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PART IV  
**Staff Reports  
on Research  
Under Way**

## 1. ECONOMIC GROWTH

### TAX POLICIES FOR ECONOMIC GROWTH

Since this study is discussed at length in Part II, above, this section is limited to a brief recapitulation of the status of the several projects.

The National Bureau, in cooperation with the Brookings Institution, held two conferences pertaining to the study. The report on the first, *The Role of Direct and Indirect Taxes in the Federal Revenue System*, was published in July 1964. The report on the second, *Foreign Tax Policies and Economic Growth*, appeared in March 1966.

Challis A. Hall, Jr., has completed a draft on the effects of various features of the corporation income tax on corporate policies with respect to capital outlays, the introduction of new products and processes, and research and development activities. The study is based on interviews conducted in 1963 with the senior executives of fifty major companies in the United States, a follow-up questionnaire distributed in 1965, and annual reports and other materials furnished by the companies. When he has completed work on this phase of his project, Hall will turn to revision of his study of the short-run shifting of the corporation income tax.

Thomas M. Stanback, Jr., completed a draft of his study of the effects of changes in the rules governing income tax allowances for depreciation on modernization investment in the textile industry. This study, too, was based largely on interviews with the principal executives of a substantial number of textile manufacturing corporations.

My survey of depreciation practices under the provisions of the Internal Revenue Code of 1954 will soon be in press. The chief objectives of this study were to measure how widely business has taken advantage of the accelerated depreciation methods afforded in the 1954 legislation; to compare the experience of different groups of enterprises according to size, organizational form, and industry;

and to estimate the effect of the use of these provisions on total depreciation allowances, tax liabilities, and business outlays for plant and equipment.

Daniel M. Holland's research is aimed at relating the way in which individuals are taxed to the nature and intensity of their personal efforts. He reports on his study below.

C. Harry Kahn's study of the tax treatment of fluctuation income has moved ahead since the delivery early in 1966 of useful electronic tapes containing data taken from a subsample of Wisconsin state individual income taxpayers for the period 1947-59. It is hoped that a draft manuscript of this phase of Kahn's study will be available in the fall of 1966. Kahn discusses his work below.

Much of the task of assembling and integrating data for Roger F. Miller's study of the tax treatment of capital gains has been completed. These data are drawn from the Wisconsin state income taxpayer file for the years 1947-59, interviews of a subsample of the file, and, for most of the subsample, data obtained from the Social Security Administration. The basic task remaining is to collate the interview and social security data with the tax file data and to construct the investment portfolios of the individuals in the file whose tax returns or interview responses indicate ownership of capital assets. When this is completed, Miller will be in a position to test a model of household saving and investment behavior and the effects thereon of capital gains taxation.

NORMAN B. TURE

#### THE TAX TREATMENT OF INCOME FLUCTUATIONS

An extensive conceptual statement of the issues and problems involved in the tax treatment of income fluctuations as related to economic growth has been completed. This is being followed by an examination of present loss carry-over and income averaging provisions, as well as alternatives, in the light

of the income experience of a large sample of Wisconsin taxpayers over the period 1947-60.

The introductory statement notes that there have been two traditional areas of concern and two types of taxpayers. The tax law reflects the fact that negative income and fluctuations in positive income are usually considered separate issues. It also reflects the dichotomy of business and individuals in general as taxpayers. Negative income has been dealt with through loss carry-overs, but has been largely restricted to business taxpayers. Fluctuations in positive income are, since 1964, dealt with through an averaging provision which is restricted to individuals who, in the current year, have experienced a sharp rise in income.

Any theoretical discussion must of course face the questions: What objectives should averaging provisions meet? Are these objectives multiple, so that several provisions would be needed, and what provisions can be made? Do existing provisions meet the stated objectives? In concrete terms, the relation of loss carry-overs to general averaging needs to be examined. Are the policy concerns relative to business so different from those of individuals as to require different approaches? And, if so, must the treatment of unincorporated business be the same as that of corporations? Loss carry-overs may be viewed as a negative tax, since they result in the reduction of negative income at some, unspecified, rate. Would an explicitly stated rate on negative income be more efficient?

The question also arises whether a more general averaging scheme than the existing one would dispose of the need for loss carry-overs. At present only sharp increases in income, and only those decreases resulting in negative income, are subject to adjustment of tax liability. In formulating a more general approach, several questions must first be answered. For instance, should the plan cover only fluctuations, or also the problem of differences in lifetime shapes of income? The latter differences may be inherent in different occupations, or may be artificially produced by taxpayers to postpone tax. The longer the

averaging period, the less attractive is postponement of income realization for tax reasons; but, *pari passu*, the more troublesome becomes the problem of changing family status of taxpayers. Marriage, divorce, remarriage, and new dependents raise problems, the longer the time period over which income is counted.

It is hoped that the Wisconsin data will help in determining whether in actual practice any feasible system more comprehensive than the present one would result in meaningful changes in tax liability for a significant number of taxpayers such as to favor activities contributing to growth.

C. HARRY KAHN

#### EFFECT OF TAXATION ON PERSONAL EFFORT

My investigation of this subject is being carried out in three parts:

1. The first part seeks to measure the size and the pattern of the rewards that top corporate executives have received in the last twenty-five years, i.e., over the period of high personal and corporate income taxes. This information is basic to an interest in the effect of taxation on executive effort, and measurement presents serious difficulties because so large a part of the stream of rewards generated for executives is contingent or deferred. Wilbur Lewellen of Purdue University and I have cooperated in devising a method of valuing all such components on a basis equivalent to salary payments, and Lewellen has the prime responsibility for developing the data and analyzing the findings. A draft of his study, based on a sample of 558 executives in fifty manufacturing companies for the period 1940-63, has been assigned to a staff review. Some of the major findings are summarized by Ture in Part II of this report.

2. A second part of my study, still in an early stage, is an analysis of the income, deduction, and taxpaying characteristics of individuals reporting salaries in excess of \$25,000. The intention is to discover their actual tax liability, as to both average level

and the dispersion around this average. This analysis utilizes the Treasury's Tax File for 1960 and 1962, from which data have been read and printed out as frequency distributions, arrayed by size of salary and wages. The Tax File, which incorporates a number of tax-return items for over 100,000 taxpayers, offers a unique opportunity for exploring both the average and the range around it for a number of relations.

3. The third strand of my study seeks to get more directly at the effect of taxation on effort. Whereas the first study described is concerned with how much executives really make and the second with how much they pay in taxes, the interview project that has occupied most of my time this last year is concerned directly with what executives, drawing on their own experience, think about the effects of taxation on the jobs they take and on how hard they choose to work. The interviews are extensive, running from one to two hours. While I had in mind, of course, a particular range of questions, each interview assumed its own cast. The task now is to see whether any clear patterns emerge from the answers, which requires careful and time-consuming study. I expect to complete a first draft of the manuscript summarizing the findings by the end of the summer.

DANIEL M. HOLLAND

#### PRODUCTIVITY IN THE SERVICE INDUSTRIES

This study, undertaken with the aid of a Ford Foundation grant, is aimed at measuring and analyzing inputs, outputs, and productivity in the service sector. The work includes broad sector comparisons, studies of individual service industries, cross-sectional studies within the service sector, and analyses of particular problems that promise to contribute to an understanding of the transformation of the United States to a service economy.

This transformation is discussed in my paper, *The Growing Importance of the Service Industries* (Occasional Paper 96), published

in December 1965. This paper was also published in the *Journal of Business*, October 1965. Another paper, "Output, Input, and Productivity in Selected Service Industries in the U. S. 1939-63," was given at the Ninth General Conference of the International Association for Research in Income and Wealth, Lom, Norway, September 2-7, 1965. It examines rates of change of various variables, 1939-63 and 1948-63, for seventeen industries (eight services and nine retail trades).

One of the principal findings is that industry rates of change of output per man tend to be positively correlated with industry rates of growth in the service sector. This relationship had previously been noticed for manufacturing by several investigators. I also find very little correlation between changes in output per man and compensation per man, again repeating the findings of earlier studies of manu-

facturing industries (see Table IV-1). This work, together with a case study by Jean Wilburn that contrasts productivity trends in the barber and beauty shop industries, will be proposed as an Occasional Paper. Solomon Fabricant intends to study these questions on a broader scale, including both service and goods-producing industries. See his report, "Employment and Productivity in Individual Industries," later in this section.

With the assistance of Harriet S. Rubin I have been preparing a paper on "The Growth of the Service Industries in the United States: A Model for Other Countries?" to be given at a manpower conference on the service industries sponsored by the Organization for Economic Cooperation and Development, to be held in May 1966. This paper analyzes changes in the sector distribution of employment in individual states in the U. S. since

TABLE IV-1

COEFFICIENTS OF RANK CORRELATION, AVERAGE ANNUAL PERCENTAGE RATES OF CHANGE, 1939-63, OF OUTPUT PER MAN AND RELATED VARIABLES, ACROSS SELECTED SERVICE INDUSTRIES

		Real Output per Unit of Labor Input	Real Output	Employment	Compensation per Man	Real Output per Unit of Total Input
Real output per man	(1)	.94	.93	.54	.00	
	(2)	.90	.90	.74	.07	.81
	(3)	.97	.93	.07	.03	
Real output per unit of labor input	(1)		.87	.50	-.22	
	(2)		.81	.57	-.14	.74
	(3)		.87	.03	-.10	
Real output	(1)			.79	.03	
	(2)			.93	.21	.76
	(3)			.33	.00	
Employment	(1)				.15	
	(2)				.33	.67
	(3)				.23	
Compensation per man	(1)					
	(2)					-.38
	(3)					

SOURCE: U.S. Bureau of the Census, *Census of Business*, 1939 and 1963.

(1) Across 17 selected service industries.

(2) Across 8 services.

(3) Across 9 retail trades.

1930. It also compares U. S. patterns of growth with cross-sectional differences among the OECD countries. A significant relation is found between changes in employment patterns and levels of per capita income.

Our work on productivity in the health industry has resulted in a draft paper, "Some Economic Aspects of Mortality in the United States," which has been circulated for comment. The analyses in this paper do not warrant any firm conclusions, but certain *hypotheses* are suggested for further research. They include:

1. The reduction in mortality that occurred between 1929 and 1960 in the United States had a very considerable economic value, as measured by increased availability of manpower. The decrease in the death rate of males 35-44 was of particular importance. If, as seems likely, a substantial part of the decrease can be attributed to research-based improvements in medical science (see the following), the economic returns to this research were probably very high.

2. While there were probably environmental changes between 1929 and 1960 that contributed to reductions in mortality (the increase in education seems the most likely candidate), there have also been some changes that were probably unfavorable for health. It is possible that environmental changes have, on balance, not had much effect on mortality in recent decades. The most important environmental change, which subsumes many of the others, is the increase in per capita income. Analyses of interstate differences in mortality at given points in time do not reveal any significant relation between mortality (age-adjusted) and income. Infant mortality does tend to show an inverse relation with income. This suggests that environmental changes may have played more of a role in lowering the death rate for infants than for other age groups.

3. Because death rates at productive ages are now quite low, it is becoming increasingly difficult to show large economic returns from reductions in mortality. Nevertheless, comparison with other western countries indi-

cates that considerable progress in the United States is still possible. From an economic point of view, greatest importance should be attached to reducing mortality of males 45-54.

4. The unusually high death rate of males 45-54 in the United States relative to other western countries may be attributable more to environmental factors than to health care; the U. S.-Europe death-rate gap for women 45-54 or 55-59 is not nearly as large as for men.

5. The difference in health status between whites and nonwhites in the U. S. cannot be explained only by differences in income.

6. If hypothesis 5 is correct, many of the conclusions that have been and are being drawn from data where the effect of color has not been disassociated from the effect of income are probably incorrect.

7. There is no significant relation between health levels and the number of physicians per capita in the United States across states. Hence the argument that physicians are very inequitably distributed across states with respect to need may be without foundation. In this connection we hope to be able to measure the *marginal* contribution of physicians to health, and to compare this with the contribution flowing from additional dollars spent for paramedical personnel, or education, or public health (broadly conceived).

I am continuing the work on productivity in the health industry with the assistance of Deborah W. Sarachek. One paper now in preparation is "The Contribution of Health Services to the American Economy." This paper will be given at a conference in May sponsored by the Health Services Research Section of the National Institutes of Health.

Progress is being made on other studies. Ernest Kurnow is preparing a draft of a paper on employment and productivity in state and local governments. Three Ph.D. theses are being written in connection with the project. They are Irving Leveson's study of self-employment, Richard Auster's study of the substitution of skilled labor for unskilled labor, and Reuben Gronau's study of the

value of consumers' time as reflected in patterns of air travel. David Schwartzman expects to complete a major study of productivity in distribution, as noted in the following paragraphs.

VICTOR R. FUCHS

#### PRODUCTIVITY GROWTH IN DISTRIBUTION

The average annual rate of growth of real output per man in retail trade between 1929 and 1958 was 1 per cent. This was considerably lower than the 2.4 per cent rate recorded for goods-producing industries and also below the 1.6 per cent per annum rate for the total economy. Output in retailing is measured by a sum of constant-dollar sales in each store type, weighted by its average gross margin. The basic assumption is that the amount of service per dollar of sales within each store type has remained constant.

Fragmentary data suggest that physical capital in retailing grew less than employment; the capital-labor ratio declined slightly. In other industries capital grew at a slightly faster rate than labor. Nevertheless, the divergence of capital-labor ratios between retailing and other industries explains only a small part of the lag in output per man; the divergence was not large and capital was not sufficiently important in relation to labor.

Despite the lag, the relative price of the output of the retailing industry did not rise. The "gross margin," which is the difference between retail sales and the cost of goods expressed as a ratio to sales, may be considered to be the price of retailing services relative to the prices of other goods. Because of the differential trends in output per man, the gross margin might have been expected to rise, but this did not happen. The paradox is resolved by a large decline in earnings per man in retail trade relative to goods-producing industries.

The relative drop in earnings implies a relative decline in the quality of labor, although several other developments may have

contributed to the relative wage decline in retail trade. Unionism grew more in other industries; the supply of female labor increased; minimum wage legislation did not cover retailing until after 1958. But the sum of the effects of these developments on wages of constant-quality labor in retailing appears to have been too small to account for more than a part of the relative decline in earnings. The evidence indicates at least a relative decline in quality and perhaps an absolute decline as well.

