem H. Buiter**  
Working Paper No. 867  
March 1982  
JEL Nos. 310, 320, 130

Sargent and Wallace (S-W) show that, even when inflation is *prima facie* a strictly monetary phenomenon—prices are flexible, markets clear, and velocity is constant—inflation is, in the long run, a fiscal phenomenon. This

follows from the government budget constraint and the existence of an upper bound on the real per capita stock of interest-bearing public debt held by the private sector. Together these ensure that in the long run the growth of the money stock is governed by the fiscal deficit, if we assign to the fiscal authorities the role of Stackelberg leaders and to the monetary authorities that of Stackelberg followers.

The discussion of the formal S-W model focuses on the distinct roles of public spending and explicit taxes in the model and on the possibility that optimal policy involves public sector surpluses and a net credit position of the public sector vis-a-vis the private sector. It is also argued that the specification of the demand for and supply of money is, *ad hoc*, a weakness shared by most existing macro models.

Finally, it is shown that if we adjust the published government deficit figures for the effect of inflation on the real value of the stock of nominal government debt (as should be done to obtain a deficit measure appropriate to the S-W model), the inflation-adjusted government deficit has been in balance or surplus in the United Kingdom in recent years. If the deficit is also adjusted for the cycle (as it should be to relate it to the full-employment S-W model), the government has been a sizable net lender. If we then subtract net public sector capital formation from total public spending (assuming implicitly that the real rate of return on public sector investment equals the real rate of return on public sector debt), we get the inflation-corrected, cyclically adjusted government current account deficit. This is the deficit measure of the S-W model. This "deficit" has been a sizable surplus in recent years and is likely to remain so in the future. The inflation tax implied by extrapolation of the past and present stance of fiscal policy is therefore a "deflation subsidy." Therefore, if the S-W framework is correct, the credibility of the Thatcher government's anti-inflationary policy should not have been undermined by a large inflation-corrected, cyclically adjusted current account surplus.

### **Macroeconomics of Stagflation under Flexible Exchange Rates**

**Pentti J. K. Kouri**  
Working Paper No. 868  
March 1982

The concerns of macroeconomic policy in the industrial countries in recent years have shifted the focus of open-economy macroeconomics to new and interesting problems. Although no synthesis, or fully coherent theory of policy, has yet emerged from this research, the results have already led to major revisions in views about the nature of the problems with which policy has had to deal. This paper provides a selective survey and discussion of some of the results of recent research, with emphasis on their implications for policy.

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