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

Reports by members of the staff on their research during 1963 follow. The findings briefly mentioned here have not yet undergone the full critical review accorded the National Bureau's studies and are therefore tentative.

## **I. ECONOMIC GROWTH**

### **PRODUCTIVITY IN THE SERVICE INDUSTRIES**

The service industries<sup>1</sup> now account for more than half of United States output, and employment in these industries is growing far more rapidly than in the rest of the economy. The rate of growth of productivity in services is said to be lagging, but the available evidence is fragmentary and conflicting, and the analysis of such a lag, if it exists, has scarcely begun.

With the aid of a three-year grant from the Ford Foundation, we are attempting to develop a clearer notion of developments in the service industries over the past three or four decades. We are gathering together—and to the extent possible will attempt to improve on—existing measures of change in output, change in labor and other inputs, and change in productivity. Major emphasis will be put on analysis of the factors responsible for changes in output and productivity, identification of obstacles to further productivity gains, and evaluation of private and public policies that are particularly relevant to productivity in these industries.

The research is being organized in two major sections. First, studies will consider in detail the problem of productivity and related changes in particular service industries. Wholesale and retail trade, personal services, and state and local government have already been selected for special attention; other industries that may deserve high priority include banking, insur-

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<sup>1</sup>Defined for this study to include wholesale and retail trade, finance, insurance, real estate, professional services, business services, repair services, personal services, and general government.

ance, health, and education. In addition to the industry research, a few studies are planned to treat a particular subject or problem in a way that cuts across industry lines. Work on the quality of labor, for example, has already begun. While the period covered will be from 1929 to the present, special emphasis will be placed on the last fifteen years. Among those participating in the project are Harry Gilman, Ernest Kurnow, David Schwartzman, and Jean Wilburn. Progress reports by them follow below.

Table IV-1 shows the relative importance of the service and goods sectors in 1929 and 1961, as measured by five different variables. Some preliminary sector comparisons have been made with use of Department of Commerce data on gross product in 1954 dollars as a measure of real output. For the period 1929-61, we find that real output per man has grown at the rate of 2.4 per cent per annum in the goods sector, and 0.7 per cent per annum in the service sector.<sup>2</sup>

Part of the differential (about 0.35 percentage points per annum) can be attributed to the changing importance of various industries with different levels of gross product per man, i.e., to intrasector shifts. In particular, the fact that agriculture—an industry with low gross product per man in 1929—became much less important during the period raises the observed rate of growth of output per man in the goods sector. Part of the sector differential is probably due to differential changes in hours worked per employee. The service industries, on average, have experienced sharper reductions in hours. Whereas the goods-service differential in rates of change of output per man is 1.7 per cent per annum, the corresponding figure for output per man-hour is 1.4 per cent.

Part of the difference (possibly a substantial part), we suspect, is related to a differential rate of change of quality per worker. Both the data on labor compensation and on demo-

graphic characteristics (such as age, sex, and years of schooling) suggest that the quality of the work force has improved more rapidly in goods than in service industries.

If we use relative changes in total labor compensation as a measure of relative changes in total labor input (adjusted for hours and quality), we find that the sector differential in output per unit of labor input is 0.7 per cent per annum. A similar type of calculation based on total factor input reduces the differential still further to 0.4 per cent per annum (see Table IV-2).

If changes in hours and quality of labor help significantly to explain differential changes in output per man, they, in turn, merit analysis. Our preliminary survey suggests also that physical capital per man has increased more rapidly in the goods than in the service sector, but the effect of this differential on trends in output per man has probably been small. This hypothesis requires further testing. In addition, we shall look at technological change and the possible influence of economies of scale. The gross product measures require further study, too, especially in industries such as government, where real output is equated with labor input in the official statistics.

VICTOR R. FUCHS

#### LABOR INPUT IN THE SERVICE INDUSTRIES

This study is concerned with estimating the effects of differential changes in the average length of the workweek and in the quality of labor on the differences between the service and nonservice industries in the rate of growth of output per man and per man-hour during the period 1929-63.

Most productivity studies of the past have equated the labor input in an industry, in a given year, with the number of employees in the industry during the year, times the average number of hours paid for or worked per employee per year. Changes in labor productivity so defined may be affected by changes in the

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<sup>2</sup>When agriculture and government enterprise are excluded from the goods sector, and real estate, households and institutions, and general government from the service sector, the figures are 2.0 and 0.8 respectively.

**TABLE IV-1**  
**DISTRIBUTION OF SELECTED MEASURES OF OUTPUT AND INPUT**  
**BETWEEN GOODS AND SERVICE SECTORS, 1929 AND 1961**  
 (percentage of U.S. total)

		Goods	Service	Goods*	Service*
Gross product (current dollars)	1929	51.9	48.1	42.2	27.3
	1961	48.7	51.3	43.2	28.6
Gross product (1954 dollars)	1929	50.8	49.2	40.8	30.4
	1961	50.9	49.1	46.7	28.1
Employment	1929	59.6	40.4	38.8	26.7
	1961	46.1	54.0	37.1	32.4
Man-hours	1929	56.9	43.1	36.3	30.3
	1961	46.2	53.8	36.7	34.5
Labor compensation	1929	54.7	45.4	47.3	33.5
	1961	49.5	50.4	45.2	31.1

Goods = Agriculture, mining, construction, manufacturing, transportation, communications and public utilities, and government enterprise.

Service = Wholesale and retail trade, finance, insurance, and real estate services, and general government.

Goods\* = Goods excluding agriculture and government enterprise.

Service\* = Service excluding real estate, households and institutions, and general government.

NOTE: Percentages have been rounded.

SOURCE: Department of Commerce, Office of Business Economics. Average hours based on John W. Kendrick, *Productivity Trends in the United States*, Princeton for NBER, 1961. Labor compensation estimated from OBE compensation per employee.

**TABLE IV-2**  
**DIFFERENCES IN RATES OF CHANGE OF PRODUCTIVITY BETWEEN**  
**THE GOODS AND SERVICE SECTORS, 1929 TO 1961**  
 (per cent per annum)

	<i>Sector Aggregates</i>		<i>Weighted Averages of Individual Industry Groups</i>	
	Goods minus Service	Goods* minus Service*	Goods minus Service	Goods* minus Service*
Output per man	1.74	1.30	1.40	1.33
Output per man-hour	1.35	0.92	1.04	0.94
Output per unit of labor input	0.67	0.45	0.64	0.45
Output per unit of total factor input	0.41	0.62	0.51	0.67

NOTE: For sector definitions, see Table IV-1.

quality of the employees and possibly also by the changes in hours of the same employee. These factors may be particularly important in comparing productivity increases in service and nonservice industries. As Victor Fuchs indicates above, for instance, since 1929 the service industries have experienced greater reductions in the average length of the workweek than nonservice industries have. This differential decline in hours of work has direct implications for output per employee. It may have implications for output per man-hour as well.

Similarly, preliminary estimates of the quality of employed persons indicate that the quality of labor has increased in the nonservice industries faster than in the service industries. That trend would result in a correspondingly lower rate of growth of output per man and per man-hour.

Cross-sectional studies have consistently revealed significant relations between such demographic characteristics as sex, color, age, education, and earnings. Economists have generally attributed the effects of these factors to differences in productivity, although in the case of race, a portion is probably the result of direct market discrimination. Accordingly, I began with an examination of these demographic characteristics of the employed in the service and nonservice industries. The estimates are being derived from decennial census data, beginning with the *1930 Census of Population*. Some preliminary estimates of the sex and color composition of the employed in 1960 and of the change in composition between 1940 and 1960 are reported in Table IV-3.

Column 1 shows that the fraction of white males was significantly lower in 1960 in the service than in the goods-producing industries. This is the group with the highest educational attainment and work experience. The table shows also (column 5) a decrease in the fraction of white male workers from 1940 to 1960 in the service industries relative to the non-service, which suggests a growing differential in the quality of labor between the two groups of industries.

A similar trend is revealed by preliminary data on other aspects of quality, namely, educational attainment and age of the employed. Between 1950 and 1960, for instance, the level of education of white males has risen faster in the goods-producing than in the service industries. During the same period, the service industries have experienced a decline of about 4 per cent in the fraction of males in the 25-64 age group. The fraction of males in that group has actually increased in the goods-producing industries.

Parallel to the estimation of demographic characteristics of the employed, estimation of hourly earnings rates by age, education, sex, and color classes is included in the study. These rates were derived from the 1/1,000 sample of the 1960 *Census of Population*. The patterns among the rates are consistent with the evidence on differential rates of investment in training—both formal and on-the-job—among color, sex, and age-education groups as derived by Gary S. Becker and Jacob Mincer, in National Bureau studies of investment in human beings. The following figures show that, for a given age, hourly earnings tend to increase with the level of education. The increase is greater for white males than for other groups. Similarly, for a given level of education, earnings tend to increase with age, generally reaching a maximum at 55-64 years. Again, as can

EDUCATION (years of school com- pleted)	AGE 45-54			
	Males		Females	
	White	Non- white	White	Non- white
0- 4	1.82	1.39	1.09	0.63
5- 8	2.44	1.78	1.50	0.87
9-11	2.77	2.37	1.71	1.42
12	3.10	2.11	1.91	1.70
13-15	3.70	2.55	2.25	1.98
16 plus	5.08	2.60	2.99	2.25

be seen below, the increase in earnings with age is greater for white males than for other groups.

With some modifications for the white-non-white differentials, which may be partly the

**TABLE IV-3**  
**COLOR AND SEX COMPOSITION OF EMPLOYED PERSONS, BY INDUSTRY,**  
**1960, AND THE CHANGE BETWEEN 1940 AND 1960**  
**(per cent)**

INDUSTRY	1960				CHANGE FROM 1940 TO 1960			
	Male		Female		Male		Female	
	White (1)	Non- white (2)	White (3)	Non- white (4)	White (5)	Non- white (6)	White (7)	Non- white (8)
All industries	61.0	6.2	28.7	4.1	-7.4	-0.6	7.3	0.6
Agriculture	78.4	12.0	7.4	2.2	-0.2	-3.5	4.5	-0.8
Mining	91.8	3.3	4.8	0.1	-0.9	-2.6	3.4	0.1
Construction	86.8	9.2	3.8	0.2	-4.1	2.0	2.0	0.1
Manufacturing	69.2	5.7	23.7	1.4	-4.2	1.3	2.1	0.9
Transportation, communications, and public utilities	75.4	7.3	16.6	0.6	-7.0	0.9	5.5	0.5
Wholesale and retail trade	57.9	4.9	34.9	2.4	-10.9	0.8	8.7	1.5
Finance, insurance, and real estate	51.8	2.6	44.1	1.6	-13.1	-1.3	13.7	0.8
Business and repair services	72.8	6.0	20.1	1.0	-12.4	0.4	11.2	1.0
Personal services	22.2	5.8	42.5	29.5	0.3	-0.8	-2.9	3.4
Entertainment and recreation service	60.9	7.9	28.8	2.4	-11.2	0.7	9.3	1.1
Professional services	36.2	3.6	54.0	6.1	-5.8	0.9	1.6	3.2
Public administration	64.2	7.2	25.5	3.0	-13.0	4.3	6.1	2.5

SOURCE: 1960 Census of Population, 1/1,000 sample; 1940 Census of Population.

result of discrimination, I shall use the hourly earnings as weights in the derivation of the labor input. Subsequently, the labor inputs derived in this manner will be compared with those derived by using interindustry earnings differentials as proxy measures for differences in labor quality.