Since 1929, retailers in nonfood as well as food stores shifted to selling techniques requiring less skilled sales clerks. Nonfood stores imitated food stores in adopting self-selection by customers as a selling technique. Open displays of merchandise with price and other information prominently shown became more common, especially in standard lines of merchandise. The trend may be interpreted as a reduction in the amount of service. But clerical help frequently takes more time and is a nuisance compared to self-selection when goods are standardized and easily accessible to customers. Various surveys have indicated that in food stores many customers prefer self-service to clerk service. These considerations suggest that only small differences in retail prices favoring self-selection techniques were required to induce substitution of these techniques for those requiring more skilled labor.

The general rise in the price of labor relative to capital increased the relative price of labor-intensive goods and services, including retail service. (The ratio of payrolls to value added is high in retailing compared to that of manufacturing and of all industries.) Hence the rise in wages induced the substitution of goods, whose prices rose less, for retail service. It is apparent from the previous discussion that over a wide area the price elasticity of demand for retail service was high. Stores selling at low prices were able to increase their share of total sales even though they provided little clerk service. Cross-sectional multiple regression analysis of variation in sales per person engaged in five store types—

food, apparel, drug, gasoline stations, and furniture—across 188 standard metropolitan statistical areas also confirms the importance of the level of wages. In those SMSA's where wages are high, sales per person engaged are high.

My efforts presently are concentrated on writing the results of my study; I expect to have a book-length manuscript ready by the fall of 1966.

DAVID SCHWARTZMAN

### PRODUCTIVITY, EMPLOYMENT, AND PRICE LEVELS

One of the most difficult problems of our time is whether, or to what degree, trends in the price level are related to the rate of advance of a nation's prosperity. The problem is usually put in more specific terms, as follows: whether, and if so how, a free society can achieve significant increases in productivity, reach and maintain reasonably full employment, and yet avoid inflation. The National Bureau, with the aid of a five-year grant from the Alfred P. Sloan Foundation, has set up a program of studies bearing on this problem. Several of the studies contemplated under the program were begun during the year. Plans for the others are being developed, and work on them will be started at the first opportunity. The program as a whole will run along three lines:

1. A statistical review to provide a tolerably solid basis for economic analysis, as well as for improving current guides to economic policy. To the extent possible, the review will draw on existing materials for the United States, and perhaps a few other countries, covering the past fifty years or more, and for some additional countries in recent decades. However, some new factual investigations are also required, and two of the studies begun last year are of this kind.

2. Historical studies of the relations between general price trends and prosperity in various periods and countries, and of the relations

between the behavior of relative prices, wages, employment, and production, on the one hand, and productivity trends, on the other, in individual industries in the United States. A beginning in this area has been made with two other studies started during the year.

3. Analyses of policies for promoting prosperity without inflation, including a study, both empirical and analytical, of wage and price policies—which embrace the so-called wage and price guidelines; and a study of lags in the implementation of monetary and fiscal policies—lags that arise from delays in recognizing the need for change in policy, from delays in taking action once it appears that action is needed, and from delays between action taken and the response. In order to understand better the changing environment within which decisions on policy have to be made, we expect that it will be useful at least to survey—from the viewpoint of policy action—the developments, both normal and distinctive, that unfold in the course of business cycles.

The first of the studies begun during the year, under the direction of George J. Stigler, is aimed at securing better measurements than are now available of the actual behavior of industrial prices. Some businessmen and economists have long suspected that the widely used wholesale price statistics of the U. S. Bureau of Labor Statistics overstate the stability of industrial prices, particularly of fabricated products. This may come about because of excessive reliance upon list prices and upon small lot sizes. With the collaboration of James K. Kindahl, Stigler is attempting to obtain records of prices in actual transactions that account for the bulk of sales in several major industries. Price data back at least to 1957 are being sought from both buyers and sellers. Once the data are collected, Stigler plans to construct price indexes comparable with those of the BLS to determine to what degree, if any, the latter understate the degree of sensitivity of industrial prices to changes in business conditions.

The results of this work should help us to examine critically the widely held view that



in modern times the inflationary process consists of price advances during periods of business expansion that are not rescinded during periods of recession. They should also facilitate study of the effects of market concentration and other factors upon actual price behavior.

The second study in progress, under the direction of John W. Kendrick, is concerned with the measures of the nation's output provided by the national income accounts. These accounts are basic to the measurement of the rate of economic growth and of productivity. There are reasons to believe that certain changes in the structure of the economy, particularly the increase in the scope of governmental activity and in the extent to which consumers contribute directly to output through voluntary and "do-it-yourself" activities, have rendered these measures less representative than before. If so, they may significantly under- or overstate rates of growth of production and productivity. The degree of under- or overstatement needs to be established, both for its own sake and as a basis for later analytical work.

Kendrick has, therefore, begun to explore the conceptual and statistical problems involved in expanding the GNP estimates to include the major types of nonmarket economic activities presently excluded from the Commerce Department estimates. He is also exploring the effect of broadening the concept of investment to include (1) durable goods purchases and the value of inventory change in the household and government sectors, and (2) intangible investments by all sectors for education, training, research and development, health, and mobility.

In addition, Kendrick is planning to revise and bring up to date the productivity estimates for the economy and major industry groups contained in his *Productivity Trends in the United States*. The new productivity estimates and a summary description of their behavior in the postwar period will be prepared for publication in an Occasional Paper.

In a third study, Solomon Fabricant is examining the historical relations among trends

in general price levels, in productivity levels, and in rates of employment. The question of these relations is posed by the widespread notion that fuller employment can be purchased at the price of "a little inflation." The study concentrates on changes in the economy as a whole—the U.S. economy, for as long a period as usable records permit, and other countries (largely in Western Europe), for a briefer period, probably only the postwar period in most cases.

Fabricant has also begun an investigation of the historical relation between trends in productivity and trends in employment in individual industries.

Further reports on the studies in progress follow. See also the report by Friedman and Schwartz in section 3.

#### INDUSTRIAL PRICES

Our study of industrial prices has the primary purpose of determining the pattern of transaction prices over recent years. The collection of the basic data on prices has been, and for most of 1966 will continue to be, our major task.

The commodities for which we are seeking price records have been chosen partly with an eye to the literature on "administered" prices (hence the inclusion of steel, chemicals, and drugs). We have also avoided as far as possible the heavy problems posed by changes in the qualities of goods, at the cost of greatly underrepresenting machinery and finished goods. The main categories of products are iron and steel, nonferrous metals, petroleum products, paper and paperboard, chemicals, drugs, rubber products, cement and glass, and selected machinery, equipment, and appliances. In each area we have selected commodities which are of large commercial importance.

We seek price data from both buyers and sellers, and from both private and public bodies. We have already approached several score of companies, and in general their cooperation has been generous. Our main source of information is the buyer of the industrial

goods, chiefly because businessmen tend to be much less reticent about buying prices than selling prices. This reticence reflects both the greater importance to a firm of its selling prices and the relatively greater importance of Robinson-Patman questions when price differences are encountered.

Although price data are beginning to accumulate on a useful scale, it would be premature to report any findings. Of course, there are many transactions which are taking place at prices below and above list prices. We seek more ambitious results: to determine the types of markets in which the transaction prices differ substantially from quoted prices, and the magnitude of the differences.

GEORGE J. STIGLER  
JAMES K. KINDAHL

#### STUDIES IN THE NATIONAL INCOME ACCOUNTS

In February 1965 I began a number of related studies in the national income accounts designed to improve their usefulness for analysis of economic growth: The initial stage involves clarification of concepts and, where possible, preparation of estimates in the following areas.

1. Possible adjustments to the official estimates of gross national product with respect to their scope: (a) Imputations for major types of nonmarket activities not now included, such as the value of unpaid household services, and of volunteer labor. (b) Reclassifications between the final and intermediate product categories in the household, business, and government sectors.

2. Redefinition of investment to include all current outlays designed to increase future income- and output-producing capacity; investment would then comprise tangible capital outlays by households and governments as well as by business, and intangible as well as tangible investments, such as research and development, education and training, medical and health, and mobility costs; in addition,

we are estimating the costs of rearing children as an investment type of outlay.

3. Creation of capital accounts for each sector, representing a deconsolidation of the total saving-investment account expanded as indicated.

Tentative estimates have been prepared in the latter two areas, and the work described in summary fashion in a paper prepared for the November 1965 meetings of the Southern Economic Association, "Restructuring the National Income Accounts for Investment and Growth Analysis." We have also begun exploratory work in the first area, relating to the scope of national product. Elizabeth Simpson will be continuing the work begun by Katherine Warden on the value of housewives' services. Harold Wolozin of American University is conducting the exploratory survey of volunteer labor.

Comments on work to date have been received from an advisory committee. Estimates are now being revised to take account of these comments, and to incorporate revised Commerce Department estimates as they become available.

In addition, I plan later to revise and update the productivity estimates for the economy and major industry groups contained in *Productivity Trends in the United States* (1961). These estimates and a summary description of their behavior will be prepared for publication in an Occasional Paper.

These projects are part of the program of studies supported by a grant from the Alfred P. Sloan Foundation. Additional financial support has been provided through the University of Connecticut by the National Science Foundation.

JOHN W. KENDRICK

#### PRICE TRENDS AND ECONOMIC GROWTH

The primary objective is to determine the historical relations between general price trends and prosperity in various periods and countries and to deepen understanding of them.

Speculations about these relations have

been diverse. It has been argued that trends in general price levels (though only within certain limits) are positively and importantly related to rates of national economic growth, or to levels of employment, or to both. Some writers have restricted the validity of one or another of these conclusions to the present era, others have put no such limitation on them. Further, some writers believe that the line of causation runs primarily from trends in price levels to rates of growth and levels of employment; others, that price trends and degree of prosperity are related because they are in part the common results of other factors.

The existence of some sort of positive relation between general price trends and prosperity is not accepted by everyone, however. It has also been argued that even modest inflation inhibits growth, and that a rising price trend has little or no effect on the average level of employment, or that it makes fluctuations in employment worse than they would otherwise be.

Past efforts to resolve empirically the issues raised by these speculations have been less than conclusive. If there is a definite relation between price trends and degree of prosperity, it would seem that some ferreting will be needed to establish it. This is the task of the present study.

The analyses of the relation between general price levels and national output being made by Friedman and Schwartz in their National Bureau study of money and banking in the United States will be utilized. With the help of Chantal Dubrin and Lora McMeekin, I am concentrating, at the outset, on supplementing the results of Friedman and Schwartz with corresponding analyses for the few other countries for which reasonably adequate long-term historical series are available, and with a more limited analysis of the post-World War II record of a longer list of countries. In addition, as already suggested, the relation between general price trends and national levels of employment is being examined.

Various indexes—for example, indexes of wholesale prices, consumer prices, and “implicit national product deflators”—need to be

compared because these differ appreciably in many cases. Further, trends must be measured in various ways, for the results are sometimes sensitive to the technical choices made; and trends must be measured over various periods, for there is reason to expect the relation between general price trends and prosperity to depend on the length of the period. Also, study must be made not only of the average rates of change but also of changes in rates of change and of the degree of irregularity of these fluctuations in rates of change.

The visit to the National Bureau of Professor Hirotaka Kato of the Japan Economic Research Institute makes it possible also to examine intensively the technical and other differences between the Japanese and U.S. wholesale and consumer price indexes, and to determine the bearing of these differences on the relative changes revealed by the indexes.

The initial effort is being focused on the empirical relation among the quantities mentioned, but the theoretical literature cannot be neglected even at this stage of the investigation. At one stage or another, further attention will have to be paid to historical developments that might have significantly influenced the relation between general price trends and prosperity. The establishment of regularly published indexes of prices, national income, and productivity is one example; the use of escalator and “improvement factor” clauses in wage contracts, another, and the means used to prevent or suppress inflation, a third.

SOLOMON FABRICANT

#### EMPLOYMENT AND PRODUCTIVITY IN INDIVIDUAL INDUSTRIES

Study of the historical relation between trends in productivity and trends in employment in individual industries is prompted by the often-expressed fear that advances in an industry in automation, in particular, and technology, in general, will destroy, or at least threaten, jobs in that industry. My early study of manufacturing industries in the United States, which dealt with this question, has been extended by Kendrick. It can now be extended further to

include the findings of Fuchs and others for nonmanufacturing industries in the United States, and also the data for manufacturing and nonmanufacturing industries in some additional countries. I want to see whether the earlier findings hold for the more recent period and for other industries and other places.

Other work is being given priority, but we are taking the time to collect some of the information that will be analyzed in the present study. At a later stage, a decision will be made whether it is possible and desirable to cover also price trends in individual industries and their relation to productivity and employment trends in the same industries.

SOLOMON FABRICANT

#### POPULATION AND LABOR FORCE DURING LONG SWINGS IN ECONOMIC GROWTH

A first draft of the study has been completed, except for a few appendixes. The contents are as follows:

- I. Introduction and Summary
- II. Long Swings in U. S. Demographic and Economic Growth: Some Findings on the Historical Pattern
- III. Economic-Demographic Interactions and Long Swings in Economic Growth
- IV. The American Baby Boom in Historical Perspective
- V. On the Relation of Economic Factors to Recent and Projected Fertility Changes
- VI. Recent and Projected Changes in Labor Force Participation in the Light of Longer-Term Experience

The manuscript is now being revised in the light of comments by the staff and other readers.

RICHARD A. EASTERLIN

#### ECONOMIC GROWTH OF THE SOVIET UNION

The object of this study, begun in 1954 under a grant from the Rockefeller Foundation, is to set forth and analyze the evidence bearing on

the rate of economic growth of the Soviet economy. The work was undertaken in full recognition of the inherent difficulty of arriving at an answer and of the special problems in securing reliable information.

To date, publications resulting from the study include the following: *Some Observations on Soviet Industrial Growth*, by G. Warren Nutter (Occasional Paper 55, New York, NBER, 1957); *Freight Transportation in the Soviet Union: A Comparison with the United States*, by Ernest W. Williams, Jr. (Occasional Paper 65, New York, NBER, 1959); *Soviet Statistics of Physical Output of Industrial Commodities: Their Compilation and Quality*, by Gregory Grossman (Princeton University Press for NBER, 1960); *Small-Scale Industry in the Soviet Union*, by Adam Kaufman (Occasional Paper 80, New York, NBER, 1962); *Growth of Industrial Production in the Soviet Union*, by G. Warren Nutter (Princeton University Press for NBER, 1962); *Freight Transportation in the Soviet Union, Including Comparisons with the United States*, by Ernest W. Williams, Jr. (Princeton University Press for NBER, 1962). In addition, a *Statistical Abstract of Industrial Output in the Soviet Union, 1913-1955* (Parts 1-5, offset, 1957) was made available to scholars working on Soviet statistics.