Comparison of these two measures of labor quality should give us an estimate of the extent to which interindustry earnings differentials reflect differences in demographic characteris-

AGE	EDUCATION (9-11 YEARS)			
	Male		Female	
	White	Non- white	White	Non- white
14-24	1.44	1.26	1.40	1.18
25-34	2.41	1.80	1.76	1.35
35-44	2.82	2.16	1.67	1.45
45-54	2.77	2.37	1.71	1.42
55-64	2.83	2.36	1.62	1.55

tics of the employed and other forces. In particular, residual differences in earnings will be

tested against H. Gregg Lewis' estimates of union effects on differential wages. This inquiry should produce better measures of labor input than are currently available.

I expect to have a preliminary draft of a manuscript ready during the summer.

HARRY GILMAN

#### GROWTH OF PRODUCTIVITY IN DISTRIBUTION

Preliminary estimates of average annual rates of growth of constant-dollar sales per person engaged in retail trade, as a whole and for ten individual kinds of business, are shown in Table IV-4.

Output of retail trade is best measured by the difference between gross receipts and cost of goods sold, with both series corrected for changes in prices; the difference, or gross margin, includes all payments for retail services. Since appropriate price deflators are not available, the output of retail trade as a whole was estimated by adding together constant-dollar sales of individual types of store, weighted by

the respective gross margin percentages of sales for 1957, derived from Internal Revenue Service reports for corporations.

The estimates indicate that the growth of productivity per person engaged has been behind that of the goods sector. As Victor Fuchs indicates in his report, part of the explanation may lie in a relative decline in hours, and estimates currently are being made of the change in man-hours used in retail trade. In addition, there may have been a decline in the quality of labor in retail trade relative to the goods sector. Average hourly earnings in retail trade did not rise as much as earnings in other industries after the war, and there has been a shift in employee composition toward demographic groups that usually have low skill levels—for example, females and persons under 20 years of age. An estimate will be made of the effect of the change in labor force composition on productivity.

IRS data show a large increase in the ratio of capital to output, when both are valued in current prices; but not enough has been done

TABLE IV-4

AVERAGE ANNUAL RATE OF CHANGE IN DEFLATED SALES PER PERSON  
ENGAGED IN RETAIL TRADE, BY KIND OF BUSINESS, 1929-58  
(full-time equivalent of employees plus proprietors)

Business	1929-48	1948-58	1929-58
Retail trade, total	0.8	1.5	1.1
Lumber, building materials, hardware, farm equipment dealers	1.1	0.4	0.8
General merchandise group stores	0.5	0.1	0.4
Food stores	1.6	2.6	1.9
Automotive dealers	1.2	1.6	1.3
Gasoline service stations	3.4	1.8	2.8
Apparel, accessory stores	-0.5	1.5	0.2
Furniture, home furnishings, equipment stores	0.2	3.2	1.7
Eating, drinking places	0.3	0.4	0.3
Drug stores, proprietary stores	0.7	1.6	1.0
Other retail stores	2.0	1.1	1.7

as yet to say how much of this change reflects price changes and how much real changes. We plan to make the estimate in order to determine the effect of the change in the quantity of capital on productivity per person engaged.

Turning to the individual trades, we find the estimates confirm the common observation of a rapid growth of productivity in food stores after World War II. Most of the growth occurred between 1948 and 1954, contemporaneously with sharp increases in incomes and use of automobiles. As might be expected, the largest increases in productivity were among large stores (over 20 paid employees), but also, curiously enough, among the smallest stores (0 or 1 paid employee). Other store-size groups showed relatively small improvements in productivity.

In the interval 1939-58, the advantage of large size increased. In 1958, food stores with 20 to 99 paid employees had sales per person engaged 59 per cent higher than stores with 2 to 19 paid employees did; in 1939, the differential was 18 per cent in favor of the smaller stores. The productivity of the 2 to 19 employee store-size group increased by 19 per cent, while that of the 20 to 99 employee store-size group increased by 85 per cent. Retailing techniques of 1939 placed the large stores at a considerable disadvantage in relation to smaller stores, but in 1958 the reverse was true—perhaps because of the widespread adoption of open displays, self-service, and parking lots. As a consequence, the sales of stores in the 20 to 99 paid-employee group increased from 10 per cent to 42 per cent of total food store sales.

Compared with stores with 2 or 3 paid employees, those with 0 or 1 paid employee had very low productivity in 1939. With the base of sales per person engaged in the no-paid-employee size group equal to 100, the 1939 index, by store-size groups, is as follows:

0 paid employees	100
1	139
2	171
3	194
4-5	198

With the same base, the 1958 index reads as follows:

0 paid employees	100
1	105
2	110
3	117
4-5	123

The improvement in the relative position of the smallest stores can hardly be explained by changes in methods of retailing or changes in census coverage. Apparently, the cost to proprietors of small stores of exercising a preference for self-employment increased with the rise of wages in the economy as a whole; earnings available in other sectors of the economy rose relative to the returns from self-employment. If this change is the explanation for the improvement in productivity of the 0- or 1-employee group, the number of self-employed proprietors would have declined more than the number of employees of stores with one paid employee. That has happened: the number of proprietors of stores with no paid employees declined by 47 per cent and the number of proprietors of stores with one paid employee by 52 per cent, while the number of employees was reduced by only 24 per cent.

The evidence suggests the great importance of large size for output per person engaged, combined with the shift of sales to large stores, and the higher opportunity costs of proprietors of the smallest stores relative to their earnings, as explanations of the gain in productivity of food stores. It should be noted, however, that part of the gain is attributable to reduced services associated with sales. Delivery services probably declined, customers bought in larger quantities and used their own storage facilities, and they no longer demanded the convenience of the small neighborhood store. Estimates will be made of the value of particular services on the basis of prices charged by stores offering different combinations of service.

Among apparel stores, the gain in productivity between 1939 and 1948 was small for all store-size groups, other than those with 0 or 1 paid employee. Their number declined by 29 per cent, and constant-dollar sales per



person engaged increased by 87 per cent among stores with no paid employees and by 33 per cent among those with one paid employee. The productivity of other store-size groups rose by 0 to 17 per cent. The rise in the general wage level appears to have had the same influence on the smallest apparel stores as on the smallest food stores. In apparel, however, the 0- or 1-employee group's share of sales was small in 1939, and its gain in productivity did not contribute significantly to the over-all productivity increase. For similar reasons, the decline in its share of total sales was not an important element in the increase in productivity of apparel stores.

Increases in size beyond the group with 4 to 5 paid employees do not add to constant-dollar sales per person engaged in apparel stores. Increases in output per person engaged as size of store increases above the 4- to 5-employee group were not apparent in either 1939 or 1958.

Wholesale trade, which in 1958 employed 3 million persons, or 24 per cent of the total engaged in distribution, is also being studied. Productivity indexes similar to those for retail trade should be ready shortly.

DAVID SCHWARTZMAN

#### PRODUCTIVITY IN PUBLIC ADMINISTRATION, STATE AND LOCAL

Department of Commerce estimates of GNP in constant dollars and various currently calculated estimates of national productivity assume no increase in the productivity of state and local government employees. In our study, we are gathering data pertinent to the assessment of this assumption and will experiment with the measurement of productivity for specific government functions. The plan of the study includes three parts:

1. A study of the factors affecting interstate differences in state and local per capita expenditures in 1957 and 1962.

There is marked variability among states in those expenditures, as the 1962 data show, in dollars per capita:

<i>Function</i>	<i>Lowest State</i>	<i>Median</i>	<i>Highest State</i>
Education	78.44	115.72	175.55
Highways	37.73	59.28	152.02
Public welfare	10.59	25.54	58.08
Health and hospitals	9.08	20.02	40.69
Police protection	4.86	8.80	18.15
Fire protection	2.06	4.37	13.01
Sewerage	1.32	6.09	14.82
Aggregate <sup>a</sup>	202.11	319.84	551.00

<sup>a</sup> Excludes utility, liquor store, and trust fund operations.

SOURCE: Bureau of the Census, *Governmental Finances in 1962*, Series G-GF 62, No. 2.

We will attempt to account for these differences by means of regression analysis, using as independent variables per capita personal income, urbanization, population density, federal aid, indicators of quality of service (e.g., the student-teacher ratio), and scale of operations.

#### 2. A study of inputs.

a. Trends in employment since 1940. State and local employees, in 1962, accounted for 73.1 per cent of all public civilian employment. The rate of growth in state and local employment had decreased during the war and the late forties and was slower than the rate of growth in federal civilian employment. During the decade of the fifties, however, the rate of growth in state and local government increased and exceeded that of the federal government. Although the rate of growth in state and local employment slowed down during the early sixties, it was still higher than the rate of growth in federal employment (Table IV-5).

#### b. Trend in capital assets since 1940.

c. Trend in resources absorbed in government activity since 1940. This is measured by the sum of payrolls, purchases of goods and services from private industry, and the imputed rental value of government-owned capital goods. This sum differs from state and local expenditures, which usually include also pension payments, transfer items like relief payments, transfers to other governments in the form of grants-in-aid and shared taxes, interest and amortization payments on government debt, and loans, but exclude the rental value of government-owned capital goods.

**TABLE IV-5**  
**PUBLIC EMPLOYMENT BY LEVEL OF GOVERNMENT**

Year	NUMBER OF EMPLOYEES (thousands)			State and Local as Per Cent of Total
	Total	Federal <sup>a</sup>	State and Local	
1940	4,474	1,128	3,346	74.8
1950	6,402	2,117	4,285	64.0
1960	8,802	2,421	6,387	72.6
1962	9,433	2,535	6,898	73.1
ANNUAL RATE OF GROWTH (per cent)				
Period				
1940-1950	3.6	6.5	2.5	
1950-1960	3.2	1.3	4.1	
1960-1962	3.5	2.3	3.9	

<sup>a</sup>Civilian only.

SOURCE: Bureau of the Census, *State Distribution of Public Employment*, selected years.

d. Changes in the functional distribution of inputs since 1940.

e. Changes in the distribution of inputs within functions since 1940.

f. Differences in the quality of labor input in industries common to the private and public economies. This aspect of the study will attempt to determine the degree to which earning differentials between public and private employees in a given industry are associated with differences in demographic characteristics (sex, age, education, color, etc.) which may be considered as indicators of the quality of labor.

3. Experiments with the development of a measure (or measures) of productivity for specific local government functions.

These functions include police protection, fire protection, and hospital services. The City of New York has been developing work-load and performance data in connection with its recently adopted system of program budgeting. We are in contact with various city departments to determine the possibility of using these data in the calculation of productivity measures.

ERNEST KURNOW

#### TAX POLICIES FOR ECONOMIC GROWTH

In our attempt to improve understanding of the relationship of the tax system's structure to economic growth, we have organized research activities along two major lines, undertaken with the support of grants from the Rockefeller Brothers Fund and the Life Insurance Association of America. One is directed to the effects of the corporation income tax and various features thereof on business decisions affecting the growth of enterprise. The other concerns the impact of the individual income tax on personal effort, saving and investment, and on the willingness of proprietors of unincorporated businesses to assume the risks of innovation and diversification.

The first group includes the study by Challis A. Hall, Jr. (Yale University) of the effects of various features of the corporation income tax on factor shares in the short run, on total private savings, and on management decisions concerning a wide range of activities affecting corporate survival and growth. Also in this group is the investigation by Thomas M. Stan-

back, Jr. (New York University) of the effects of recent changes in the tax rules governing depreciation on capital programs in the textile manufacturing industry, particularly modernization of facilities. This group of studies, finally, includes my examination of the use of the various depreciation methods afforded by the Internal Revenue Code of 1954. As indicated in the individual reports following, substantial progress has been made in all three of these undertakings during the past year, and we expect these studies to be completed in 1964.

Our second group of studies consists of three projects undertaken by Roger F. Miller (University of Wisconsin), Daniel M. Holland (Massachusetts Institute of Technology), and C. Harry Kahn (Rutgers University). Miller's project is an econometric analysis of the effects of the tax treatment of capital gains and losses on individual saving, portfolio composition, and the transferability of personal savings. Holland is developing an interview study of the impact of progression in the income tax on the effort of individuals subject to the high income-class rates. Kahn is investigating the adequacy of the averaging provisions as applied to unincorporated businesses.

In addition to these individual research efforts, our program of studies has included two research conferences in 1963, sponsored jointly by the National Bureau and the Brookings Institution. For each of the conferences, a planning committee was set up to develop the agenda and to select the authors, discussants, and conference participants. Research papers were distributed to participants well in advance. The first conference, held October 17 and 18, on *The Role of Direct and Indirect Taxes in the Federal Revenue System*, was concerned with the consequences of a shift toward greater use of indirect taxes in the federal revenue system. The planning committee called upon Arnold C. Harberger to prepare a paper on the effects of such a shift on saving and investment and personal effort. Richard Musgrave and Peggy Brewer Richman focused their report on the effects on resource allocation, international trade, and the balance

of payments of substituting a value-added tax for the corporation income tax. The implications of greater federal use of indirect taxes for the over-all equity of the tax system, for administrative and compliance burdens, and for intergovernmental fiscal relations were examined by Douglas Eldridge. Otto Eckstein, assisted by Vito Tanzi, directed his attention to measuring and comparing the relative use of direct and indirect taxes in the United States and other countries and to the question whether differences in this respect help to explain differences in their growth rates.

Formal discussions at the conference were provided by E. Cary Brown and William Feller on the Harberger paper, Harvey Brazier and Ronald Welch on the Eldridge paper, Carl Shoup and Lawrence Krause on the Musgrave and Richman paper, and Fritz Neumark and Dan T. Smith on the Eckstein paper. A background paper setting forth the issues of the conference was prepared by John F. Due, chairman of the planning committee. Samuel Chase prepared a summary of the conference proceedings.

The second conference, held December 5 to 7, was devoted to a detailed examination of postwar tax policies and economic growth in selected countries. E. Gordon Keith, chairman of the planning committee for the conference, had arranged in the fall of 1962 for the submission of a monograph on this topic by a recognized authority in each of the countries to be included in the survey. Those papers were the basis for the research conference to which the authors of the monographs, two discussants from each of the countries included, and a number of American experts on taxation and growth were invited.

The authors of the papers and the discussants (in the order of the conference discussion) were: Federal Republic of Germany, Karl Häuser, author, Paul Senf, Fritz Neumark. Italy, Francesco Forte, author, Siro Lombardini. Sweden, Leif Mutén, author, Karl O. Faxén, author, Lars Nabseth, Claes Sandels. Netherlands, Cornelis Goedhart, author, J. van Hoorn, Jr., A. J. van den Tempel. Japan, Ryutaro Komiya, author, Sumio Hara, Makoto

Yasui. United Kingdom, Alan Williams, author, Alan R. Prest. France, Pierre Tabatoni, author, Robert Liebaut, D. de la Martinière.

The two conferences united the efforts of able scholars from the United States and abroad, and the volumes containing the papers, discussions, and summaries will be major contributions. That on the first conference is scheduled for publication by midsummer of 1964, and no attempt will be made here to summarize the findings or the conference proceedings. More time will be needed to prepare the volume on the second conference, and it may be useful to report briefly on the papers presented.

*The United Kingdom:* Alan Williams organized his paper around four principal topics: (1) differentiated tax treatment of distributed and retained profits, (2) various capital recovery allowances which have been employed for tax purposes, (3) tax measures bearing upon innovation and risk taking, and (4) taxation and work incentives.

With respect to the first topic, Williams found that the more favorable treatment of retentions until 1958 must have contributed to a higher rate of corporate saving, since corporate retention as a proportion of profits fell off very sharply after 1958, when undifferentiated tax treatment of corporate profits was adopted. The drop in the corporate saving rate has been more than offset by the increase in personal saving. Although self-financing has fallen off since 1959, inability to obtain funds has rarely been a significant barrier to investment.

For the period 1958-60, Williams found that: (1) a markedly higher proportion of larger companies than of smaller ones have raised capital externally; (2) the greater the company's rate of growth, the smaller the role of internally generated funds in financing that growth; (3) the lower the rate of return realized on capital, the greater the role of external funds as a source of funds.

The various types of accelerated depreciation allowed in the United Kingdom have been, according to Williams, an important source of financing fixed capital formation since 1951.

Various surveys indicated that investment decisions of some 25 to 40 per cent of the surveyed firms were materially affected by the initial and investment allowances. This was probably owing more to the effects of these allowances on the availability of funds than to their effects on the profitability of investment.

Williams found no clear-cut case for the widespread view that various elements of the British tax structure discourage risk assumption or significantly limit the sources of risk capital. He characterized the tax treatment of research and development activities as extremely liberal.

Citing several interview studies since the war, Williams found that taxation in the United Kingdom has not importantly influenced the size of the labor force or certain highly specialized components of it.

Some of the main points in Williams' conclusions were:

1. To the extent that tax policy in postwar Britain has been directed at all deliberately toward the promotion of economic growth, it has been concerned mainly with raising the level of capital formation in private industry.

2. This policy has clearly been successful inasmuch as industry generally has not been short of tax-free funds, although the degree of self-finance possibly has not always been as high as some segments of industry would have wished.

3. When it comes to incentives to invest, initial and investment allowances appear to have been more successful in stimulating capital expenditures than many observers have been willing to concede, though their full potentialities, so easily demonstrable in principle, have not been fulfilled in practice.

*The Netherlands:* In analyzing postwar economic growth in the Netherlands, Cornelis Goedhart stressed three factors which have contributed to that country's favorable experience. First, the expansion of aggregate demand has been sufficiently strong to elicit the investment needed to provide jobs for a rapidly growing labor force. Next, since in the Netherlands the adequacy of aggregate demand depends in large part on foreign demand, this

first condition meant keeping wages under control in order to ensure the competitiveness of Dutch export industries. Indeed, Goedhart characterized this wage policy as "the most important growth-furthering tool in the hands of the Government so far." Third, budget policy, particularly tax policy, fostered a rate of saving adequate to finance the investment required for a satisfactory growth rate and to yield a foreign surplus on current account large enough to cover capital exports and build up exchange reserves.

In Goedhart's view, as long as wage policy in the Netherlands ensures a sufficient expansion of exports, hence of aggregate demand, the main problem for tax policy in relation to economic growth is furthering a sufficiently high level of savings rather than affording inducements to invest. In this connection, he concluded that: (1) the most important aspect of tax policy has been the high level of budget receipts relative to expenditures and the favorable effect on the national savings ratio; (2) some part of the automatic growth in revenue accompanying the expansion of national output has been earmarked for tax reduction, affording an increase in private disposable income and saving; (3) use of retained profits for investment has been encouraged by a variety of tax devices, such as investment rebates, accelerated depreciation, loss carryovers, and unlimited carryforward of initial losses of new companies; (4) tax exemption of premiums for life annuities and pensions has resulted in a substantial increase in this form of saving; (5) the heavy company tax has apparently not had very disturbing results, at least so far. One possible explanation is that the tax has been shifted forward in higher output prices, a shift made possible by accommodating changes in monetary conditions and by the fact that the incomes policy has kept Dutch export prices competitive with those of Western Europe over all.

*Japan:* Ryutaro Komiya focused on the effects of taxation on capital formation in postwar Japan. In analyzing the very rapid growth in the postwar period, he cited three key factors: the large proportion of gross domestic

product allocated to capital formation, the high rate of technological advance, and the rapid absorption of disguised unemployment involving the shift of large numbers from sectors of low to sectors of high productivity. The high level of capital formation he attributed, in turn, to several specific factors and, more generally, to the strong expansion of aggregate demand fostered by large annual tax reductions.

Among the specific factors contributing to the strength of investment demand, Komiya included: (1) the need for reconstruction until the mid-1950's; (2) opportunities for exploiting the technological advances made by the United States and other countries; (3) various developments, including land reform and the spread of unionism, tending to reduce disparities in the distribution of income and to expand domestic markets, particularly for consumer durables; (4) changes in market structure, tending toward more effective competition, while also increasing recognition of realizable economies of scale; and (5) the very low incremental capital-output ratio. Komiya attributed the last in part to the fact that effective demand has continued to expand very rapidly relative to the expansion of capacity. In addition, capital outlays for reconstruction or repair of war damage brought into production relatively large amounts of otherwise idle capital. Relatively small proportions of total investment were for replacement and for residential construction and "social overhead" capital.

In this context, Komiya emphasized the importance of the availability of funds as a determinant of the level of private capital formation. Government, he noted, has contributed directly to a high national saving rate by pursuing a low-expenditure, large-surplus budget policy. Both personal and corporate saving are extremely high, whether measured in relation to gross domestic product or in relation to the respective income shares.