Indexes of industrial production originally published in *Growth of Industrial Production in the Soviet Union* have been revised and brought up to date in accord with information released by the U.S.S.R. in the last few years. An Occasional Paper discussing these revisions is being prepared. A second Occasional Paper is nearly completed on agricultural output and income. Arcadius Kahan is preparing this report. A summary volume combining the major findings for individual sectors and discussing such other matters as population, employment, construction, and standard of living is in preparation. It is hoped that it will appear initially as an Occasional Paper and be followed by the summary report itself.

G. WARREN NUTTER

## OTHER STUDIES

These studies concerned with long-run economic trends were published: *The Flow of Capital Funds in the Postwar Economy* (Studies in Capital Formation and Financing 12), by Raymond W. Goldsmith; *Determinants and Effects of Changes in the Stock of Money, 1875-1960* (Studies in Business Cycles 13), by Phillip Cagan; *Trade Union Membership, 1897-1962* (Occasional Paper

92), by Leo Troy; and *Output, Employment, and Productivity in the United States After 1800* (Studies in Income and Wealth 30). *Household Capital Formation: Growth, Cyclical Behavior and Financing, 1897-1962*, by F. Thomas Juster, is in preparation.

For other studies of economic growth, see section 2 and the report by Friedman and Schwartz in section 3.

## 2. NATIONAL INCOME, CONSUMPTION, AND CAPITAL FORMATION

### INVESTMENT IN EDUCATION

Ever since its inception our project has been supported by the Carnegie Corporation of New York, and a recently received third grant enables us to expand this work. Jacob Mincer is beginning an investigation of the effects of education on labor force participation and unemployment. A program of Research Fellows in the Economics of Education is also being established. Each fellow will spend about a year in residence at the National Bureau working on a study of his own interest.

Barry Chiswick and I have begun a study of the relation between education and the personal distribution of earnings and other income. It is hoped that the study will contribute to an understanding of the causes and meaning of poverty, the effects of unequal opportunities, subsidies to education, and so on. A preliminary report was presented to the December 1965 annual meeting of the American Economic Association and published in the May 1966 issue of the *American Economic Review* under the title "Education and the Personal Distribution of Earnings."

Our analysis assumes that each person invests an amount in human capital that maximizes his economic well-being. If the curve  $D$  in Chart IV-1 measures his marginal rate of return on additional investments and

$S$  his marginal cost of funds, he is assumed to invest an amount  $OC$  determined by the intersection point  $P$ . A more able person would have a higher demand curve like  $D_l$ , and given the same  $S$  would go to  $P_l$ , while a less able person would have a curve like  $D_k$  and go just to  $P_k$ . Similarly a person who can obtain funds under relatively favorable circumstances would have a supply curve like  $S_j$  and would go to  $P_j$ , while an equally able person with less favorable opportunities would have a supply curve like  $S_i$  and invest only to  $P_i$ .

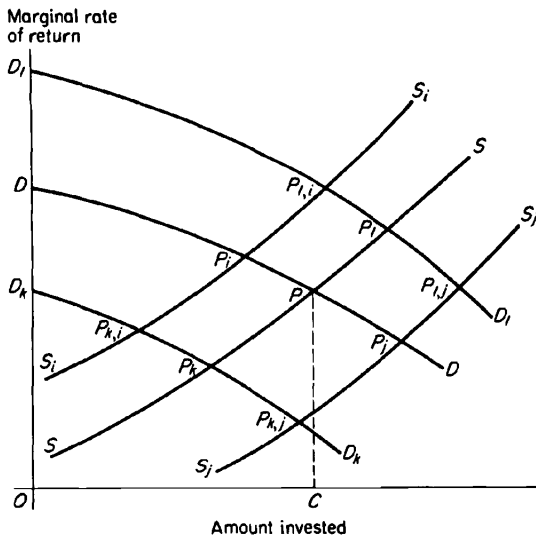
As should be intuitively clear from the diagram, and has been rigorously shown in the aforementioned article, a combination of differences of ability and opportunities can produce various kinds of systematic differences in the distribution of earnings. Our empirical analysis is using this theoretical framework to study the effect of education on the distribution of earnings in states and regions of the United States, and to compare differences among a number of countries at various levels of development.

GARY S. BECKER

### CONSUMER PURCHASE PLANS

Research on the experimental survey of consumer purchase probabilities for household durable goods and automobiles is continuing

**CHART IV-1**  
**Supply and Demand for Investment in Human Capital**



as a joint project with the U.S. Bureau of the Census. The draft of an Occasional Paper which deals with the first phase of this experimental research, carried out in 1964 and early 1965, will soon go to press.

Additional data were obtained in October 1965 from 2,000 sample households in Louisville, Kentucky, divided into four subgroups selected at random. The hypotheses being tested with these new experimental data are:

1. That a refinement of the scale on which respondents are asked to register their purchase probabilities for cars and durables will improve the accuracy of respondents' probability judgments. The refinement essentially attempts to differentiate between households willing to take a very strong expectational position (absolutely no chance of buying) from those willing to indicate a small but positive probability of purchase (almost no chance of buying). The experiment made in July 1964 grouped the two groups together, and it seemed worthwhile to see if meaningful differentiation between the two could be achieved.

2. That asking households about the "expected value" of expenditures on a comprehensive category of items—household durables and appliances, furniture, rugs, and major home improvements—is a more efficient way to predict total purchases in this category than asking about the probability of purchasing a list of specific items. In the experiment of July 1964 it was clear that the probability scale was substantially less useful for predicting purchases of household durables than it was for predicting purchases of automobiles. The reason may have been that purchases of household durables compete with purchases of other items (furniture, home improvements, etc.) that were not included in the probability question. In addition, it seems plausible that respondents may have better judgment about the total amount of money they were prepared to spend on this cluster of goods than about the separate probabilities that one or another might be purchased, and the global total is a more important magnitude to predict.

3. That a purchase probability scale embodying only numerical values is superior to a scale which includes both numbers and adjectives designed to interpret them. The different meanings that households attach to the same adjectives have long been a potential source of "noise" in survey data, and it was thought worthwhile to see whether their elimination would help to clarify and sharpen judgments about purchase probabilities.

4. That inclusion of a number of questions designed to serve as a financial review for the household—concerning asset holdings, changes in asset position, condition of durable goods stock, outstanding debt, expectations and attitude, for example—sharpens responses to the purchase probability question by putting them in the context of constraints and opportunities as they actually exist. A review of this sort immediately preceding the purchase probability question might result in greater accuracy and more realism by coming closer to reproducing the environment in which actual purchase decisions would necessarily be made.

We have also field tested (on a very small sample of about thirty households) several questions that would have economically useful content if the responses prove to foreshadow actual behavior. One question sequence deals with prospective financial saving by the household, and follows the same general approach as the question sequence that asks about the "expected value" of expenditures on a cluster of household durables, appliances, and so on. The second question sequence attempts to obtain the complete distribution of prospective income changes as viewed by the respondent, instead of simply obtaining a net judgment about whether income is expected to go up, down, or remain the same. The typical income expectations question presumably represents the respondent's best guess about his income prospects, but it would be valuable to know the dispersion of probable outcome around this estimate.

Although analysis of the second round of experimental data cannot be completed until reinterview material becomes available in March 1966, some of the comparisons among the subgroups (roughly 500 households each) are interesting. In general, the Louisville experiment was designed to compare responses to a survey schedule that had been used in July 1964 with responses to alternative survey schedules embodying hypotheses that we wished to test. Although we do not have purchase data against which to contrast the probability judgments, we do know whether the alternative survey schedules yielded similar distributions of purchase probabilities. From the preliminary tabulation of results, it appears that:

1. Differentiation of respondents with a strong (zero probability) expectational position from those with a slightly weaker (almost zero probability) position will not make much difference, although there may be a slight gain in accuracy. Since relatively few households selected the "almost no chance of buying" option, the gain cannot be very great.

2. Use of a purely numerical scale without accompanying descriptive adjectives yields a

much less smooth distribution of responses than the precisely equivalent scale which contains both. The numerical scale shows markedly stronger peaks at 50 (50 in 100 chances) and at 100 (100 in 100 chances) than does the alternative. These results suggest that the purely numerical scale is unlikely to produce more accurate judgments on balance, though this is not necessarily the case.

3. Comparison of scale responses for households who were asked a battery of financial review questions prior to being asked about purchase prospects indicates that inclusion of these preliminary questions does make a difference. In general, households asked the financial review questions showed a smaller proportion of zero-probability responses and a larger mean value, using the identical scale, than households asked the probability questions first. In addition, their mean scale value was closer to their actual past purchase rate. These differences indicate that asking a battery of preliminary questions will improve the accuracy of the probability responses, although the reinterview material will provide the only conclusive answer on this point.

F. THOMAS JUSTER

#### PHILANTHROPY IN THE AMERICAN ECONOMY

Total expenditures classified as philanthropic in this study have been rising—in the period 1929–59, for example, they increased faster than gross national product, rising from a ratio of about 5 per cent to about 12 per cent. I take this to mean that we have become a more generous as we have become a more affluent people. Another conclusion is that the great increase in the role of philanthropy has been in the public sector, although there has been very real growth in the private sector as well.

A manuscript for staff review is expected to be completed shortly. The study has been

aided by a grant from the Russell Sage Foundation.

FRANK G. DICKINSON

#### ANALYSIS OF CORPORATE GIVING

Over the past year my work on the analysis of private giving has been proceeding on a part-time basis. The manuscript on economic aspects of corporate giving is being updated and revised for submission to the Board. Recent trends in corporate giving suggest that some change in its determinants may be taking place.

During the mid-to-late 1950's, corporation giving apparently experienced a period of consolidation following the sharp upward impetus provided by the excess-profits tax of the early 1950's. In the four years 1955-58 giving, as reported on corporate income tax returns, ranged between \$395 and \$418 million, the lower amount reflecting the drop in corporation profits in the recession year 1958.

Since 1958 corporate giving has risen regularly and by large annual increments. Beginning at \$395 million in 1958, it rose to \$595 million in 1962, the latest year for which data are available. This 51 per cent rise corresponds to a 30 per cent rise in corporate net income before taxes. For the first time, giving exceeded 1 per cent of corporate before-tax income, except for 1945, 1952, and 1953, when the excess profits tax provided a strong "price" incentive to giving.

The 1958-62 rise in percentage of income given suggests that corporations may be raising the level of their "propensity to give" and paying less attention to purely tax-saving inducements than in the past. Earlier analysis had shown that the percentage of income given quite closely paralleled the percentage of corporate income paid in taxes. However, from 1958 to 1962, the movements in the

two series diverged. For corporations reporting net income, contributions rose from 0.88 to 1.05 per cent, while income taxes declined from 43.3 to 41.1 per cent of income.

RALPH L. NELSON

#### OTHER STUDIES

*The Flow of Capital Funds in the Postwar Economy* (Studies in Capital Formation and Financing 12) by Raymond W. Goldsmith and *Output, Employment, and Productivity in the United States After 1800* (Studies in Income and Wealth 30) were published. The reports of the conferences on Production Relations and on Investment Behavior are being made ready for publication.

Two reports from the study of pension plans, which has been supported by grants from the Maurice and Laura Falk Foundation and the Life Insurance Association of America, have been completed. *The Effect of Pension Plans on Aggregate Saving: Evidence from a Sample Survey* (Occasional Paper 95) by Phillip Cagan was published, and *Private Pension Funds: Projected Growth*, by Daniel M. Holland, is in press. Roger Murray's summary of the major findings of the study, "Economic Aspects of Pensions," is in preparation. Two shorter and more specialized reports have been prepared in the course of the study. One of them, by Robert Bartell, deals with multi-employer and union pension funds; the other, by Elizabeth Simpson, analyzes plans of nonprofit organizations.

A new study of the national income accounts is reported on in section 1 and a study of GNP revisions is reported in section 3. Some studies reported in sections 3 and 4 are concerned with consumption and capital formation. Plans for a conference on the size distribution of income and wealth are noted in Part III.



### 3. BUSINESS CYCLES

#### STUDY OF SHORT-TERM ECONOMIC FORECASTING

This project, initiated in 1963 with financial support from several industrial companies, has developed methods for evaluating short-term forecasts of the course of the U. S. economy and is applying these methods to a large and varied collection of actual forecasts.

A manuscript, by Victor Zarnowitz, "An Appraisal of Short-Term Economic Forecasts," has been revised and is being reviewed by the Board of Directors. A study entitled "Indicators of Business Expansions and Contractions: A Revised List," by Geoffrey H. Moore and Julius Shiskin, is almost completed. Other papers in preparation are "Recognition of Cyclical Turning Points" by Rendigs Fels, "The Short-Term Forecasting Ability of Econometric Models" by Jon Cunyningham, "Variable Span Diffusion Indexes" by Geoffrey H. Moore and Julius Shiskin, "On Some Criteria of Forecast Evaluation" by Jacob Mincer and Victor Zarnowitz, and "Errors in Estimates of Gross National Product and Their Relation to Forecasting Accuracy" by Rosanne Cole.

The individual reports that follow indicate the state of research in several of these areas.

#### FORECASTS OF AGGREGATE ECONOMIC ACTIVITY

Some of the conclusions of my study, which may supplement those noted in last year's report, are the following:

1. Forecasts for gross national product as a whole are typically much better than those for most of the component expenditures. This reflects in part cancellation of errors in the summation by sectors, but possibly also the fact that some methods of forecasting, such as the use of business cycle indicators or money supply, are concerned directly with measures of aggregate economic activity rather than with any component outlays or sectors of the

economy, and may yield better forecasts for total GNP than other methods do for the sectors.

2. While consumption has typically been predicted with smaller percentage errors than investment or government expenditures, forecasts of consumption are definitely less useful than the others when compared to simple extrapolations. This is because the consumption data, particularly those for nondurable goods and services, form rather smoothly growing series which would have been predicted relatively well by simple trend projections. The average errors of consumption forecasts have usually exceeded those of such extrapolations.

3. Forecasts of GNP and industrial production for four to six quarters ahead are seldom better and often worse than the results of autoregressive or trend extrapolations, while forecasts for the next quarter or two are generally more accurate than extrapolations. Forecasts of annual figures one year ahead also are generally more accurate than extrapolations. Such forecasts are usually made late in the preceding calendar year and have effective spans of little more than six months. A good forecast for the first two quarters is sufficient to produce a moderately good record for the year as a whole.

4. In forecasts covering several future periods (e.g., quarters), accuracy diminishes steadily as the predictive span increases. However, the errors generally do not increase faster than the extension of the forecast span. That is, errors in the implicit forecast rate of change do not always increase with the span, even when an adjustment is made for the fact that the recent past and present must in part also be predicted because of the lag of information. The evidence is consistent with the idea that projection of a certain rate of growth over a sequence of short intervals has been one of the basic devices in the construction of the multiperiod forecasts.

5. The record of forecasters in predicting

the dates of turning points is on the whole poor. The most pertinent information comes from the multiperiod predictions (for several quarters or a few semiannual periods ahead) rather than the annual forecasts. These data do not indicate that forecasters were able to predict the turn several months in advance. Not only were actual turns missed but turns were predicted that did not occur. Most errors were associated with declines, from which it appears that in the postwar period downturns were more difficult to predict than upturns.

An extension of the study of forecasting experience, focusing on the comparative merits and shortcomings of different forecasting methods and procedures, is planned, with the assistance of a grant from the Reim Foundation. Direct information on the methods used in making forecasts is largely lacking and would be difficult and costly to collect. A promising approach to the problem, however, is an indirect one, based on comparisons of summary error measures for different types of predictions of the same variable. This involves (1) comparisons of actual forecasts with various types of extrapolations, distinguishing between the systematic parts (biases) and the random parts of the errors, and resulting in estimates of the "autonomous" and "extrapolative" components of forecasts; (2) comparisons between econometric model forecasts and more informal forecasts, and between the recorded forecasts and predictions that could have been obtained from anticipations data and leading indicators; (3) analysis of the structure of forecasts from a given source, that is, relations between the predicted values of such elements of the economic system as aggregate income, consumption, investment, and government expenditures. This analysis would include comparisons of these relations with their counterparts for the actual values.

The methodology for these further studies has already been developed for the most part, and some explanatory applications have also been made by Jacob Mincer and myself and by Rosanne Cole.

VICTOR ZARNOWITZ

## BUSINESS CYCLE INDICATORS

A comprehensive review of the National Bureau cyclical indicators has been completed, and a revised list has been compiled. About 120 series were covered in this review, including those that came out well in previous studies and others that appeared promising for this purpose.

The current review has extended the use of explicit criteria and objective standards employed by Mitchell, Burns, and Moore in establishing previous lists. This has been accomplished by means of a plan for assigning scores to each series within a range of 0 to 100. The scoring plan includes six major elements: (1) economic significance, (2) statistical adequacy, (3) historical conformity to business cycles, (4) cyclical timing record, (5) smoothness, and (6) promptness of publication. When the subheads under these elements are counted, some twenty different properties of series are rated in all. For example, under statistical adequacy points are separately assigned for eight different properties: type of reporting system, coverage of process, coverage of time unit, measure of revisions, measure of error, availability of descriptive material, length of period covered, and comparability throughout the period. The scoring of each series reflects our desire to make as explicit as possible the criteria for selecting indicators and to increase the amount of information available to the user as an aid in evaluating the current behavior of the indicators.

The assigned scores are intended to measure only the relative usefulness of different series in analyzing short-term business conditions and prospects, and may not be relevant to their other uses. Even in appraising the series as cyclical indicators, the scores were considered rough rather than precise measures. However, the scoring plan contains other information that is not revealed by the final score. Thus the scheme sets forth the many different factors that need to be taken into account in evaluating and interpreting indicators, and the points assigned for each of these

factors indicate particular merits and limitations of series. In this way, the scoring plan may be of assistance to both producers and users of the statistics.

In classifying indicators into groups useful for purposes of business cycle analysis, it is desirable to take account of both their economic interrelations and their cyclical behavior. The following scheme, designed to accomplish this, reflects the many necessary compromises among the purposes that a classification and presentation of indicators may serve, the varied interests and sophistication of users, and the simple as well as the intricate cyclical relationships among economic series.

1. The major principle of classification is a fourfold grouping by cyclical timing: leading, roughly coincident, lagging, and unclassified by cyclical timing. The first three categories take into account timing at both peaks and troughs, but within them timing at peaks is distinguished from timing at troughs, where there are significant differences. The fourth category includes economic activities that have an important role in business cycles but have displayed a less regular relation to them.

2. The type of economic process represented by the series is used as a secondary principle of classification, with emphasis on the processes that are important for business-cycle analysis. The major categories are (1) employment and unemployment; (2) production, income, consumption, and trade; (3) fixed capital investment; (4) inventories and inventory investment; (5) prices, costs, and profits; (6) money and credit; (7) foreign trade and payments; (8) federal government activity; (9) economic activity in other countries.

3. A short list of series, drawn from the full list, is also presented.

Various composite indexes computed on the basis of the 1966 list are very similar to those based on the 1960 list. The principal contribution of the 1966 list, therefore, is the added information provided by new series and the new classification, especially in facilitating judgments on the performance of the several

economic processes represented. New composite indexes are presented for some of these processes.

The new list is described in a proposed Occasional Paper, "Indicators of Business Expansions and Contractions: A Revised List." This paper is now being revised for review by the Board of Directors in the light of comments from a staff reading committee and a committee appointed by the American Economic Association to review the Bureau of the Census publication *Business Cycle Developments*. The new list, we expect, will be included in *Business Cycle Developments* as soon as the Occasional Paper is published.

GEOFFREY H. MOORE  
JULIUS SHISKIN

#### RECOGNITION OF CYCLICAL TURNING POINTS

My paper on this subject, based on reports on the business outlook appearing in periodical business and financial publications, is being revised in accordance with the comments of the staff. The chief change is incorporation of an explicit scoring system. Each forecast or analysis of the business situation included in my study has been scored for "accuracy" on a scale of 0 to 4 and for "confidence" on a scale from 0.0 to 2.0. Accuracy refers to how close the predicted peak or trough was to the actual one. Confidence refers to the firmness with which the forecaster expected a peak or trough in the vicinity of the actual one. A negative score is given for false alarms.

RENDIGS FELS

#### GNP REVISIONS AND FORECASTING ACCURACY

One element of forecast error arises from errors in the data used to construct the fore-

cast. Because these errors are beyond his control, the forecaster is generally not to be faulted for them. It is therefore important in evaluating the record of forecasting accuracy to know how much of the systematic error (or bias) in forecasts is brought about by data errors. Assessments of the success and potential usefulness of forecasts, as well as recommendations for their improvement, would differ according to the extent of these errors.

This part of the forecasting study appraises the accuracy, as indicated by successive revisions, of the provisional estimates of gross national product, and determines how much the errors in these estimates could have contributed to errors in forecasts of future values of GNP. Official estimates of the latest levels and movements in GNP, known to the forecaster at the time he makes his forecast, are provisional figures and themselves a type of forecast. Typically, these are the data used to form the forecast base and, in part, the forecast itself.

How much the accuracy of a given set of forecasts is impaired depends on the relative importance of the autoregressive component of the forecasts (i.e., the extent to which the forecast is a projection of past values of GNP). Using the analysis developed by Mincer and Zarnowitz, estimates have been made of the importance of the autoregressive component to the forecasts and to their accuracy. A considerable part of the errors in the forecasts reviewed by Zarnowitz can be traced to errors in the GNP data used by the forecasters. As a rough average, about 20 to 25 per cent of the forecast error is estimated to have been induced by data errors.

Errors in the data are only one of several sources of forecast error. Some attempts have been made to separate data errors from other sources of error and bias and to obtain estimates of their relative importance.

The first draft of a paper, "Errors in Estimates of Gross National Product and Their Relation to Forecasting Accuracy," is now undergoing revision.

ROSANNE COLE

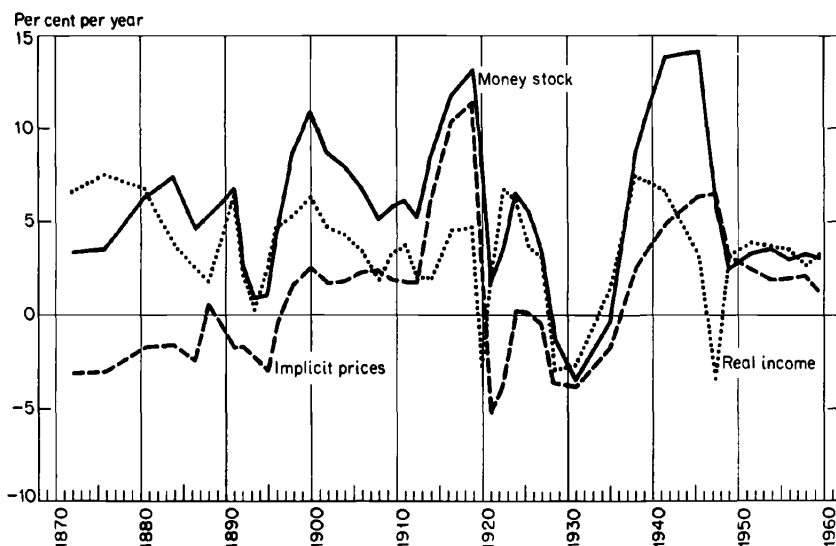
## MONEY AND BANKING

One of the conclusions reached in our *Monetary History*<sup>1</sup> was that over long periods differential rates of change in the money stock are reflected primarily in corresponding rates of change in prices and are largely unrelated to rates of change in real income, but that over fairly brief periods, differential rates of monetary growth are reflected in both prices and real income. The question is, how brief is "brief?" Clues are provided in some results of our statistical studies over this past year. Chart IV-2 makes it clear that "brief" is longer than the ordinary business cycle, since the rates of change plotted there were computed from groups of three successive phase averages, which should eliminate strictly reference cycle fluctuations.

In order to examine the effect of lengthening the period, we computed rates of change from groups of four, five, six, seven, eight, and nine successive phases, so moving from an average span of six years for our standard rates of change computed from groups of three phases to an average span of about seventeen years for the rates of change computed from groups of nine phases. The resulting rates of change for this largest group of phases are plotted in Chart IV-3, for money and nominal income in the top panel, and for money, prices, and real income, in the bottom panel. Some numerical results are given in Table IV-2 for all phases. Lengthening the period smooths out the minor fluctuations in the money and nominal income series and brings out even more sharply the striking agreement between the two—the simple correlation rises from .90 for three phases to .95 for nine. Of perhaps more interest here is the bottom panel, which shows the division of nominal income into price and output changes. Lengthening the period clearly reduces the amplitude of the movements in real income relative to those in both prices and money; the price series comes much closer

<sup>1</sup>*A Monetary History of the United States, 1867-1960*, Princeton University Press for National Bureau of Economic Research, 1963, p. 678.

**CHART IV-2**  
**Rates of Change Computed from Moving Three-Phase Averages:**  
**Money Stock, Implicit Prices, and Real Income, 1869-1961**



SOURCE: Table IV-2.

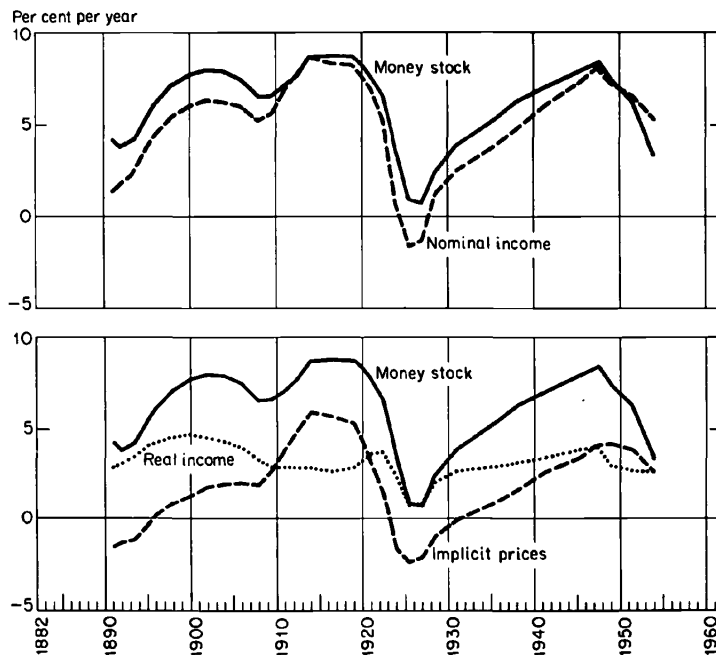
to being a direct translation of the money series than does the real-income series; in this sense, our generalization in *A Monetary History* is confirmed by the chart. However, the residual, relatively mild fluctuations in the rate of growth of real income show a closer parallelism of movement to those in money than for the short periods—the simple correlation rises from .70 to .77, though it remains below that for prices; and the partial correlation, holding prices constant, rises from .63 to .88.

Our first impression was that this result contradicted our earlier generalization, and so in part it does. A reconciliation is suggested by the dating of the residual fluctuations in the rate of change in real income: in each case, the decline reflects the impact of a deep depression, and the upswing reflects the reaction to it—the decline around 1890 in the lower panel of Chart IV-3, the deep depression of the 1890's; the decline around 1908,

the effect of the deep depression of 1907-08; the decline in 1918, the deep depression of 1921; the decline in 1928, what we call the Great Contraction. In each case, the smoothing process we adopted has spread the influence of the deep depressions over a considerable period and shifted the dating of the low points. Thus the high correlation between the smoothed rates of monetary and real income changes in Chart IV-3 and Table IV-2 is a reflection of another of our major generalizations<sup>2</sup>—the one-to-one relation between severe economic contractions and severe monetary contractions, a cyclical relation of such great magnitude that it takes more than a seventeen-year period to eliminate it. On the other hand, the sharp reduction in amplitude of the movements in real income relative to those both in money and in prices is the reflection in the data of our generalization

<sup>2</sup>*Ibid.*, pp. 677-678.