Several factors were cited by Komiya as contributing to the high rate of personal saving, including the large share of proprietors' income in the nonagricultural sector, the high and rising proportion of "bonus" income in wages and salaries, and the limited development of con-

sumer instalment credit, reflecting the fact that most Japanese consumers save and accumulate liquid assets before buying durables. He nevertheless observed that a decrease in tax progressivity in postwar Japan may have contributed to a rise in the personal saving ratio.

Komiya examined a number of special tax measures aimed at promoting personal saving, including favorable treatment of dividends, and tax exemption of interest income from small deposits and of capital gains on securities. He found it virtually impossible to measure econometrically the influence of such provisions but expressed the view that, if they did increase personal saving, it was through their effects in redistributing income rather than by increasing the saving ratio at any particular level of income. Komiya also examined a number of special tax provisions to encourage investment in specific sectors, such as certain tax-free reserves, accelerated depreciation on a selective basis, favorable tax treatment of income from certain new products or patents, and partial tax exemption of income from exports. He concluded that these measures had had little effect on aggregate saving and investment in Japan, though some of them had affected the composition of investment and—depending on the productivity of capital in different industries—might thereby have affected the rate of growth.

Komiya's general conclusion was that, although great emphasis had been placed in Japan on investment and economic growth as objectives of tax policy, there was little empirical knowledge of the actual results obtained.

*Germany:* Karl Häuser's study of tax policy and growth in the Federal Republic of Germany was concerned with tax influences on the supply of factors of production and on factor mobility and resource allocation.

Häuser divided German postwar experience into four periods. A period of economic collapse, from 1945 to mid-1948, was followed by three and one-half years of rising output, as the policy of the Western Allies toward Germany was revised, Marshall Plan aid was afforded, restrictions on industrial production were moderated and eliminated, and currency

reform took effect. In large part, the great increases in output during the second period were made possible by small amounts of investment, which served to bring back into production large amounts of plant and equipment previously idle. That, in turn, increased effective demand for labor and its productivity. The succeeding period of "normalization," 1952-57, Häuser characterized as one of consolidation, during which the incremental capital-output ratio nearly doubled, so that a given rate of expansion of output required a much larger investment in plant and equipment than in the former period. Finally, a period of overemployment was noted by Häuser. In that period, the share of profits in national income dropped abruptly as did the ratio of retained profits to total net savings. Gross investment, however, continued to increase. Those developments compelled greater reliance on external financing, important sources for which were budgetary surpluses and foreign capital suppliers.

In Häuser's view, ". . . all periods considered . . . were periods in which production and economic growth did not suffer from a lack of overall demand, i.e., rapid growth did not require the stimulation of demand. Hence, the speed of economic growth was chiefly determined by the accretion of factors of production or by their improvement. This called for a tax policy which favored the accretion of capital."

During the first period referred to by Häuser, the high rates of wartime taxation were held over—indeed, increased—in order to pay reparations and curb inflation. The rates were reduced during the second period but, nevertheless, remained very high by almost any other standard. Yet those high rates, according to Häuser, contributed decisively to rapid growth, since they enhanced the effectiveness of a number of tax measures to spur investment. They included accelerated depreciation allowances and deductions from taxable income of retained earnings.

By 1951, many of those tax advantages had been canceled. Tax benefits for investment were continued, however, in a large number of specific cases. Häuser concluded that the

special tax privileges for export industries and for certain basic industries were highly effective during the periods (1951-55 and 1952-56, respectively) in which they were available.

Häuser pointed out that, while the various measures alluded to above were on the whole quite effective in promoting capital formation, they had adverse consequences for the distribution of tax burdens and income. Partly to remedy these distributional effects but also to encourage capital formation, a large number of tax privileges for personal savings were developed. In Häuser's view, those measures were not effective in augmenting the volume of saving.

Turning to tax measures aimed at increasing factor mobility and shifting the use of resources, Häuser cited a number of cases in which such measures were employed with considerable success. They included tax concessions to encourage residential construction in the vicinity of major industrial establishments, and the incentives for exports and for basic industry development already referred to. On the other hand, he found that special tax provisions aimed at raising efficiency in agriculture had not had perceptible effect.

*Sweden:* Leif Mutén and Karl Faxén prefaced their discussion of tax policy and economic growth in Sweden by observing that the processes of economic growth are not yet sufficiently well understood for us to "know exactly what kind of action we have to stimulate in order to promote economic growth." They then turned to an appraisal of the impact of a variety of tax and related financial features on the rate of saving and investment in postwar Sweden.

Underlying their appraisal is the view that capital formation is important primarily as a means of embodying the fruits of research and education. "It is . . . far from profitable to push capital formation beyond a certain level. . . . Economic growth does not . . . come about through the acquisition of a greater number of capital items of the same type, but because the net capital items represent a continual improvement on the old ones as regards quality and efficiency. . . ." They concluded that maintain-

ing full employment and economic growth requires a certain investment ratio irrespective of consumers' choices between present and future consumption. The tax system, they maintained, should be designed to accommodate realization of this rate of investment. Noting that a large fraction of capital formation in Sweden is undertaken in the public sector and that government budget policy greatly affects the rate and volume of saving, they discounted the importance of structural features in the tax system for increasing private saving propensities in the aggregate.

Mutén and Faxén examined the so-called "free" depreciation system of 1938-51 as well as the current depreciation rules. While noting the significant impact free depreciation might have on the net rate of return on investment, they nevertheless asserted that the really important effect of this provision had been in expanding internally available funds. They criticized the provision as possibly contributing to misallocation of capital, since it was not available for buildings, presumably favored long-term investments over capital items with relatively short useful lives, and was of relatively little avail to new firms compared with established companies showing profits. In addition, it was available only to corporations and not to unincorporated enterprises. Mutén and Faxén also pointed out that, whereas current interest in the free depreciation system focuses primarily on its possible contribution to economic growth through encouraging capital formation, it was originally introduced into the Swedish tax system in an effort to eliminate conflicts between taxpayers and tax administrators over the correct depreciation rates. The authors stated they had no finding as to whether free depreciation furthered Swedish economic expansion during the period 1938-51 when it was in effect.

In discussing the investment reserve system, Mutén and Faxén pointed out that, although this device was intended as a means of leveling out economic fluctuations by changing the timing of capital outlays, it may also have significance for growth. They referred to the 1958-59 recession, the first occasion for testing the

efficiency of the reserve system as a stabilization device, when the law was amended to authorize investment reserve financing of projects over more than two years. Use of the new authority to finance investments in the export industries in order to bolster the Swedish export position vis-à-vis the Common Market was cited as evidence of increasing interest in the provision in connection with growth policy.

In evaluating the contribution of the investment reserve system to growth, Mutén and Faxén emphasized its potential as an anticyclical device and the importance in growth strategy of mitigating recession developments: “. . . an efficient anticyclical policy may contribute to economic growth even if it has no effect on the investment volume over the trade cycle—through mitigating the growth-hampering effects of underdevelopment and stagnation, such a policy may further economic growth even more than a policy which aims at promoting investment without anticyclical ambitions.” They noted that most firms do not count on investment reserves as a normal means for financing investment programs; hence, the reserve system does not have the effect of inducing postponement of the bulk of their investment until the reserves are released. It may, however, serve to accelerate capital outlays when an increase in such spending is desired for stabilization purposes. The release of reserves is also thought to favor promoting investment in research laboratories and other projects for which the profitability is not easily calculated.

Mutén and Faxén concluded that Swedish tax rules have fostered a very conservative dividend policy. Noting that capital gains on corporate shares are not generally subject to income tax, there is a strong tax impetus for accumulation of earnings in corporations. Among companies reporting profits, the ratio of dividends to after-tax profits is roughly 50 per cent. The opportunities to reduce corporate income for tax purposes—by taking advantage of liberal depreciation rules, investment reserve contributions, inventory reserves, and other features—result, however, in a relatively high incidence of nonprofit corporations. The au-

thors estimated that 46 per cent of gross receipts (in 1960) of all Swedish corporations except banks went to companies showing no profits.

Mutén and Faxén concluded that the Swedish tax system affords greater opportunities than those of most other countries for conversion, by expanding companies, of tax deferral into permanent tax relief; this feature of the tax system creates a strong incentive for Swedish corporations to set up capital accumulation as a major policy objective; and this incentive is stronger for high-profit than for low-profit firms.

*Italy:* Francesco Forte prefaced his discussion by observing that the strong growth of the Italian economy since 1951 has occurred despite rather than because of the Italian tax system; that this system is not favorable to growth; and that it will indeed “exert an increasingly negative role in the coming years” unless substantially reformed.

A major feature of the Italian economic expansion in the period 1951-61, according to Forte, was reduction in unemployment and a shift in employment from agriculture to industry. The consequent increase in total wages and salaries contributed to a broadening of consumer markets, particularly for durables, in turn opening up significant new lines of activity and channels for business growth. At the same time, increases in wage rates apparently lagged behind productivity gains, particularly in industries that developed to meet the demands of new mass-consumption markets. Especially in those industries, expansion of profits was very rapid (even with substantial price reductions and relatively large increases in wages), affording internally generated funds adequate to finance a high rate of capital formation. Other circumstances strongly favorable to Italian economic expansion, in Forte's view, were the ample supply of technical personnel, a high saving propensity (reflecting, in large part, inequality in income distribution), expansion of European and North American markets for Italian exports, ready availability of finance, and favorable changes in the political and social structure of the nation.



Forte pointed out that total tax revenues have grown steadily since the late 1940's and are now about 25 per cent of national income. That growth has reflected the expansion of public expenditures which, according to Forte, has contributed importantly to Italian economic development. The revenue system, he observed, has proved to be sufficiently productive to finance the expenditure growth without increasing budgetary deficits, therefore without reducing the rate of national saving.

The author detailed the predominance of indirect taxes in the Italian tax system. Direct taxes account for somewhat more than 50 per cent of local government revenues but only about 25 per cent of central government revenues, and the latter are almost 90 per cent of total revenues of central and local governments combined.

Most of the direct tax revenues are derived from schedular income taxes. Of these, the largest revenue producers are the taxes on so-called "movables," i.e., wages, salaries, entrepreneurial and professional income, while the least productive are the taxes on income from land and buildings. Forte regarded the heavy weighting of direct taxes on profits and wages compared with interest and rent as adverse to economic growth.

Over all, Forte was critical of the present direct taxes because of (1) the highly differentiated rate structures and burdens imposed thereby, (2) the abundance of opportunities for evasion and avoidance, and (3) the fact that most of the revenues of these taxes come from the incomes of enterprises rather than from individuals.

While observing that heavy reliance on indirect taxes may have some advantages for economic growth, Forte noted that the present Italian indirect taxes are highly differentiated with respect to rates and method of imposition and are subject to widespread evasion. There is growing sentiment in Italy for substitution of a value-added tax and a single-stage tax on sales at differential rates for the present turnover tax. It is based on the view that (1) the excess burden of the present extensively differentiated excise system would be reduced

while still permitting limited discrimination to affect specified policy objectives, and (2) the proposed taxes would be more conducive to growth by allowing exemption for both exports and capital goods.