**CHART IV-3**  
**Rates of Change Computed from Moving Nine-Phase Averages:**  
**Money Stock, Nominal Income, Real Income, and Implicit Prices, 1878-1961**



SOURCE: Table IV-2

about the greater importance of monetary changes for the longer-run movements in prices than in real income. The effect shows up most clearly in Table IV-2 in the final four columns that give the regression coefficients. To begin with, a one-percentage-point change in the rate of growth of the money stock is accompanied on the average by six-tenths of 1 per cent change in prices and four-tenths of 1 per cent change in real income (the simple regression coefficients). The sum of the two remains unity, or a bit more, throughout the table; but by the time the nine-span rates are reached, the change in prices is eight-tenths of 1 per cent, and the change in real income is only three-tenths of 1 per cent. The same effect is reflected in the partial regression coefficients.

The effects we have been discussing proceed continuously as the number of phases used in computing rates of change increases, so there seems no way to choose a particular duration as separating "brief" from "long." The period for which the quantitative change associated with a one-percentage-point change in the rate of monetary growth is equal for prices and for income is less than the shortest of our periods, which means less than six years on the average. The change in prices is double that in income for a span of five phases, or about ten years. These numbers perhaps help give some content to "brief" or "long," even if they do not provide a sharp demarcation.

MILTON FRIEDMAN  
 ANNA J. SCHWARTZ

TABLE IV-2  
 RATES OF CHANGE COMPUTED FROM VARYING NUMBER OF PHASES: SELECTED STATISTICAL CHARACTERISTICS  
 OF MONEY, NOMINAL INCOME, PRICES, AND REAL INCOME, 1882-1961

Number of Phases	Correlation Coefficients										Regression Coefficients			
	Standard Deviations					Simple					Partial			
	$\sigma_M$	$\sigma_P$	$\sigma_Y$	$\sigma_I$	$\Gamma_{MP}$	$\Gamma_{MY}$	$\Gamma_{PY}$	$\Gamma_{MI}$	$\Gamma_{MP.Y}$	$\Gamma_{MY.P}$	$\Gamma_{PY.M}$	$b_{PM}$	$b_{YM}$	$b_{PY.M}$
3	.0539	.0369	.0311	.0584	.8380	.6985	.4720	.9013	.8056	.6297	-.2900	.574	.403	.680
4	.0462	.0332	.0247	.0492	.8314	.6959	.4326	.9102	.8192	.6711	-.3658	.598	.371	.739
5	.0391	.0298	.0193	.0415	.8323	.6997	.4001	.9234	.8435	.7218	-.4601	.636	.345	.826
6	.0335	.0271	.0153	.0359	.8312	.7098	.3906	.9286	.8542	.7525	-.5090	.673	.324	.904
7	.0289	.0249	.0122	.0318	.8368	.7290	.4021	.9340	.8675	.7831	-.5549	.722	.308	1.001
8	.0252	.0231	.0100	.0288	.8446	.7567	.4204	.9412	.8876	.8268	-.6250	.773	.300	1.128
9	.0221	.0215	.0087	.0264	.8598	.7739	.4271	.9549	.9243	.8808	-.7369	.837	.306	1.285

SOURCE: Rates of change are slopes of least squares lines calculated for groups of 3, 4, 5, 6, 7, 8, and 9 successive phases of each series. Underlying annual data, same as in *A Monetary History*, Chart 62, facing p. 678. Average values of each series were computed for successive reference expansions and contractions, with the initial and terminal years of the phase each weighted one-half and intermediate years weighted unity.

NOTE: M = Money stock; P = Implicit price deflator; Y = Real income; I = Nominal income.

## FLUCTUATION IN MATERIALS STOCKS ON HAND AND ON ORDER

A book-length manuscript on this subject has been completed. By dealing with materials on order in the same frame of reference as materials stocks on hand, the analysis is focused on purchasing decisions. These decisions reflect the need to supply materials for current operations along with the need to alter stocks on hand or on order in line with the many functions that stocks serve.

Purchasing, that is, new orders for materials (the point at which goods enter stock on order) reflects these needs with far more delicacy than does the receipt of materials (the point at which goods enter stocks on hand). As a result, the dynamics of inventory fluctuation seem more evident in the empirical data. For example, the rate of change in department store "ownership" (the sum of stocks on hand and on order) seems to move in close contemporaneous association with the rate of change in department store sales, as the classic acceleration model prescribes. The problem is, however, that it moves too much—incremental stock-sales ratios are substantially greater than average ratios. This, along with some interesting particular episodes, requires explanation in terms that comprehend problems in the timing of buying in the light of changing market conditions. The link between materials ownership and sales of durable goods manufacturers is far less in accord with acceleration notions. Though the advance knowledge of requirements yielded by sales orders would seem to make the achievement of materials stock objectives feasible, the empirical association is not very close, nor is the association with ownership at all clear. The reason is that the on-order part of the total undergoes large fluctuations which seem to reflect changes in market conditions.

Mildly, then, in the case of department stores, and strongly in the case of durable goods manufacturers, the emphasis on purchasing highlights one group of the functions that stocks serve—the capacity to adjust the

timing of buying to changing expectations about deliveries, prices, or other market conditions. The time series indicate that these phenomena are of particular importance during the first year of cyclical expansion.

Expectations about materials markets are based on a network of information about market conditions in general, and about what suppliers, customers, and competitors are doing. At the same time, the actions that these expectations set off affect the market and therefore subsequent expectations. This "ecology" of interplay between the individual marketeer and his environment raises questions that require empirical and theoretical exploration. For one thing, it poses a puzzle: new orders are capable of virtually immediate transmission of buying intentions from buyer to seller; market information is good and tends to be shared by many market participants. Why then does buying on the basis of expectations not seesaw back and forth from one extreme of opinion to another?

The last chapter of the book attempts a theoretical exploration by focusing on one aspect of market-oriented considerations (by no means the more important one)—prices—and constructing an "ecological model of price-timed ownership." Price-timed ownership (a positive or negative quantity) consists of the difference between the amount of materials actually on hand and on order and the amounts that would be held if materials prices were expected not to change. The model describes how the expectation that materials prices will rise is capable (under appropriate circumstances) of causing a wave of price-timed buying which has rising and falling phases of reasonable duration and intrinsic reversing mechanisms.

The model is constructed on the basis of a group of assumptions which, however much they require testing and further specification, are believed to be basically realistic. The assumptions refer to *structural* and *behavioral* characteristics of business situations and *market reactions*. Natural time lags are recognized where they exist, but the model does not make use of formal discrete "periods." Let



me present the framework of the argument.

Business structural characteristics: (1) Extension of stock on hand and on order predicated on an expected rise in prices (positive price-timed ownership) occurs at increasing costs, and this causes price-timed ownership in any firm to have ceiling levels. (2) Firms in an industry differ with respect to their "proclivity to benefit from price-timed buying." The proclivity reflects the potential advantage to be gained from shifting the number of weeks' supply on hand and on order in accordance with expected changes in materials prices. Fewer firms have a very high proclivity than have a more moderate proclivity. Thus, for the familiar notion of the "representative firm," the model substitutes a "hill-shaped distribution of firms."

Business behavioral characteristics: These concern the circumstances that dictate a change in price-timed ownership. Desired change is effected promptly by appropriate positive buying or negative buying (reducing other buying), though there can be lags of an administrative sort. The level of price-timed ownership that is desired is predominately a function of (1) the expected rate of change in prices; and (2) the assurance with which the expectation is held. Assurance builds gradually in response to a number of influences, including sequential validation of previous expectations.

The structural and behavioral characteristics imply that as expectations change desired price-timed ownership can be described by a surface in three dimensions. The horizontal direction records, from left to right, increasing expected rates of increase in prices. The backward dimension records increasing assurance. The surface lifts moderately from left to right and more sharply in the backward dimension as assurance increases. But the structural characteristics prescribe that the rise slows and finally ceases before the rear right corner of the surface is reached.

Desired ownership is achieved by price-timed buying (positive or negative). Diagrammatically, it is the *rate* at which the ownership surface rises or sinks. For an industry as a

whole, it is positive when many companies flock from a lower spot on the ownership surface to a higher one. When upward movements concentrate in the steeper positions of the surface, total price-timed buying is relatively large. But as the situation matures, the movements tend to concentrate increasingly at the flatter (rear right) part of the surface. The total price-timed buying declines; that is, the buying wave passes its peak. I might add that other characteristics of the model also cause or contribute to the reversal. Decline is augmented as firms start actually to reduce their ownership by negative buying (move downward on the surface).

This buying has an impact on the materials markets and thereby on future expectations and their assurance. Consider the impact of positive price-timed buying: the addition to the buying that would otherwise occur tends to raise materials prices, to lengthen delivery periods, and to impair selections. These responses, though reasonably swift, are not immediate. Finally, evidence of the market responses feed back via various information systems to market participants, influencing their expectations about further change in price and their actions in response thereto.

The model, then, describes a wave in price-timed buying in terms of a pattern in which a changing number of firms buy changing quantities of materials to effectuate shifts in desired ownership. The buying in turn has an impact on the very conditions toward which expectations are addressed and communicated, and gives rise to further rounds of expectations, evaluations, buying, and market impact.

But the specifics of the process prescribe that response must cumulate somewhat deliberately at first, accelerate, and soon decline. This results partly from the structure of proclivities and of their ceilings, partly from the fact that perception and learning are involved and take time to mature and to respond to environmental change including change in opinion, and partly from the character of the market reaction and the information it generates.

Since the lags are not formal but factual, the time required for the fluctuation to occur is implicitly specified by the model. As mentioned earlier, the time series on new orders and ownership have revealed a "period of thrust" occurring during the first year of expansion which seems intimately associated with market-oriented timing of buying. Incidentally, these same periods typically constitute the rising phases of "sub-cycles." Appropriate lags and other specifications of the model should produce waves of the required duration. It would be instructive to explore, by means of computerized simulation, whether this test is met, and to learn how sensitively the duration and amplitude of fluctuation vary with changes in each of the critical parameters.

Of course, as usual, the construction raises questions more ably than it answers them. The book closes by mentioning some of the more pressing ones, and indicates directions that study might take.

Firm and refined knowledge of the processes whereby fluctuation generates and is transmitted laterally and vertically becomes increasingly worthwhile in an economy geared to high-level operation. For one thing, if I am correct in pointing to ecological interplay as a matter of some importance, the notion of a level of stock accumulation that "is not too high to be maintained" is of questionable relevance for individual industries. Incidentally, as mentioned earlier, expectations about prices are only one part, and usually a lesser part, of the many considerations that govern the timing of materials buying. When the process I have described gets under way in an industry sequence, buying will *necessarily* wax and wane. Stabilization strategy must be rather to intercept and to deteriorate alignment among waves in these industry groups. Indeed, this strategy could have wider relevance if, as seems plausible, some of the critical aspects of a buying wave for materials apply to important categories of finished durable goods.

RUTH P. MACK

## LABOR FORCE AND UNEMPLOYMENT

An initial version of a paper on the relation between labor force participation and unemployment was presented at the Berkeley Conference on Unemployment in June 1965. I am revising and expanding it to include additional research materials. The paper deals with labor force responses to short-term fluctuations in demand. Its major conclusions are that (1) the labor force responds positively to demand fluctuations, though not as strongly as some recent analyses suggest. (2) The weaker the degree of attachment to the labor force in a given population group, the more elastic is the supply of labor of that group with respect to changes in market and nonmarket conditions. (3) The relation between labor force participation and unemployment can be properly understood only when recent and longer-term developments on the supply side and in the wage structure are brought into consideration.

The reciprocal relation between labor force participation and unemployment is one aspect of a larger study of the unemployment structure in the United States in which I have been engaged intermittently during the past few years. I plan to return to this study as soon as possible, and on a full-time basis during the coming academic year. The purpose of the study is to assess and analyze the unequal incidence of unemployment on various population groups in the labor force. An important focus is the empirical analysis of effects on employment of worker and employer investments in education and training and in other employment costs, including those of job information in labor markets.

During the past year I completed work on a proposed Technical Paper written with Victor Zarnowitz, "On Some Criteria of Forecast Evaluation." The paper, shortly to be submitted for staff review, develops a methodology for appraising forecasts and illustrates its use in the analyses of business

forecasts collected in the National Bureau's study of short-term economic forecasting.

JACOB MINCER

#### JOB VACANCIES

A brief report on "Job Openings and Help Wanted Advertising as Measures of Cyclical Fluctuations in Unfilled Demand for Labor" has been published as part of the conference volume on *The Measurement and Interpretation of Job Vacancies*. Further research on this subject, which includes an analysis of the behavior of vacancy data in foreign countries, is being undertaken. The paper in preparation, tentatively entitled "The Cyclical Behavior of Job Vacancies," considers various concepts and definitions of vacancies and unemployment and theoretical formulations of the relation between them. Levels and changes in total vacancies, or their available proxies, will be compared with those in employment and unemployment, and geographical and occupational variations in vacancies are being analyzed.

CHARLOTTE BOSCHAN

#### THE CYCLICAL TIMING OF CONSUMER CREDIT, 1920-64

This study analyzes the cyclical timing of consumer credit in the United States in the years since 1920, a subject of increasing importance because of the tremendous growth in this sector of the economy in recent years. During the past forty-four years consumer credit, and more especially instalment credit, has grown much more rapidly than disposable personal income. Automobile credit outstanding, for example, has grown more than seventeenfold since 1929, while disposable personal income has increased only a bit more than five times in the same period.

Along with this impressive growth, consumer credit has experienced rather wide cyclical swings. The impact on the economy of these fluctuations could, therefore, be con-

siderable, and they may become still more important in the future. For this reason it seemed appropriate to consider the relation between turning points in consumer credit and business cycles generally.

We have found first that there is a high degree of conformity in the turning points in total consumer credit and in instalment credit to business cycle turning points. The conformity to the business cycle extends to the flow of credit as well as to credit outstanding. Indeed, there is a distinct pattern or sequence in the relevant turns. The peaks and troughs in net credit change occur first and lead business cycle turns; those in credit extensions generally occur at about the same time as business cycle turns; repayments and outstandings turn last and lag business cycle turning points. This general pattern has been quite consistent throughout the period under review.

We have studied the cyclical timing of automobile credit with particular care, because it is the only kind of credit that can be easily related to the cyclical behavior of the product for which it is extended. The results of such comparison are shown in Table IV-3. The questions to which the pattern revealed in the table is relevant are of considerable importance. Does a major industry such as the automobile industry tend to expand and contract its activities prior to turns in general economic activity and so help precipitate them, or does it react more passively, turning up or down at about the same time as or after general economic activity? Furthermore, what is the role of credit? Does it expand and contract in response to changes in the auto industry, or is the chain of causation the other way around?

While it is difficult to give definitive answers to these questions, the general pattern revealed by the average leads and lags in the table is suggestive. Turns in the net change in auto credit outstanding (which reflect the effect of changes in extensions and repayments on outstandings) consistently occur first and lead the business cycle at peaks and at troughs during the prewar as well as

TABLE IV-3  
AVERAGE LEAD (—) OR LAG (+) AT BUSINESS CYCLE PEAKS AND TROUGHS:  
AUTO CREDIT, REGISTRATIONS, PRODUCTION, AND PERSONAL INCOME

	At Peaks		At Troughs	
	Months	Rank	Months	Rank
PREWAR (1929-38)				
Net change in auto credit outstanding	-2.0	1	-19.0	1
Auto credit extensions	-1.5	2	-1.5	4
New passenger car registration	-0.5	4	-2.0	3
New passenger car production	-1.0	3	-1.5	4
Personal income	+1.2	5	-3.7	2
POSTWAR (1948-64)				
Net change in auto credit outstanding	-7.2	1	-3.8	1
Auto credit extensions	-2.2	3	-3.2	2
New passenger car registration	-3.5	2	-2.2	4
New passenger car production	-1.0	4	+0.3	5
Personal income	+1.8	5	-2.7	3
BOTH PERIODS				
Net change in auto credit outstanding	-5.5	1	-8.8	1
Auto credit extensions	-2.0	3	-2.7	3
New passenger car registration	-2.5	2	-2.2	4
New passenger car production	-1.0	4	-0.4	5
Personal income	+1.5	5	-3.1	2

SOURCE: Credit data, *Federal Reserve Bulletin*; auto industry data, *Automobile Facts and Figures*; personal income data, Barger and Klein, Department of Commerce estimates.

the postwar period. Moreover, these leading turns in net change in credit outstanding consistently precede turns in the activity of the automobile industry as revealed by new passenger car registrations and production. However, while the turns in industry activity precede turns in personal income on the average at peaks, they are preceded by turns in personal income at troughs.

There is thus some evidence to suggest that changes in the net impact of automobile credit at peaks precede and possibly help precipitate downturns in the auto industry and ultimately in the economy despite the continued increase in personal income. At troughs, on the other hand, the independent role of credit is less clear because, while the credit series lead and turn up first, personal income also leads and turns up prior to an upturn in the series reflecting activity in the

auto industry. Thus both credit and income appear to be favorably situated to encourage revival, but the independent impact of credit alone is difficult to assess.

The findings of the study are still being reviewed, but it is expected that a draft manuscript of a proposed Occasional Paper will be available shortly.

PHILIP A. KLEIN

#### SOURCE BOOK OF STATISTICS RELATING TO CONSTRUCTION

This book, which is in press, provides annual, monthly, and quarterly data on various measures of construction activity, including contracts placed, building permits and housing starts, construction expenditures, and the production and shipment of construction

materials. Source notes and descriptions of the series as well as summary measures of cyclical behavior are presented.

ROBERT E. LIPSEY  
DORIS PRESTON

#### ELECTRONIC COMPUTER APPLICATIONS

The manuscript for a proposed Technical Paper, "Electronic Computer Programs for Business Cycle Analysis," is being edited. It deals with the Bureau's standard business cycle analysis and with recession-recovery analysis. The paper outlines the general approaches, incorporates knowledge gained since the appearance of the original publications describing the measures,<sup>3</sup> provides guidance for the interpretation of the results, and offers detailed instructions for the use of the computer programs.

Julius Shiskin is preparing a revised version of his *Electronic Computers and Business Indicators* (Occasional Paper 57, 1957). He plans to review the progress that has been made in the last decade in separating cyclical from other types of economic fluctuations through various statistical adjustments. These include seasonal, holiday, and trading-day adjustments, techniques to smooth out irregular movements, and a new method of trend adjustment. The latest computer programs that have been developed to make the necessary computations will be described.

We are experimenting with programmed determination of cyclical turning points in economic time series. Two approaches are being investigated. One, designed by Milton Friedman and programmed by Charlotte Boschan, is based on the subdivision of time series into segments in such a way that the variances of first differences within each segment are minimized. The program seeks to determine significant changes in the level of first differences; it is not designed to locate

alternating peaks and troughs, as is necessary for the Bureau's standard cyclical analysis. The other approach aims largely at simulating the decision process used at the Bureau to determine specific cycle peaks and troughs. A preliminary program determined the turns of unproblematic test series quite well. The usefulness of the program, however, depends on its ability to deal with a substantial portion of problematic cases. Modifications of the approach, aiming at this goal, are being tested.

The operations of the electronic computing unit are supported by a grant from the International Business Machines Corporation and by general funds of the National Bureau.

GERHARD BRY  
CHARLOTTE BOSCHAN

#### OTHER STUDIES

Phillip Cagan's *Determinants and Effects of Changes in the Stock of Money, 1875-1960* (Studies in Business Cycles 13), Thor Hultgren's *Cost, Prices, and Profits: Their Cyclical Relations* (Studies in Business Cycles 14), the conference report on *The Measurement and Interpretation of Job Vacancies*, Reuben A. Kessel's *The Cyclical Behavior of the Term Structure of Interest Rates* (Occasional Paper 91), and Philip A. Klein's *Financial Adjustments to Unemployment* (Occasional Paper 93) were published. A paperback reprint of Chapter 7 of Friedman and Schwartz' *Monetary History*, entitled *The Great Contraction, 1929-33*, was published by Princeton University Press.

F. Thomas Juster's *Consumer Buying Intentions and Purchase Probability: An Experiment in Survey Design* is in press. Victor Zarnowitz' "Orders and Production in Manufacturing Industries: A Cyclical Analysis," the report of the conference on Investment Behavior, and George R. Morrison's "Cycles in Corporate Bond and Stock Financing" are in preparation.

Other studies concerned with aspects of business cycles are reported by Cagan and Earley in section 4 and by Mintz in section 5.

<sup>3</sup>A. F. Burns and W. C. Mitchell, *Measuring Business Cycles* (New York, NBER, 1946); Geoffrey H. Moore, *Measuring Recessions*, Occasional Paper 61 (New York, NBER, 1958).

## 4. FINANCIAL INSTITUTIONS AND PROCESSES

### INTEREST RATES

This study, undertaken with the aid of grants from the Life Insurance Association of America, is concerned with the behavior, determinants, and effects of interest rates. Joseph W. Conard had chief responsibility for planning and directing the project until his death in April 1965. Jack M. Guttentag is now director of the project.

Conard's report on the project as a whole, "The Behavior of Interest Rates: A Progress Report," is in press, and his draft manuscript, "Yield Differentials Between Newly Issued and Seasoned Securities," is being revised with a view to publication. An Occasional Paper by Reuben A. Kessel, *The Cyclical Behavior of the Term Structure of Interest Rates*, was published.

The study is benefiting from the advice and assistance of an advisory committee whose members are W. Braddock Hickman (chairman), Federal Reserve Bank of Cleveland; Julian D. Anthony, Hartford Life Insurance Company; Daniel H. Brill, Board of Governors of the Federal Reserve System; Lester V. Chandler, Princeton University; George T. Conklin, Jr., The Guardian Life Insurance Company of America; Milton Friedman, University of Chicago; Raymond W. Goldsmith, Yale University; Sidney Homer, Salomon Brothers & Hutzler; Norris Johnson, First National City Bank of New York; Robert G. Link, Federal Reserve Bank of New York; Roger F. Murray, Teachers Insurance and Annuity Association; James J. O'Leary, Life Insurance Association of America; Roy L. Reiersen, Bankers Trust Company; Eli Shapiro, Harvard University; Henry C. Wallich, Yale University; and C. Richard Youngdahl, Aubrey G. Lanston and Company.

### THE RESIDENTIAL MORTGAGE MARKET

The study of the residential mortgage market is proceeding along two fronts: a time series study that is compiling new historical data from the records of life insurance companies,

and a cross-section study of the principal factors influencing the structure of mortgage yields, which employs existing data provided by the Federal Reserve Bank of Chicago and other sources.

Construction of time series on residential mortgage yields and terms for the period 1951-63, which has engaged the efforts of Jack Guttentag and Morris Beck, is virtually completed. The series have a one-year overlap with the new current series covering conventional mortgages being compiled by the Federal Home Loan Bank Board, which began December 1962. Monthly series on the following loan characteristics are now available: average gross effective yield, contract rate, loan-value ratio, and maturity, for conventional and FHA home mortgages. Other series, including some for regions, are being prepared. A draft of a Technical Paper describing the scope, significance, and limitations of the data is near completion.

In the cross-section study we have begun to study geographical yield differentials, using a segment of the new data being compiled by the Federal Home Loan Bank Board covering a sample of conventional mortgages authorized by five types of institutional lender (savings and loan associations, life insurance companies, commercial banks, mutual savings banks, and mortgage companies), in eighteen metropolitan areas. Information available for these mortgages includes the contract rate, fees and charges paid by the borrower, effective yield (contract rate adjusted to take account of fees and charges), loan-value ratio, purchase price, maturity, type of lender, location of property, and purpose of loan. The last distinguishes new construction loans (permanent mortgages to owner-builders), loans for the purchase of new homes (homes purchased from operative builders), and loans for the purchase of existing homes. During the period of rate stability we selected for study (May-December 1963), the sample covered almost 50,000 mortgages. We did not, however, have access to the individual

cases. Rather the unit of observation employed was an average for a given type of property, type of lender, month, and metropolitan area. These pooled observations numbered almost 1,800.

Using regression analysis that allows for differences between metropolitan areas in loan and property characteristics, we found that Los Angeles had the highest and Boston the lowest effective yield of the eighteen metropolitan areas, the differential between them amounting to .88 percentage points. The three lowest-yield areas were all in the East (Boston, Baltimore, and Philadelphia); the next four were in the Midwest (Detroit, Minneapolis, Chicago, and Cleveland); the next four comprised three areas in the South (New Orleans, Memphis, and Miami) plus New York; and the highest seven comprised six areas in the West and Southwest (Houston, Seattle, Denver, Dallas, San Francisco, and Los Angeles) plus Atlanta. Hence there is a marked regional gradation, running from the East (lowest), Midwest, South, and West and Southwest (highest), but with the exceptions noted.

Geographical yield differentials are generally higher on loans authorized by commercial banks and by savings and loan associations (mainly local lenders) than on loans by insurance companies and mortgage companies, which operate more often in the national markets. Interarea differences in risk (not taken account of in our regression) probably are greater for local lenders, but in all probability these differences also reflect various types of market imperfections. We hope to unravel this problem further by employing data on individual transactions, which include the location of lender as well as location of property. This will permit us to distinguish "inside" from "outside" lenders for every metropolitan area.

#### NONRESIDENTIAL MORTGAGES

The collection of data on nonresidential mortgages covering the period 1951–August 1965, which are broadly comparable to the new data

on residential mortgages, is nearly completed, and tabulation and analysis are under way. Royal Shipp of the Federal Reserve Board is collaborating on this study, which will include an analysis of the determinants of changes in yield over time and the structure of yields at various points in time.

The Life Insurance Association of America recently initiated a current series that begins where the Bureau's historical series stops. For the time being, the current series covers the same fifteen life insurance companies included in our historical survey, but it is hoped that the series can later be broadened to include some small life insurance companies, and that eventually other major lender groups will participate.

JACK M. GUTTENTAG

#### DIRECT PLACEMENTS: YIELDS AND QUALITY, 1951–1961

A second draft of the "yields" portion of the study is nearing completion. It contains the following chapters:

- I. Introduction and Summary of Findings
  - II. Statistical Techniques, Problems of Measurement, Variables
  - III. Yields on Industrial Direct Placements
  - IV. Yields on Utility Direct Placements
  - V. Yields on Direct Placements Compared with Yields on Public Offerings
- 
- Appendix A. The Signs of the Coefficients
  - Appendix B. The Changing Characteristics of Direct Placements
  - Appendix C. Yields on the Issues of Finance Companies
  - Appendix D. Regression Coefficients and Standard Errors, 1951–1961

Chapters III and IV and Appendix C will contain series on yields, both cross-classified and computed, by "quality" class, by industrial class, by intervals over times charges earned, and by intervals over size of issue and size of issuer.

Plans for a separate report on changes in the "quality" of direct placements as reflected

in yield differentials and other characteristics of the issues are being drawn up.

AVERY B. COHAN

#### CYCLICAL BEHAVIOR OF INTEREST RATES

The initial research on this part of the interest-rate project has been described in a proposed Occasional Paper now being reviewed by the Board. Further work is proceeding along several lines.

First, the study includes a comparison of the cyclical behavior of a wide variety of interest rates, with particular emphasis on yields of bonds that differ by economic sector, quality, and maturity. Quality differences produce risk premiums, which according to some theories indicate important financial developments over the business cycle. Differences by maturity reflect liquidity premiums and expected future changes in rates. Recently there has been a new interest in liquidity premiums, and further examination of their cyclical behavior is planned. One question is whether short-term fluctuations in those premiums are related to the level of rates or to the deviation of levels from "normal," as studies have variously suggested, and whether the premiums of a broad range of securities (not just those of Treasury bills, to which recent work has been confined) show the same behavior.

Second, monetary influences on interest rates are being given special attention. The paper referred to above documents an inverse association between interest rates and the rate of change of the money stock. To shed further light on that relation, the monetary influence has been divided into separate components reflecting different ways in which new money comes into the economy. One way of special interest is through changes in earning assets acquired by the banking system. We are analyzing those changes to see whether their effects on interest rates can be distinguished from those of other sources of change in monetary growth.

A third and quite different line of study is the effect of interest rates on business cycles.

In theory, a rise in rates during business expansions tends to restrain economic activity and eventually contributes to a downturn, and conversely for business contractions. We have found a relation between the length of lead or lag of interest rates at business cycle turns and the duration of the concurrent reference cycle phase. Presumably, a long lag in the upturn, say, of interest rates allows the expansion in business to last longer (other things the same) until the eventual rise in rates helps to bring on a downturn. The relation is statistically significant for commercial paper rates and high-grade bond yields for the full period 1857-1961. While slow rises or declines in activity may tend to produce long durations as well as long lags in interest rates, that possible source of spurious correlation does not appear to explain the relation, which shows up even when the average change per month in activity for each phase is held constant.