In evaluating the Italian corporation income tax, introduced in 1954, Forte concluded that, despite certain structural features which might be regarded as having adverse incentive effects, the tax discriminates in favor of new enterprises and of companies undertaking modernization of their production facilities in order to increase their average rate of return. On the other hand, he asserted that the growth orientation of the tax could be enhanced by introducing provisions permitting greater and more explicit differentiation in favor of risky, potentially high-productivity industrial undertakings and against corporate entities used primarily for evasion of personal taxes or those in lines of activity deemed to be of little consequence for economic development.

Turning to the accelerated depreciation and investment allowance provisions, Forte found them to be justified primarily as a means of allowing for increase in the costs of depreciable facilities in a system based on historic costs. Noting that these measures were also intended to promote private capital formation, he nevertheless asserted it would be well to introduce tax devices encouraging the development of a capital market in order to reduce business dependence on internal financing. He offered no judgment as to the efficiency of the accelerated depreciation provisions in spurring investment.

*France:* Pierre Tabatoni prefaced his discussion by avowing the difficulty of identifying the contribution of tax policy to the postwar growth of the French economy, indeed, of separating tax influences from many other relevant factors. Among the major tax measures aimed at promoting private capital formation and exports, Tabatoni listed the introduction of the value-added tax in 1954, supplemental depreciation allowances and introduction of the declining balance method, tax deferral on gains reinvested in depreciable facilities, tax-free revaluation of fixed assets, and loss carryovers. He emphasized the cash-flow rather than the rate-

of-return effects of these provisions on private investment, particularly for smaller firms. Citing a recent analysis of 400 companies, he reported that internal financing is the key variable in explaining investment by small firms but not that by large companies, which have easy access to the capital markets. He concluded that broadening the financial markets should be an important objective of fiscal policy in the interest of promoting investment and growth.

Noting the coincidence of a sharp upturn in private capital outlays with substitution of the T.V.A. (value-added tax) for the turnover tax in 1954, Tabatoni concluded that the deductibility of capital costs in the T.V.A. has served to promote capital formation. As to the revaluation of depreciable assets, he reported that relatively limited use has been made of that privilege by businesses in general, although a considerably larger proportion—about one-third—of corporations have done so. The principal constraint is that election to revalue assets involves imposition of a tax of 3 per cent on the revaluation reserves. That tax is in lieu of other taxes on profits. If the reserves are distributed, however, they are subject to ordinary income and profits taxes.

Tabatoni noted that a large number of French companies have not elected to use the declining-balance depreciation formula made available in 1960. In part, this may be attributed to advantages obtainable under various special depreciation provisions applicable to certain industries and types of facilities. In part, uncertainty about future tax rates may deter use of this method.

The contribution of research to economic growth was explicitly recognized in recent tax changes, according to Tabatoni. Among these are deductibility of donations to public or private research organizations, when approved by the administration, a special first-year depreciation allowance of 50 per cent of the cost of buildings and equipment to be used for research, and exemption of gains on the sale of patents and of patent royalties if these are reinvested in fixed assets within three years. Tabatoni noted that only very limited use of

the first two of these provisions has been made to date but concluded that tax policy nevertheless served to promote that type of growth-generating activity.

NORMAN B. TURE

#### CORPORATE PROFITS TAXATION AND ECONOMIC GROWTH

The objective of this study is to ascertain how taxation of profits affects decisions that are relevant for corporate and economic growth. Among corporate activities generally deemed related to growth are capital expenditures, research and development, introduction of new products and processes, and financing of expansion. Basically, the research techniques adopted are interviews with corporate executives supplemented by quantitative analysis.

The study has been going forward in three phases. One is examination of alternative assumptions about short-run shifting of the corporation income tax. I have prepared a proposed Technical Paper describing the methodology and the results of the analysis with respect to manufacturing industries. Revision of the paper is being deferred while work goes ahead on other phases of the study, principally analysis of the interview results.

In 1963, I completed most of the interviews originally planned for the study. The material obtained is being reviewed and collated with the help of my research assistant to obtain preliminary estimates of findings and to identify gaps in information. Since the corporate practices under review may have been subject to considerable change during the interview period, I hope to be able to develop an approach to incorporating the changes into the completed material.

I have also been attempting to develop some measure of the differential impact of the corporation profits tax on the rate of private saving. Completion of this phase, too, is deferred while the work on the interviews goes forward.

CHALLIS A. HALL, JR.

## EFFECT OF CHANGES IN TAX LAWS ON MODERNIZATION EXPENDITURES IN THE TEXTILE INDUSTRY

The effect of business income taxation on the pace of investment in technically advanced production facilities is of obvious importance in a study of tax policy and economic growth. I have been investigating the effects of recent changes in depreciation provisions and the investment credit on modernization in the textile industry. The industry was selected for examination because the provision for shorter service lives for tax depreciation purposes was made by the authorities a year earlier than in other industries, and because a relatively large proportion of the industry's equipment had been widely thought to be in need of replacement at the time of the change.

The investigation has consisted principally of interviewing executives of twenty-five firms and of the five leading textile machinery manufacturers. The interviews have aimed at developing information about: (1) the extent to which tax considerations (including both depreciation and investment credit) enter into investment decisions; (2) the extent to which investment opportunities (especially in advanced machinery) may be opened up by any tax change that alters favorably the return on investment (i.e., the extent to which there are investment opportunities "at the margin"); (3) the extent to which investment expenditures may be influenced by increments in internally generated funds or by availability of external funds; and (4) the extent to which the recent tax changes may reduce the replacement cycle and accelerate the introduction of technical advances in the industry.

Essentially there are two routes by which liberalized depreciation may increase investment expenditures: (1) During the earlier years, heavier depreciation charges reduce taxes and thereby increase after-tax return on investment over the life of the asset and shorten the period necessary for the newly acquired asset to "pay back" its initial cost. (2) Even if the effect upon return on investment is ig-

nored, investment expenditures made generate a larger flow of internal funds with liberalized depreciation in the earlier years of the asset's life. If firms have limited access to the capital market or, for some reason, restrict themselves to making capital expenditures out of internally generated funds, the volume of expenditure may well be increased and, over time, the replacement cycle be shortened.

Among the firms interviewed, the tax law changes appear not to have influenced investment through the first route, in many instances. The principal reason is that most of the firms use a pre-tax payback investment computation which prevents explicit recognition of the tax effect. On the other hand, executives were keenly aware of the effect of the change in the law in terms of increased cash flow. The extent to which increased cash flow influences the volume of investment and length of replacement cycle has been difficult to determine, however. The interview evidence bearing upon this question is currently in the process of being analyzed.

At present I am preparing a manuscript bringing together the findings of the study so far. Subsequently, we will determine whether the investigation should be extended and, if so, the best way to proceed.

THOMAS M. STANBACK, JR.

## SURVEY OF THE USE OF ALTERNATIVE DEPRECIATION METHODS UNDER THE INTERNAL REVENUE CODE OF 1954

In discussions of the orientation of federal tax policy toward encouraging a higher rate of economic growth, considerable emphasis is given to accelerated depreciation as a means of promoting capital formation. The effectiveness of such tax options, of course, must depend in the first instance on how extensively they are used. This study draws on various sources of data compiled by the Statistics Division of the Internal Revenue Service to show the extent of use of the accelerated depreciation provisions enacted in the Internal Revenue

Code of 1954 and to delineate some of the characteristics of taxpayers using these methods and of the properties to which they are applied.

Some preliminary results of the investigation can be reported in summary form at this time. Sole proprietorships and partnerships have made much less use of the accelerated methods than corporate taxpayers have. In the tax year 1959, for example, total deductions computed by use of the accelerated methods were about \$550 million for sole proprietorships and \$439 million for partnerships—or roughly 8 per cent and 21 per cent, respectively, of total depreciation claimed. For corporations, depreciation deductions computed by accelerated methods were about \$12.3 billion, approximately 60 per cent of their total depreciation charges.

Among all forms of organization, the number of companies using the accelerated methods was relatively small. For example, among sole proprietorships, only 5.5 per cent used the declining-balance depreciation method and 0.9 per cent used the sum of the years-digits method. For partnerships, the respective proportions are 10.7 and 2.0 per cent. For corporations, the most recent tax year for which comparable data are available is 1957; in that year, 14.6 per cent of corporate returns indicated use of the declining-balance method and 6.6 per cent use of the sum of the years-digits method.

Within the corporate sector, relative use of the accelerated methods apparently increased steadily after they were introduced in 1954. Thus, for comparison with the 1957 data just cited, the proportion of all returns on which the declining-balance method was used was only 7.6 per cent in 1954, and the proportion on which the sum of the years-digits method was used was only 4.8 per cent. Data from a much smaller number of very large corporation returns show that use of the declining-balance method increased from 44 per cent in 1956 to 54 per cent in 1959; and use of the sum of the years-digits method rose from 35 to 40 per cent.

Despite the increase in use of the accelerated methods, it is clear that, in terms of numbers,

most corporations have continued to rely exclusively on the straight-line method. Since a company may use different methods for different facilities, the data do not permit precise calculation of the number of returns on which only one of the methods was used. By subtracting from the total number of returns the number on which some method other than straight line is used, however, an estimate of the minimum number of companies using only straight line is obtained. The actual number is likely to be somewhat greater. According to this computation, the minimum proportion of total corporation returns using only straight-line depreciation declined from about 86 per cent in 1954 to 79 per cent in 1957.

The larger the company, the greater on the whole appears to have been the relative use of the accelerated methods. This pattern shows up in the 1957 data in each major industry division. Considerably less variability in the proportion of returns using each method is to be seen among industries when industry totals are compared. A cross-distribution of returns, by size of total assets and industry division, however, shows substantial variation in any size class as among industries in the relative use of a given method.

A special compilation by the Statistics Division of the IRS, providing data on the amount of property in depreciable-assets accounts in the taxable year 1959, shows that 53.5 per cent of such property acquired since 1953 was being depreciated by one or the other accelerated method in 1959. Among companies with total assets of \$1 million or less, the proportion was 32.6 per cent. For corporations with total assets of more than \$1 million and less than \$25 million, the proportion was 44.6 per cent; for companies with assets in excess of \$25 million, 57.4 per cent of assets acquired since 1953 were being depreciated under the accelerated methods.

These data show very little variation in use of the accelerated methods by broad type of asset, e.g. structures, production equipment, and so forth. Considerable variation, however, is observable among broad industry classes; in manufacturing, for example, 67 per cent of

depreciable property acquired since 1953 was subject to accelerated depreciation in 1959; in mining, on the other hand, the corresponding proportion was 23 per cent.

I hope to complete analysis of the data and a manuscript on this project by midyear.