It is hoped to have a draft manuscript on the second phase of the study prepared by the middle of this year.

PHILLIP CAGAN

#### EFFECT OF INTEREST RATES ON REAL INVESTMENT

I have been reviewing empirical studies that investigate the impact of financial variables on investment outlays of various sorts—business plant and equipment, residential housing, consumer durables, and state and local government enterprises. The purpose has been to determine whether the National Bureau's interest rate study should include an investigation of the relation between monetary variables and real investment behavior, and if so what the nature of the investigation should be.

Broadly speaking, three different types of data can be used to examine this problem. First, time series on the past investment behavior of economic units (firms, households, governments) can be studied at various levels of aggregation with the aid of monetary and other variables measured at a similar level of



aggregation. Second, differences in the past investment behavior of a cross section of individual economic units can be studied with the aid of financial variables relating to the same units; some of the relevant variables (liquidity position) will be different for each unit, while others (borrowing rates) may vary only among certain classes. Third, the influence of monetary variables on investment behavior can be studied by inquiries directed to individual economic units about the reasons for their past behavior or about their prospective behavior under designated economic conditions.

All three types of data have been used, with different degrees of intensity, to study this problem. Most studies fit into the first category, where the difficulties of statistical estimation tend to be formidable. The basic problem is the refusal of economic time series to generate a sufficient amount of independent movement in the potential explanatory variables to produce much confidence that the observed average relations are the true structural ones. If empirically estimated relations are to provide reliable information for policy decisions, it is essential that the structure of the relation correspond to economic reality and not simply to what happens to provide the best statistical fit. For example, if the "best fit" estimate of interest elasticity actually includes some of the effects on investment behavior of another variable, say, sales change, the estimating equation will yield good results only during periods when interest rate movements and sales changes have their customary relation to each other. But the consequences of a shift in monetary policy that alters interest rates will not be predicted accurately unless the shift is accompanied by just the "right" amount of sales change. The fact that it is difficult to derive a satisfactory structural relation from collinear data is, of course, the reason why it is so easy to get good fits and so hard to get good forecasts from time-series relations.

A great deal of research on this subject, mainly concerned with analysis of time-series relationships, is currently under way at various

research centers. One type of time-series analysis that might warrant investigation by the Bureau would deal with the relation between cyclical movements in monetary variables and cyclical movements in investment commitments, such as new orders and construction contracts. The advantage of the new orders and construction contract series is that they cover a long time span, are available monthly rather than annually, and pertain to an early and presumably sensitive stage of the investment process.

Investigation of the monetary influences on real investment through surveys of investment decision-makers has been put to widespread use, although the potentialities of this method have not been fully exploited. For the most part, the raw survey results indicate that monetary influences on real investment decisions are comparatively unimportant. This conclusion has been subject to considerable debate, but my reading of the bulk of the evidence is that little indication of rate sensitivity in relation to business investment decisions can be found in the survey data. One curious feature of the most recent and probably the most exhaustive of these surveys (done for the Royal Commission on Banking and Finance in Canada) is that, of the business firms which indicated that their own investment decisions were affected by monetary conditions, many reported that it was not because funds were more expensive or harder to get, but because the activity levels of their customers, hence the demand for their products, would be adversely affected. That is, while relatively few firms included in the survey said that they would be directly affected, a substantial number indicated that they might cut back their own investments because of the effects of monetary tightness on other firms. But if there are no direct effects, there can hardly be indirect ones of real importance. On the whole, my feeling is that the survey method, as generally used, has severe inherent limitations which make it unlikely to be a fruitful area in which to invest research resources.

Another possibility, which would also in-

volve considerable use of the interview technique, is to investigate the decision-making process used by business firms in the investment field. For example, if firms use some estimate of their "cost of capital" as a minimum acceptable payoff for investment projects, how sensitive is this estimated cost of capital to market interest rates? Could the investment criteria that firms use conceivably give weight to monetary variables? It seems to me that these kinds of questions have not been thoroughly explored, and that further study would yield valuable insights into the actual or potential influence of monetary factors on real investment, and into the way that monetary factors work to influence investment.

Still another possibility would be an investigation of differences among investment sectors in the analytically appropriate measure of borrowing cost, designed to develop better insights about the probable degree of interest rate sensitivity. For example, corporations obtain most of their investment funds from what may be viewed as an equity source (retained earnings), and place relatively little reliance on debt funds. For governmental units, on the other hand, debt funds constitute the major source of capital. For households, the bulk of capital needs are derived from debt funds; only a small fraction—smaller in recent years than previously—consists of equity funds. Thus the mixture between debt and equity varies widely among capital-using sectors. Since monetary policy has a more direct (and presumably stronger) influence on the cost of debt than of equity funds, its effectiveness may vary according to the mixture of debt and equity in the capital structure.

F. THOMAS JUSTER

#### SEASONAL VARIATIONS

The reappearance of seasonal variation in interest rates in the 1950's, after two decades of dormancy, is the subject of the present study, which was begun by the late William

H. Brown, Jr. A number of interest rate series are being examined to determine the extent of their seasonal variation over the past fifteen years and, when necessary, an appropriate adjustment for this variation.

Brown had evaluated the seasonal patterns for the period 1951 through 1960 and adjusted the series accordingly. The marked change, however, in the seasonal amplitudes since 1960, indicative of the generally unstable character of the seasonal variation of these series in the postwar period, calls for a re-examination of the earlier findings together with a presentation of the results covering the period 1960 through 1965. Preliminary analysis of the new adjustment of the Treasury-bill rates suggests that while there has been some seasonal variation in the series since 1960, its extent is small in comparison with that of the previous five years.

STANLEY DILLER

#### BANKING STRUCTURE AND PERFORMANCE

Since the end of World War II the scope and service mix of commercial bank operations as well as the organizational structure of the industry have undergone substantial changes. The major structural change has been the growth in importance of branch banking. As recently as 1947, branches of commercial banks accounted for only 22 per cent of total commercial banking offices; by the end of 1964, more than 50 per cent of all banking offices were operated as branches. In this same period, commercial banks greatly increased their participation in the consumer loan markets, and substantially broadened the variety of financial services performed for other borrowers. A strong upsurge in time-deposit accounts, which started in 1962, has substantially altered the structure of deposits. Time deposits were only 37 per cent as large as demand deposits at the end of 1947; they were 82 per cent of the amount of demand deposits at the end of 1964.

Although a substantial amount of research

has been conducted analyzing the consequences of these changes, many questions remain unanswered. At the public policy level, the principal controversies concern the desirability of relaxing various parts of the existing regulatory structure. At the bank operations level, pricing of services, especially new services offered business customers, and the desirability of competing for time deposits are examples of unresolved problems raised by the changing environment in which banks must compete.

With the aid of a grant from the American Bankers Association, an exploratory study was undertaken to develop a research program on banking structure and performance, aimed at determining what influence, if any, the different types of bank organization and market structure have had upon prices charged, costs incurred, and the level of services offered by commercial banks.

The exploratory study was materially assisted by an advisory committee appointed by the National Bureau to suggest research topics and review the proposals for research which were developed. The members of the committee are Lester V. Chandler, Princeton University (chairman); David A. Alhadeff, University of California; John J. Balles, Mellon National Bank and Trust Company; Howard D. Crosse, Federal Reserve Bank of New York; Milton Friedman, University of Chicago; Jack M. Guttentag, University of Pennsylvania; Raymond E. Hengren, Federal Deposit Insurance Corporation; Donald R. Hodgman, University of Illinois; Robert C. Holland, Board of Governors of the Federal Reserve System; Clifton H. Kreps, Jr., University of North Carolina; Wesley Lindow, Irving Trust Company; Thomas G. Moore, Carnegie Institute of Technology; Roger F. Murray, Teachers Insurance and Annuity Association; Almarin Phillips, University of Pennsylvania; Roland I. Robinson, Michigan State University; Marvin E. Rozen, Pennsylvania State University; Edward S. Shaw, Stanford University; Robert P. Shay, Columbia University; and Charls E. Walker, American Bankers Association.

The research program developed in the exploratory study took into account banking research presently in progress or projected. The choice of topics was strongly influenced by an effort to formulate a long-range research program and to give priority to studies that would provide a base of tested knowledge upon which future studies could build. Although the suggested investigations do not attempt to tackle directly the most pressing public policy issues, they are designed to provide much of the basic information upon which sound policy decisions should be based.

Availability of data also exercised a strong influence on the design of the research program. Reflection on the conclusions of existing research convinced us that much of the problem of interpretation of the results of this research is a direct consequence of the almost complete dependence on readily available data. Hindered by the paucity of existing data and by inadequate resources for data collection, the researcher typically developed models to use available data that of necessity left important variables out of account or poorly specified. It was considered important, therefore, to formulate studies that would secure new and appropriately designed statistics from individual banks, the bank regulatory authorities, and other financial agencies and authorities.

The exploratory study concluded that research on the following six topics would be worthwhile: (1) the terms on which bank services are performed for businesses, (2) the availability and level of bank services to business, (3) the terms on which banks grant credit to consumers, (4) the terms on which banks grant credit in the mortgage market, (5) economies of scale in banking, and (6) a study of productivity in banking.

The first and third of these studies, dealing respectively with business and consumer lending terms, have been selected for investigation by the National Bureau, under a grant from the American Bankers Association.

DONALD P. JACOBS  
GEORGE R. MORRISON

## CONSUMER CREDIT

Three reports from the consumer credit study were either published or approved for publication during the past year, making a total of eight publications to date. Those published this year are Philip Klein's *Financial Adjustments to Unemployment* (Occasional Paper 93) and Wallace P. Mors's monograph, *Consumer Credit Finance Charges: Rate Information and Quotation* (Studies in Consumer Instalment Financing No. 12). F. Thomas Juster's "Household Capital Formation: Growth, Cyclical Behavior, and Financing, 1897-1962" will soon be in press.

The objective of this program, supported by grants from several finance companies, is to assess the role of consumer credit in the U. S. economy. The individual studies have centered attention on consumer behavior, the level and structure of finance rates and costs, and the functioning of credit markets as affected by economic and legislative forces. Studies in progress, by Richard T. Selden, Wallace P. Mors, and myself, are concerned with sources of funds to the finance industry and with the factors affecting the structure of finance rates in new- and used-car financing. In the latter case, data on individual credit contracts during 1954-55 and 1958-59 are being analyzed. The factors considered pertain to the characteristics of the market (type of credit source, region, state legal rate ceiling, and city size); provisions of the credit contract (terms, dealer profit margins, and other charges and fees for services); and characteristics of the borrower (occupation, income, liquid assets, net worth, burden of instalment payments, age, and education).

ROBERT P. SHAY

## THE QUALITY OF CREDIT IN BOOMS AND DEPRESSIONS

Geoffrey Moore's and Philip Klein's study, "The Quality of Consumer Instalment Credit," is being prepared for press, and Thomas Atkinson's Occasional Paper, "Trends in Corpo-

rate Bond Quality," will soon be ready for review by the Board. An Occasional Paper, "The Quality of Agricultural Credit," by George Brinegar and Lyle Fettig, is in preparation. My summary volume, "The Quality of Credit in the Postwar U. S. A.," has been reviewed by the staff and is now being revised for submission to the Board.

Three studies in progress are reported on below.

JAMES S. EARLEY

## THE QUALITY OF POSTWAR RESIDENTIAL MORTGAGE CREDIT

The main part of this study deals with tests of the validity of certain "ex ante" measures of mortgage loan quality, e.g., term to maturity, loan payment-to-income ratios, loan-to-value ratios, occupation, marital status, and similar measures of loan, property, and borrower characteristics. The development of these tests relies heavily on data supplied to us by the United States Savings and Loan League, the National Association of Mutual Savings Banks, and the Mortgage Bankers Association. The above organizations also have contributed to the financial support of this project.

In addition to the above analysis, we tested our "independent" variables to determine the extent of intercorrelation among them and to determine which, if any, had undergone significant changes between the time when the loan was granted and when it became delinquent.

The study will also examine postwar changes in time series data covering both "ex ante" and "ex post" measures of mortgage quality. Significant findings of recent studies by VA, FHA, and HHFA are summarized, and an attempt is made to link up the time series and cross-sectional analyses.

JAMES S. EARLEY  
JOHN P. HERZOG

## STATISTICAL COMPENDIUM ON CREDIT QUALITY

Although the quality of credit is an important element in our economic structure, only rarely does it enter as a direct or explicit part of the current analysis of business and financial conditions. One reason for this is the lack of readily available evidence. A considerable number and variety of credit quality indicators are published, but they are widely scattered and thus not generally known. To help remedy this situation, we are preparing a statistical compendium of time series relating to the quality of credit. This compendium, by bringing together in a single volume most of the known series on the subject, would serve the informational needs of economic and financial analysts, providing them with a comprehensive list of available data along with a description of their nature and sources, and supplying a historical perspective against which future movements of these measures of credit quality can be judged.

The credit quality indicators to be included pertain to terms of credit, borrower characteristics, credit ratings, and measures of lending experience. Emphasis is being placed on consumer instalment credit, home mortgage loans, and business debt. Some information will also be shown for agricultural credit and the obligations of state and local governments.

Where appropriate to facilitate their use, monthly and quarterly series subject to seasonal influences will be presented in seasonally adjusted form along with the original data. Charts of many of the series will be included.

The compendium will also contain a brief guide to the interpretation of these series, which should help identify the major problems in evaluating the current state of the credit structure. At the same time, this will point up the gaps that exist in our knowledge of the subject and in our statistical arsenal of credit quality measures.

Considerable progress has been made in collecting and processing the time series. Writing their descriptions and a brief guide

to their interpretation is the next order of business. An initial report suitable for publication as an Occasional Paper is expected to be ready shortly, and the final volume late this year.

The Board of Governors of the Federal Reserve System and Bankers Trust Company have contributed substantially to the support of the study.

EDGAR R. FIEDLER

## POSTWAR MUNICIPAL BOND QUALITY

The amount of municipal bonds outstanding—that is, the tax-exempt bonded debt of all domestic public agencies below the level of the federal government—has grown faster than any of the other principal forms of marketable debt instruments since the end of World War II. Our study of these bonds will concentrate upon those characteristics and conditions that purport to measure the probability of payment of bond principal and interest.

We plan to attack this subject in several ways. Aggregative quantitative and qualitative measures, such as those pertaining to the debt burden of municipalities, will be used as indicators of broad postwar patterns in the quality of municipal bonds. In addition, the results of three methods of measuring the quality of individual municipal bond issues will be analyzed.

First will be an examination of distributions based on the quality ratings assigned to municipal bonds by selected agencies that perform this rating service for their customers or for regulatory purposes. The agencies whose data may be utilized for this purpose include Dun and Bradstreet, Standard and Poor's Corporation, Moody's Investors Service, and the Federal Deposit Insurance Corporation.

Second will be an evaluation of the aggregated opinions of the capital market as indicated by the market yields on municipal bonds. Under this method it is assumed that the market will pay a higher price, i.e., accept

TABLE IV-4  
DISTRIBUTIONS OF RATED MUNICIPAL BONDS ISSUED, 1947-64  
(THREE-YEAR AVERAGE OF PERCENTAGE OF DOLLAR AMOUNT ISSUED)

	Aaa	Aa	A	Baa	Ba and Below
1947-49	19.9	34.5	29.9	14.1	1.5
1950-52	21.0	31.3	34.6	11.4	1.7
1953-55	23.0	29.5	35.1	11.4	1.0
1956-58 <sup>a</sup>	13.8	37.1	36.9	10.9	1.1
1959-61	14.1	32.1	39.3	13.4	1.0
1962-64	16.0	24.0	43.2	15.2	1.6

SOURCE: 1947-1955, Roland I. Robinson, *Postwar Market for State and Local Government Securities*, Princeton University Press for NBER, 1960, p. 66; 1957-64, tabulations by the Investment Bankers Association of America. Public-housing bonds are included. Three-year averages are not weighted.

<sup>a</sup>Distributions for 1956 were incomplete, so average is for 1957-58 only.

a lower yield, for a debt instrument with a low credit risk than for a similar instrument with a high credit risk. The market yield of individual issues generally will be represented by yield averages of homogeneous groups of municipal bonds. These yield averages will be compared with yield averages for other groups of municipal bonds and for other types of bonds.

The third method will be an examination of selected measures of the ability and willingness to pay of a sample of governmental units that were borrowing during the postwar period. The measures to be examined include comparisons of municipal debt with population, estimated true property value, income, retail sales, and savings in the municipal area; cash-flow coverage of revenue debt service charges; and tax rates, tax collection records, current budget performance, and past defaults. The results from all of the methods employed will be compared and any significant differences will be examined.

Preliminary analysis using these methods has produced some interesting results. Certain aggregative measures indicate that the municipal debt burden increased in the postwar period. Per capita municipal debt in the United States rose from \$170 in 1947 to \$482 in 1964. During the same period, the ratio

of net municipal debt outstanding to gross national product more than doubled (rising from .061 to .137), and so did its ratio to disposable personal income (which rose from .085 to .198). On the other hand, interest charges on municipal debt have not risen quite as rapidly as the revenue base of state and local governments since the end of World War II. Despite relative increases in recent years, interest charges were 4.5 per cent of state and local revenues in 1964 as compared with 4.8 per cent in 1947.<sup>1</sup> There has been a rapid increase in the amount of limited-liability municipal debt outstanding. In 1948, nonguaranteed obligations amounted to only 10.3 per cent of municipal debt outstanding. By 1964 they had increased to 37.2 per cent.<sup>2</sup> These limited-liability obligations are generally considered of lower quality than full faith and credit instruments. Rating and market yield comparisons between general obligations and limited-liability obligations will be used to test this generalization.

Substantial progress has been made on the study of the percentage distributions by rating

<sup>1</sup>Data computed from figures compiled by the Governments Division, Bureau of the Census, Department of Commerce.

<sup>2</sup>*Ibid.*

classes of rated municipal bonds issued during the postwar period. An example of what is being done appears in Table IV-4, which shows that during 1947-64 there has been a downward trend in the proportion of municipal bond issues rated Aaa and Aa, a rise in those rated A, and little change in those rated Baa and below.

These data suggest that there has been a trend toward concentration of rated municipal bonds in the lower "investment grades." Quantitative and qualitative credit factors which might have caused such a shift will be examined. Rating distributions based on outstanding as well as newly issued municipal bonds will be examined, and comparisons will be made between rating distributions of general obligations and of limited-liability bonds.

A related problem revealed by preparatory analysis is the large share of municipal bonds which are not rated by any rating agency. Data on unrated issues indicate that since 1957 roughly one-quarter of total municipal issues by dollar volume and from one-half to two-thirds by number were not rated.<sup>3</sup> The evaluation of the quality of these unrated bonds will be based on market yields and on

<sup>3</sup>Based on data obtained from the Investment Bankers Association.

selected measures of ability and willingness to pay. In addition, market-yield relationships will be used to provide a quality comparison between general obligations and limited-liability municipal bonds and to estimate the quality of special classes of municipal bonds.

GEORGE H. HEMPEL

#### OTHER STUDIES

The following reports were published: *The Flow of Capital Funds in the Postwar Economy* (Studies in Capital Formation and Financing 12), by Raymond W. Goldsmith, and *Determinants and Effects of Changes in the Stock of Money, 1875-1960* (Studies in Business Cycles 13), by Phillip Cagan.

The studies by George R. Morrison, "Cycles in Corporate Bond and Stock Financing"; C. Harry Kahn, "The Tax Treatment of Income from Employment"; Lawrence H. Seltzer, "The Personal Exemptions in the Federal Income Tax"; and the conference report on Investment Behavior are nearing completion.

Other studies of financial institutions and processes are reported by Ture in section 2 and by Friedman and Schwartz and by Klein in section 3.

## 5. INTERNATIONAL ECONOMIC RELATIONS

### EXPORTS OF MANUFACTURES BY LESS DEVELOPED COUNTRIES

The compilation and processing of basic data for this project, which is being financed by a grant from the Ford Foundation, are nearing completion, and I expect to have a draft report ready for review in the near future. Some of the results of the study are described in Part II.

HAL B. LARY

### UNITED STATES PERFORMANCE IN INTERNATIONAL COMPETITION

The purpose of the study is to analyze the behavior of United States shares in the imports of leading foreign countries and to provide explanatory hypotheses for the changes observed. The study, now nearing completion, has been financed by a grant from the National Science Foundation.

TABLE IV-5

NUMBER OF PRODUCT GROUPS IN WHICH U. S. EXPORT PERFORMANCE FROM 1953-55 TO 1960-62 WAS STRONGER OR WEAKER THAN THAT OF OTHER LEADING COUNTRIES

Comparison With "Price-Fall" Countries	Comparison With "Price-Rise" Countries			Total
	U. S. Stronger	U. S. Weaker	No Comparison	
U. S. stronger	9	1	2	12
U. S. weaker	4	17	4	25
No comparison	1	1	1	3
Total	14	19	7	40

In the search for hypotheses to explain the behavior of U. S. market shares, data have had to be developed, on a uniform basis, for a number of domestic economic indicators for the United States and other countries, including price changes for individual products or product groups. The present note deals only with changes in market shares and with associated price changes.

Recognizing the inadequacy of existing price statistics for appraising international competitiveness, the National Bureau has undertaken a separate study (reported on by Kravis and Lipsey) aimed at the improvement of information in this area. For present purposes, however, there is little choice but to draw on the domestic wholesale prices of each country. These have been preferred over export unit values, since the quality of the latter is particularly subject to question.

For purposes of the analysis briefly reported on here, we have divided merchandise trade into forty product groups and have recorded for each product group imports of twelve leading foreign countries<sup>1</sup> from the United States and from each other in 1953-55 and in 1960-62. Changes between these periods in the percentage shares of the imports supplied by the United States and by each of

the other twelve countries have been computed for each product group. The changes in the shares of the foreign countries covered have then been aggregated, to the extent permitted by available price series, for countries in which prices of any given product group fell and countries in which they rose relative to price changes in the United States between the two periods.

Table IV-5 gives a frequency distribution indicating the strength or weakness of U. S. export performance in relation to that of each of the other two groups of countries ("strength" meaning that the U. S. share of the market rose more, or fell less, than that of the other country group specified).

If share changes were strongly (inversely) correlated with price changes, one might expect that U. S. market shares would have declined in relation to those of the "price-fall" countries and increased in relation to those of the "price-rise" countries. The totals in the table show a strong tendency for this expectation to be realized in relation to the first group of countries (right-hand column) but less so in relation to the second (bottom row). An examination of the individual cells does not show, however, the concentration of observations in column 1, row 2, which one might expect if relative price changes were the dominant factor. Instead, in the majority of cases, U. S. market shares tended either to rise in relation to both the "price-rise" and the

<sup>1</sup>These countries are Austria, Belgium-Luxembourg, Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Sweden, and the United Kingdom.



“price-fall” countries or to fall in relation to both.

These observations suggest that factors other than relative price changes contributed to gains and losses in the United States share of export markets. There remain, of course, many important questions to be examined. For instance, what happens if we take countries individually rather than group them as above? Is the ranking of price movements closely correlated with the ranking of share changes? If not, how can the absence of such ranking be explained? Does it mean that increases in imports as well as in domestic prices are both closely correlated with domestic production, so that countries with the highest increase in domestic production have also the highest increase in imports and in domestic prices? What role, if any, did the share of the market supplied by a country in 1953–55 play in the subsequent development? What geographic preferences are discernible? Were the products in which individual exporting countries registered their highest market gains those in which they also registered their highest expansion of domestic production, and in that event is the ranking of domestic rates of production a good proxy for technological innovation?

These are some of the questions which must be answered before more definitive pronouncements can be ventured on the role of prices in the behavior of market shares. Such answers cannot be provided until we abandon the general treatment followed in this note and begin to particularize on individual commodity and country behavior. An attempt to answer some of these questions is made in a proposed Occasional Paper now in preparation in advance of the main volume of the study.

H. G. GEORGIADIS

#### INTERNATIONAL PRICE COMPARISON STUDY

This study of comparative prices and price trends, supported by grants from the National

Science Foundation, is developing and evaluating measures of the price competitiveness in international trade of the major industrial nations. Price measures for machinery, transport equipment, metals, and metal products are being calculated for the United States, the United Kingdom, the Common Market countries, and Japan, covering as much as possible of the period since 1953.

The price-collection phase of the project has now been completed. Our data include information from more than 150 American firms that buy or sell in international markets, from many U. S. government agencies which take bids from both American and foreign firms, from five price collection projects conducted in foreign countries, and from other data on purchases by many foreign governments. Work is now concentrated on analyzing the data and preparing preliminary reports on specific product groups; these will be circulated to the industries involved for comments and suggestions. One paper containing a general description of the study and indexes for iron and steel products was published in August 1965 as Occasional Paper 94, *Measuring International Price Competitiveness: A Preliminary Report*. Additional reports have been prepared for nonferrous metals and products, textile machinery, and office equipment; and analyses of railroad equipment, aircraft, power-generating machinery, and motor vehicles are under way. We plan to draft a report on the full study by the summer of 1966.

Doris Preston has been participating in the collation and analysis of the data with the assistance of Madeleine Schreiber and Zenaida Mata.

IRVING B. KRAVIS  
ROBERT E. LIPSEY

#### FOREIGN TRADE AND BUSINESS CYCLES

The manuscript of my monograph “Cyclical Fluctuations in the Exports of the United States Since 1879” was reviewed by the staff and is being revised. Its contents are:

1. Are Exports Expected to Rise or to Fall When a Country's Economy Expands?
2. The Data; Some Basic Aspects of World Imports; the Method
3. Comparison of Instabilities: U. S. Export Prices, Quantities, and Values
4. Fluctuations in Foreign Imports and Their Effects on U. S. Exports
5. When and Why Exports Reverse Their Course
6. How U. S. Business Cycles Affect the Quantity of U. S. Exports
7. Export Prices and Export Values in Domestic Business Cycles
8. Summary

ILSE MINTZ

#### BALANCE-OF-PAYMENTS ADJUSTMENT POLICIES

The purpose of this study is to identify and analyze the policies which have been pursued, in the postwar years, in situations of balance-of-payments disturbance. The study is planned to cover eleven major industrial countries: Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, Switzerland, the United Kingdom, and the United States. Our work is benefiting from the advice and assistance of an Advisory Committee whose members are Peter B. Kenen (chairman), Columbia University; Arthur Bloomfield, University of Pennsylvania; J. Marcus Fleming, International Monetary Fund; George Garvy, Federal Reserve Bank of New York; Gottfried Haberler, Harvard University; Charles P. Kindleberger, Massachusetts Institute of Technology; Irving B. Kravis, University of Pennsylvania; Fritz Machlup, Princeton University; and Robert Triffin, Yale University. Financial support for the project has been provided by the Alfred P. Sloan Foundation and the Ford Foundation.

The core of the study will be a statistical description and analysis of the policies followed in the countries under consideration. For this purpose, time series will be constructed for variables which may serve as indica-

tors of balance-of-payments disturbances, such as changes in foreign exchange reserves or in net foreign assets, and for variables which describe policy measures, such as changes in foreign exchange rates, in the discount rate, in open-market operations, in money supply, in the government's revenue and expenditures, and the like. To these will be added series indicative of other target variables—the rate of unemployment, the rate of change of prices, or the rate of change of industrial production—which may compete with balance-of-payments adjustment in the use of various policy measures.

By observing all these series, the rules of behavior of each government may be identified. The question why one country follows a particular pattern of policy rules while another follows a different pattern, or why certain rules seem to be observed in one period and other rules in another, may then be explored. It may also be asked at this stage what the characteristics of the system are for the group of countries under investigation as a whole. For instance: Does the system, as represented by policies actually followed, have a deflationary or an inflationary bias? Is it likely to be stable?

Work on this project started in the fall of 1965 and is expected to take about two years. The first few months have been devoted primarily to the preparation of the project's general framework and to the study of Japan, which is serving as a pilot case.

MICHAEL MICHAELY

#### OTHER STUDIES

The conference report, *Foreign Tax Policies and Economic Growth*, and *Measuring Transactions Between World Areas*, by Herbert B. Woolley, were published.

Walther P. Michael is preparing a revised draft of his manuscript "International Capital Movements, 1950-54."