NORMAN B. TURE

#### PERSONAL CAPITAL GAINS TAXATION AND ECONOMIC GROWTH

This study is concerned with the impact of the present tax treatment of capital gains and losses on individuals' decisions about the total volume of their personal savings, transferring accumulated savings among alternative earning assets, the riskiness of their portfolios, and the manner in which their current savings are translated into real investment. Multiple regression analysis is being used to test various hypotheses on the nature and magnitude of this impact. For this purpose, the facts pertaining to the individual behavior of a large group of persons over an extended period of time are needed.

The data requirements of such a study are very extensive and include many variables not connected with capital gains, *per se*, but relevant to explaining variations over time and among individuals in their behavior. All the variables must be studied jointly in order to determine the *net* effect of the differential tax treatment of capital gains, and the interaction of other variables with this differential.

The first requirement is to construct a financial history for each taxpayer-investor to be studied, for the years since 1946. The financial history must be sufficiently detailed to permit us to reconstruct the person's portfolio. In particular, it is necessary to know the total value of the portfolio, the amount of unrealized gains or losses, and the degree to which the portfolio reflects risk aversion on the investor's part. Putting this information together with the investor's history of total income and actual realized gains and losses, an index of capital gains realization can be constructed for each year for each person. In a multiple regression

study, this index can be related to those variables which a priori judgment indicates should be useful in explaining the differences among persons in their willingness to realize gains. For example: If, in a multiple regression study, it appeared that age had a regression coefficient significantly less than zero in explaining willingness to realize capital gains, that would be evidence for the hypothesis that persons were "locked-in" to investments in which they have substantial capital gains, since the probability of avoiding the tax altogether by holding until death increases with age. This judgment must be based on the partial regression coefficient, of course, where the effects of other variables, such as occupation, education, income, and so on, are held constant.

A more detailed examination of portfolio behavior can throw additional light on the willingness of individuals to realize capital gains. If a person concentrates his sale of investments among those with only capital losses, or only very small gains or losses, and avoids selling investments with substantial gains, he is avoiding the realization of gains for some reason. In addition to tax reasons, of course, it may be that the person judges the future prospects of the groups of investments differently. This latter hypothesis, which is alternative to the tax-avoidance hypothesis, may be partially tested by learning whether or not investors discriminate in their sales among assets with quite different recent price histories. The absence of such discrimination would seem, on a priori grounds, to support the "locking-in" hypothesis.

More direct evidence on investor behavior can be obtained through personal interviews with investors in the attempt to learn their reasons for past portfolio management decisions. An extensive and detailed study along these lines is being made by James Morgan of the Michigan Survey Research Center. We are including some similar questions in our survey, although the latter is principally directed toward obtaining objective data on past actions. We have plans for exchanging data with Morgan in the future.

The data to be utilized in this study and in

related studies at Wisconsin are collected from various sources and are in various stages of initial processing. The basic source is panel data on incomes and the major components of incomes (such as wages, dividends, capital gains, etc.) from Wisconsin individual income tax returns, 1947-59, for approximately 1 per cent of the persons filing. These data have been coded, punched, verified, and put on magnetic tape. Format errors, taxpayer errors, and detectable coding errors are still being removed.

In order to reconstruct detailed past portfolios of investors, it is necessary to have detailed identification of the sources of property incomes of the persons in the sample. The names of the companies paying dividends and interest and the amounts paid by each company are being obtained from the tax returns. These data are still being coded and punched. When these data are put on tape, they can be used along with the historical records of prices and dividends of stock issues, developed by James Lorie of the University of Chicago School of Business, to capitalize dividends received into the number and value of shares owned. Similar procedures can be utilized for interest sources.

In order to extend the range of the data, we have acquired a tape of the taxable incomes and amounts of taxes withheld and paid for all persons filing returns in Wisconsin for the 1962 income year, including persons in our sample. A similar tape of 1961 data exists and may be obtained if additional funds can be found for it.

Trust and estate tax returns can be obtained, where applicable, for persons in the sample. The Social Security Administration is providing information on age, race, covered incomes and covered quarters, and benefits for persons in the sample for whom it has the relevant data.

A major data source for all the studies will be an interview survey of a stratified subsample of 2,000 persons. The questions will include detailed asset information plus some income data not shown on the returns, as well as some motivational questions. Final pre-testing is under way, and interviews will begin soon.

The data being acquired for the same persons from many different sources require a major programming effort for integration of the different sets of data in order to build a consistent record for each individual. The programming is in process, with concentration on matching the basic tax-return data we have coded and punched with the 1962 income-tax tape prepared by the Wisconsin State Department of Taxation.

ROGER F. MILLER

#### THE TAX TREATMENT OF FLUCTUATING INCOMES

An important question, posed but not answered in my monograph, *Business and Professional Income Under the Personal Income Tax* (now in press), is the extent to which tax liability on income from unincorporated businesses and professions is increased by year-to-year fluctuations in that income. A tax bias against fluctuating incomes could be significant both in distorting the allocation of resources and in discouraging entrepreneurs from undertaking innovations, new ventures, diversification, and other growth-generating activities on which the returns are expected to fluctuate relatively widely. The extent of this tax bias against incorporated enterprises is slight in view of the limited graduation of the corporation income tax. On the other hand, the bias may be relatively large for unincorporated businesses and professions. Since these business organizations represent a very large proportion of the total business population and account for a substantial share of total business income, their capacity and incentives for survival, for the assumption of risk, and for growth have an important bearing on the growth of the entire economy.

To obtain some measure of the additional tax burdens on fluctuating incomes in unincorporated businesses, the effect of the limited averaging provisions available under the present tax law, and the effectiveness of alternative averaging devices, the Wisconsin sample of identical taxpayers for 1947-59 has been drawn upon. I am obtaining a subsample consisting of: (1) all taxpayers ever reporting business

and professional (i.e., sole proprietorship or partnership) profit or loss during the period; (2) all returns ever reporting negative total income during the period, regardless of source. The first group contains 3,839 taxpayers for varying numbers of years; the second, 607 taxpayers. A preliminary tape containing 1,719 taxpayers in the first group, and 275 in the second, is now in my possession and being processed.

Of the second group of 607 taxpayers reporting negative income in one or more years of the period, only 291 also reported unincorporated business and professional income for any year. The group of taxpayers with negative income in any one year was selected specifically to test the efficacy of currently available loss carryback and loss carryforward provisions. These provisions are a type of averaging which, by its very nature, is mainly available to taxpayers whose loss results in negative income for the year. Very little is known at present about the extent to which those unable to offset a loss in the current year are able to do so through carryback or carryforward. Taxpayers with or without business or professional income were included in this group in order to secure a large enough sample for the purpose at hand. The question of the required size of the sample is complicated by the possibility that, of the 607 taxpayers reporting negative income at some time in the 1947-59 period, many may not have filed returns for all thirteen years. The sample includes taxpayers regardless of the number of years they filed a return. Some complication may also arise from the fact that some negative incomes will have occurred at the beginning or the end of the period. For those taxpayers, only the carryforward or carryback, respectively, can be tested. It is hoped that these flaws in the data may be overcome by a cautious pooling of the information obtained from returns with incomplete carryover periods. For instance, a taxpayer with negative income for 1959, the last year of the sampling period, may supply us with valuable information on his carryback opportunities even if we cannot learn anything about his carryforward chances.

The problem of fluctuating income may, of course, be as real for taxpayers whose annual income is always positive as for those who sometimes have net losses. To assay the magnitude of that problem the group of 3,839 taxpayers with business and professional income in any one year will be analyzed. Here, too, taxpayers will be represented for varying lengths of time but, because of the large size of the sample, this is expected to be much less of a handicap in this analysis than in that of loss carryovers.

C. HARRY KAHN

#### EFFECT OF TAXATION ON PERSONAL EFFORT

Initially, we intended to study the effect of the personal income tax on the amount and character of effort with reference to groups of persons (1) playing an important role in resource allocation and economic growth, and (2) likely to be subject to high marginal rates of tax. Many groups meet such a definition—corporation executives, individual entrepreneurs, professional men, scientists, inventors, among others. We have now decided to concentrate, as a start at least, on top corporate executives. They certainly constitute one of the most important of the groups in terms of our initial criteria. Moreover, more published data relevant to our interests are available for them than for any of the other groups we might examine.

The published data are necessary for one strand of our inquiry—that concerned with discovering how heavily and progressively they have in fact been taxed, given the variety of compensation arrangements open to top corporate executives. The second part of our study will perforce have to go beyond published materials, generating its own data and impressions primarily from interviews.

Wilbur G. Lewellen and I have been working on the first part of the study, and we have developed a conceptual framework which will permit valuation of all compensation—pensions, stock options, and so forth, in addition to salary and currently taxable bonuses. Con-

currently, data on a number of executives have been collected from proxy statements and other sources. We plan to continue this work, the next step being to write a program for processing the data and deriving the salary equivalents of other forms of reward.

I plan to turn to the interviews shortly and, without attempting here a detailed discussion of this phase, will suggest its basic objectives. Economic theory points to two kinds of influence that income taxation might exercise on effort. On the one hand, persons deprived of income by a tax may seek to work more to recoup it. On the other hand, because of the tax, failure to work entails less of a sacrifice than before (i.e. the price of leisure has been cut), so they may seek to work less after the tax has been imposed. The observed result is compounded of these two possible effects. In the interviews, I will attempt to separate them. In addition, I shall face the problem of trying to ascertain the relative influence of taxes on decisions, recognizing that a number of other factors play a role also.

To sum up, I think of the study as consisting of three sections: (1) the basic statistical background on the heaviness and progressivity of taxes on executives; (2) a summary of what theory would lead us to expect; and (3) the results of the interviews.

DANIEL M. HOLLAND

## LONG SWINGS IN THE GROWTH OF POPULATION AND LABOR FORCE

The purposes of this study, conceived within the framework of Abramovitz' inquiry into long swings in the economy as a whole, are: (1) to describe long swings in the growth of population and labor force of the United States over the past century; (2) to determine so far as possible the factors responsible for these swings; (3) to see what light the long-swings approach can throw on the determinants of population and labor-force growth in recent decades; and (4) to consider the implications of the findings for projections to 1970 and later. Publications resulting from work to date

are: *The American Baby Boom in Historical Perspective*, Occasional Paper 79, NBER, 1962; and "Influences in European Overseas Emigration before World War I," *Economic Development and Cultural Change*, April 1961. Since July 1, 1963, the study has been supported by funds provided by the U.S. Office of Manpower, Automation and Training.

The study is divided into two parts. The first includes a description and analysis of the long-term historical pattern, focusing chiefly on the period before World War I. The second part involves an examination of the period since World War I and consideration of prospects for the next decade or two in the light of the record and analysis developed in the first part. During the past year, work on the second part was confined chiefly to assembling and processing additional data. Most time has been spent on analysis of the historical pattern, some of the principal findings of which are summarized below.

Roughly synchronous long swings have characterized the growth of the nation's population and labor force since at least 1870 and probably for some time before. Until 1920, swings in both series arose very largely from corresponding movements in immigration. Recently, however, changes in fertility have assumed a more important role in population swings, and labor force-participation rate changes in swings in the labor force. The swings are evident in the figures for females as well as males and in most age groups other than the very young and very old.

The swings in the rates of growth of the national aggregates are largely confined to the nonfarm, nonagricultural sections of the country. The swings are apparent, for example, in the growth of the total population residing in nonfarm areas, both urban and rural, and in metropolitan areas, old and new; and in the growth of the labor force in nonagricultural industries and in urban areas. The growth of farm population, of the population in rural areas taken as a whole and in rural territory adjacent to metropolitan areas, and of the agricultural and rural labor force typically either fails to conform to the long swings or



conforms inversely. A possible exception, of greatest quantitative importance in the pre-Civil War period, is population and labor-force growth in new agricultural areas, which appear to conform positively while those areas were being settled. It is noteworthy that the swings in growth of nonfarm population and nonagricultural labor force are widely diffused geographically, typically occurring at the same time in the various regions and geographic divisions of the country. But this does not mean that the population of a given city or metropolitan area, or even the urban population of a single state, will consistently show every long swing.

The contrasting behavior of population growth in farm and nonfarm areas suggests the possibility of long swings in *internal* migration, and this, indeed, is so—an interesting point, as we shall see below.

Partial light on the economic characteristics of the swings is provided by the figures for the main industrial components of the nonagricultural labor force and for the major occupation groups. These indicate that the swings occurred with high regularity in the same industrial sectors, namely, construction; transportation; trade; finance, insurance, and real estate; professional services and amusements; domestic service; and personal services. On the other hand, manufacturing and forestry and fishing show no consistent pattern, while mining tended to move inversely.

Since the swings in national population and labor-force growth before World War I were due predominantly to swings in immigration, the analysis of causes of the swings focuses on the explanation of the latter. The question of chief interest is whether there is evidence that the observed immigration waves were repeatedly associated with fluctuations in the same factors, and particularly whether their source appears to have rested on changing conditions in the United States or in the areas of origin. The answer appears to be that the swings in immigration were a response to corresponding swings in the demand for labor in the United States. Some of the evidence follows.

In the United States, turning points of long swings in output growth tended to precede those in the rate of immigration, suggesting that immigration was responding to changed conditions in the United States rather than abroad. During long swings in the United States, rising immigration was accompanied by rising hourly wage rates and, so far as the limited evidence goes, declining unemployment rates; when immigration was falling, hourly wage rates either fell or rose at slower rates and the unemployment rates tended to rise. There is also a substantial similarity in the timing of out-migration waves from diverse areas of origin—different parts of Europe, Canada, Latin America, Asia, and even the rural sector within the United States. There is no evidence that the migration swings were responding to similar swings in the rate of labor market entry in the areas from which the immigrants came.

Although this evidence points to U.S. demand conditions as the *systematic* factor responsible for immigration swings, the degree of responsiveness of immigration from one long swing to the next could be, of course, influenced by developments outside the destination area. The unprecedented amplitude of the migration response at the time of the Irish famine seems a good example of this.

While surges in population growth associated with immigration may not have initiated swings in the rate of economic growth, this does not mean that the demographic movement did not play an important functional role in such swings. Rather, the evidence suggests that, at least since 1870, the flow of foreign and internal migrants responding to an upswing in labor demand did generate a wave of urban development. This view stems from the observation that the industries moving in positive conformity to swings in urban population growth are those, according to input-output data, most dependent on final urban consumer demand.

As previously noted, immigration swings typically lagged swings in the growth rate of nonagricultural output as a whole. Together, these findings suggest a more comprehensive

pattern for the industrial structure of long swings in which, among the positively conforming industries, those more closely dependent on urban household demand either lag or, if turning concurrently, do so sluggishly. The decennial observations on labor force are too infrequent to discern this finer pattern, but evidence of it is apparent in output and capital data.

A preliminary draft of the study is scheduled for early summer and the final draft for the end of the year.

RICHARD A. EASTERLIN

## OTHER STUDIES

One of the reports growing out of the study of long swings in construction that Moses Abramovitz and Manuel Gottlieb have been engaged in has been published: Gottlieb's *Estimates of Residential Building, United States, 1840-1939* (Technical Paper 17). Another report, Abramovitz' "Evidences of Long Swings in Aggregate Construction since the Civil War" (Occasional Paper 89) will soon be in press. Gottlieb's manuscript, "Long Waves in Urban Building, Local and Nationwide," is being reviewed by the staff.

A summary volume on the economic growth of the Soviet Union is being prepared by Warren Nutter. It will combine the major findings, some already published, on growth in individual sectors and discuss such other relevant matters as population, employment, and standard of living. One of the sectors on which work continues (by Gale Johnson, Douglas Diamond, and Arcadius Kahan) is agriculture, in which attention is being devoted to output, inputs, and productivity trends. Work on the agricultural monograph has been impeded by various difficulties, and this, in turn, has delayed completion of Nutter's summary volume. It is hoped that work on the summary volume can proceed, utilizing some of the major series in the agricultural monograph, which Gale Johnson has agreed to supply.

The growth in trade union membership is reviewed in Leo Troy's "Trade Union Membership, 1897-1960," which will shortly be submitted to the Board. The Income and Wealth Conference report on "Components and Sources of Output Growth, 1840-1920," is being edited.

Other studies concerned with economic growth are reported in section 2.

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

### INVESTMENT IN EDUCATION

A major product of this study, a monograph entitled *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*, has been approved for publication by the Board of Directors. The table of contents follows:

#### I Introduction

#### *Part One: Theoretical Analysis*

- II Investment in Human Capital: Effect on Earnings
- III Investment in Human Capital: Rates of Return

#### *Part Two: Empirical Analysis*

- IV Rates of Return from College Education
- V Underinvestment in College Education?
- VI Rates of Return from High School and Trends over Time
- VII Age, Earnings, Wealth, and Human Capital
- VIII Summary and Conclusions
- Appendix A: Sources and Methods
- Appendix B: Mathematical Discussion of the Relation Between Age, Earnings, and Wealth

Albert Fishlow reports below on the work he has been doing while in residence at the National Bureau in 1963. The general aim of his study is to provide some needed historical

perspective on trends in the supply of and demand for education in the United States.

The research on investment in education is being financed by grants from the Carnegie Corporation.

GARY S. BECKER

#### HISTORICAL TRENDS IN EDUCATIONAL INVESTMENT

During the year, I initiated research in two related areas: first, determination of the changing volume of resources invested in formal education in the United States over the past century; second, explanation of the wide variations in the growth rates of educational outlays and of school attendance.

The total resources devoted to education, especially in the earlier years of the period covered, is heavily weighted by the potential earnings forgone by students. Accordingly, a special effort has been made to derive estimates of those opportunity costs, using as a guide actual wage payments to children of school age. Another feature of the inquiry has been to introduce explicitly into the calculation changes in such important variables as the length of the school year, the agricultural character of the labor force, and the rates of participation of children in the labor force. The results thus far suggest that our estimate of educational investment will differ considerably from existing estimates.

Variations over time in educational expenditure and enrollment are more than ordinary business cycle phenomena. The rapid rise of secondary school attendance in the decade of the 1920's is an example. Our interest is in whether such a surge is very largely a response to the increased supply of facilities voted by the public for noneconomic reasons, or whether it is a response in significant degree also to increases in the economic advantages of educational investment. Much work, including that of Gary Becker, has been done to measure the realized rate of return on education, but the extent to which those returns have influenced enrollments, in the aggregate and in specific types of courses, has received much less atten-

tion. Preliminary investigation reveals an association between the rise of high school attendance in the 1920's, in Ohio and Massachusetts, and declining wage rates in those states for high-school-age students; and a slowing down of growth of attendance in the 1930's accompanied by some relative improvement in the wages received by such younger workers. Although far from conclusive, the correlation suggests a significant role of opportunity costs in explaining changing school enrollments.

I hope to have a manuscript on the volume of expenditures ready soon. Study will continue on the forces underlying the changing rate of enrollment.

ALBERT FISHLOW

#### THE IMPACT OF PUBLIC AND PRIVATE PENSION SYSTEMS ON SAVING AND INVESTMENT

Last year's Annual Report contained a summary of some of the major findings of this project, which has been supported by a grant from the Maurice and Laura Falk Foundation, supplemented by a grant from the Life Insurance Association of America. We are now engaged in revising and writing up the basic research results, which we expect will appear in a two-volume work. It will include, in addition to studies reported on by Cagan and Holland previously, a study paper on union and multiemployer pensions by Robert Bartell, which was prepared during the year and reviewed by our Advisory Committee, and the paper by Elizabeth Simpson, described below. Daniel Holland reports below on the current status of his paper dealing with projections of the volume of private industrial pension programs.

#### PENSION FUNDS OF NONPROFIT ORGANIZATIONS

The noninsured pension funds of nonprofit organizations have apparently traced a path of steady, substantial growth in assets during the postwar years. Data gathered by Elizabeth

Simpson suggest a 10 per cent rate of growth in 1959-60 and a 9 per cent growth rate for 1945-46. Despite the maturity of a comparatively few large funds which dominate this group, rates of growth have been well maintained by an increase in the number of participants in existing plans, increases in contribution rates, and extension of formal pension programs to a larger proportion of those employed by nonprofit organizations.

This stability in rates of growth is in sharp contrast to the pattern of growth for corporate noninsured funds, which recorded annual gains in assets ranging from about 15 per cent in the late 1940's, to more than 20 per cent in the early 1950's, and to 11 to 12 per cent most recently. The long history of gradual improvements and extensions of retirement benefits in religious and other nonprofit organizations is seen to be in clear contrast with the explosive postwar growth of pension programs in industry.

For fiscal years ending in 1959, a large group of pension funds of nonprofit organizations held about \$1 billion of assets, at market value, diversified as follows (per cent).

Cash and deposits	1.6
U. S. government securities	8.5
Corporate and other bonds	38.4
Mortgages	11.2
Preferred stocks	4.6
Common stocks	32.3
Other assets	3.4
	100.0

Portfolios reflect professional management of high-quality securities and generally good rates of return. As compared with corporate pension funds, mortgages were favored somewhat more and common stocks somewhat less.

Elizabeth Simpson's study paper will deal with investment and other characteristics of this small but steadily growing segment of the pension field, which covers not only the non-insured funds discussed above but also a similar volume of insured programs.

ROGER F. MURRAY

## PROJECTIONS OF PRIVATE PENSION PLANS, 1962-82

The first draft of the manuscript incorporating my initial set of projections, for private industrial pension plans, of coverage, beneficiaries, contributions, benefit payments, fund earnings, fund levels, and annual net fund accumulations for the next twenty years has been read by the pension study's Advisory Committee.

In response to their criticisms and suggestions, the projections have been revised and amplified. While some of the estimating procedures were changed substantially, a preliminary examination suggests that the new projections are not very different from the earlier ones. But closer examination is required to confirm or deny this impression. I plan next to undertake this closer analysis and rewrite the manuscript in which the estimates are presented and discussed.

DANIEL M. HOLLAND

## THE CHANGING POSITION OF PHILANTHROPY IN THE AMERICAN ECONOMY

During the past year, we revised Chapter 1 of the manuscript, "The Changing Role of Philanthropy in the American Economy: 1929 to 1959." Chapter 4, on private foreign philanthropy, was also largely rewritten and eight new tables added. Some new tables and text on religious giving for Chapter 3 were completed.

The publication of Merle Curti's *American Philanthropy Abroad* indicated clearly that we should review and possibly extend our discussion of private foreign philanthropy. Curti's book, which encompasses the period since about 1800, reviews in detail the manner of raising and disposing of about \$4.4 billion during the 31 years covered by our study—an amount about one-third of what we call private foreign philanthropy. The difference is that we do not limit the concept of that philanthropy (or philanthropy in general) to institutional giving. Curti includes only funds given by the American people, business enter-

prises, religious groups, and others to domestic philanthropic institutions. These, in turn, devoted the funds to the needs of the people of Europe and, to a lesser extent, of those in other continents. Thus our Chapter 4 reports on a flow of funds from the United States to the peoples, not the governments, of other nations approximately three times the amount which Curti includes in his aggregates of institutional giving abroad.

In this connection, we developed several pairs of new tables designed to show for the 31 years, as a whole and for each separately, the relation between the amounts given that ultimately went to the people of other countries compared with the total amounts in our estimates of domestic private philanthropy. First, noninstitutional, or what we might call direct, giving by individuals in the United States to the people of other countries was about 60 per cent of the entire amount sent abroad for philanthropic purposes during the 31 years. Second, of our estimated grand total of \$184 billion of all foreign and domestic private philanthropy, only \$12.3 billion, or 6.7 per cent, was sent abroad and 93 per cent was used at home. Third, of only the "person-to-person" giving (noninstitutional), the total sent abroad was \$7.8 billion compared with our estimate of \$41 billion total person-to-person giving classified as private domestic philanthropy. Thus, 19 per cent of that giving was sent abroad, with a definite and sharp downward trend in the percentage from 1929 to 1959. Fourth, of religious giving, alone, \$3.2 billion of our estimated \$48.3 billion was sent abroad, or 6.6 per cent of all the funds given to religious institutions in the United States was sent abroad and about 93 per cent was used at home.

These four relationships are, of course, interrelations between private foreign philanthropy and private domestic philanthropy, two of the four major segments in our research design. (The other two are public foreign philanthropy and public domestic philanthropy.) The interrelations indicate the relative importance of the funds first given to agencies in the United States plus person-to-person funds sent abroad

to the people of other nations. Stated conversely, more than 90 per cent of the total for private domestic philanthropy was used within the United States.

It is hoped that by the fall of 1964 we shall have completed a revised draft of all parts of the manuscript.

FRANK G. DICKINSON

#### THE ANALYSIS OF PRIVATE GIVING

A proposed Occasional Paper or Technical Paper on economic aspects of corporation giving, submitted in October 1963, is being revised in the light of comments by a staff reading committee. The proposed paper contains the following sections:

- Historical Background
- Trend in Corporate Giving Since 1936
- Taxes and Corporate Giving
- Secular Income Elasticity
- Some Determinants of Giving Rates
  - Corporate Size
  - Profitability
  - Employment
  - Dividends
- Corporate Giving Through Company-Sponsored Foundations
  - A Recent Development
  - The Period of Endowment
  - Summary of Fund Flows
  - Effect on Flow of Corporate Contributions

When revisions of the above paper have been completed, the analysis of family giving will be resumed. Cross-sectional analyses will be elaborated, in an effort to measure more conclusively the effects of such family characteristics as income, age, occupation, and education of the family head. An effort will be made, also, to see whether a change has taken place over the period 1935-50 in giving habits. Particular attention will be paid to the rise in personal income tax rates.

RALPH L. NELSON

#### OTHER STUDIES

*Studies in the National Balance Sheet of the United States*, by Raymond W. Goldsmith and Robert E. Lipsey; *Capital and Rates of Return in Manufacturing Industries*, by George J.

Stigler; *Estimates of Residential Building, United States, 1840-1939*, by Manuel Gottlieb; and the Income and Wealth Conference reports, *The Behavior of Income Shares* (Vol. 27), and *Models of Income Determination* (Vol. 28), were published. Two reports in press are "Anticipations and Purchases: An Analysis of Consumer Behavior," by F. Thomas Juster, and "Business and Professional Income Under the Personal Income Tax," by C. Harry Kahn.

Among the reports soon to go to press are

"Evidences of Long Swings in Aggregate Construction Since the Civil War," by Moses Abramovitz, and "The Flow of Capital Funds in the Postwar Economy," by Raymond W. Goldsmith. The Income and Wealth Conference report, "Components and Sources of Output Growth, 1840-1920," is being prepared for press.

Robert E. Lipsey reports on the status of a source book on investment series in section 3, and F. Thomas Juster describes his work on capital formation by consumers in section 4.

### 3. BUSINESS CYCLES

#### GENERAL STUDIES

Arthur F. Burns has prepared an article on business cycles for publication in the new *International Encyclopedia of the Social Sciences*. It deals with the nature and causes of business cycles, organized around the following topics:

- Types of Economic Movement
- Growth of Knowledge About Business Cycles
- Cyclical Behavior of Aggregate Activity
- Cyclical Behavior of Constituent Parts of Aggregate Activity
- The Cumulative Process of Expansion
- Gathering Forces of Recession
- The Process of Contraction
- Forces of Progress and Recovery
- Differences Among Business Cycles
- Progress Towards Economic Stability

Another paper by Burns, "Economics and Our Public Policy of Full Employment," was presented in April at Rice University, in its Semicentennial Lecture Series. It was printed in *The Morgan Guaranty Survey*, July 1963, and will also appear in a forthcoming collection of lectures at Rice University, which Professor Edgar O. Edwards has brought together under the title *The Nation's Economic Objectives: Roots and Problems of Achievement* (University of Chicago Press).

Work on a description and evaluation of the National Bureau's business cycle chronology is proceeding slowly. For the postwar period, 1946-61, it seems clear that (1) the number and general position in time of the present

list of expansions and contractions is broadly supported by the evidence now available; and (2) revisions in the monthly dates of peaks and troughs, where needed at all, will be small. No general revision of the reference dates during 1919-38 seems necessary. If resources permit, a revision of the pre-1919 dates will be undertaken. Here it is probable that a number of peaks and troughs will be shifted by a few months, and that the general effect will be to reduce the recorded length of business contractions and increase that of expansions.

In connection with the forecasting study (see below), the development of a chronology of retardations in aggregate economic activity is being investigated. This calls for the identification within certain business cycle expansions of intervals of relatively slow growth or minor decline in total activity.

#### STUDY OF SHORT-TERM ECONOMIC FORECASTING

The purpose of this new project is to assess the accuracy of short-term forecasts of aggregate economic activity in the United States. The materials to be compiled and analyzed are authentic forecasts, by reputable individuals, groups, or agencies, of the nation's economic fortunes in the near future—the next few quarters or the next year or two. From the results for a representative collection of this sort—the observed magnitudes, types, and structure

of the forecasting errors—what can be said about the dependability of economic forecasts? What are the comparative merits and shortcomings of the different assumptions, techniques, and models used? Can we reduce the errors and allow for the limitations of the forecasts? What improvements are feasible?

Systematic work on the project, which is under the direction of Victor Zarnowitz, began in July. Julius Shiskin, Jon Cunyningham, and Rosanne Cole are engaged on various parts of the study. Arthur Burns, Geoffrey Moore, and Jacob Mincer have also taken an active interest. Mincer and Zarnowitz are working on an introductory paper on methods of forecast evaluation. Moore and Shiskin have drafted a paper on "Variable-Span Diffusion Indexes and Economic Forecasting." Our plans call for preparation, in the course of this year, of several additional reports. The study is supported by grants to the National Bureau from several industrial companies.

The results of the first phase of the investigation, as summarized below, cover relatively few forecasts. They are therefore preliminary and tentative.

#### GENERAL ECONOMIC FORECASTS

We have completed a detailed analysis of three sets of forecasts of GNP and its major components (two of them also cover other variables such as industrial production, unemployment, and prices). It must suffice here to label them: forecast A, an end-of-year forecast for the first half and for the second half of the next year, produced since 1947 by a group of forecasters from various industries, government, and academic institutions; forecast B, an annual forecast by the staff of a large company, beginning in 1953; forecast C, a quarterly forecast over the next four or five quarters, prepared since 1957 by the staff of another large company. All these are bona fide predictions published or circulated shortly after they are made.

#### MEASURES AND STANDARDS OF PREDICTIVE ACCURACY

As forecasts have different dimensions and aspects, there is more than one useful way to

measure their accuracy. Perhaps the simplest is to compare the forecast with the actual level. Another is to compare the forecast change with the actual change. The error in the change will be the same as that in the level, when the actual level at the time of the forecast is known. When this is not so, the two will differ by the amount of the error in estimating the current level. Usually, but not always, the error in the change will be smaller than in the level. The condition that will make it smaller is that the estimate of the current level has an error of the same sign as the forecast of the future level. This happens frequently because of the underestimation bias, as shown below. In addition to these measures expressed in the units of the variable in question, one may wish to compute errors in relative terms, for example, by taking differences between the predicted and the actual percentage changes.

Given a sample of observed errors of any of these types, it is again useful to summarize its evidence by means of a few interrelated measures. A simple average of the errors  $\bar{E}$  can serve as an indication of a tendency either to underestimate or to overestimate. But  $\bar{E}$  can of course be very small or even zero in the presence of large individual errors of opposite signs. To avoid such canceling out, the errors can be averaged without regard to sign, obtaining the mean absolute error  $|\bar{E}|$ . A more complex measure is the root mean square error,  $M$ , where the procedure is to square the errors, take their average, and obtain the square root of the result. This measure has several useful properties; for example, the total mean square error can be broken down into the part due to the mean bias, if any, and the part due to the variance of the errors ( $M^2 = \bar{E}^2 + S_E^2$ ). The tables which follow indicate the great importance of the latter component:  $M$  is decidedly larger than the absolute value of  $\bar{E}$  (and somewhat larger than  $|\bar{E}|$ ).

Measures such as  $\bar{E}$ ,  $|\bar{E}|$ , or  $M$  tell us how much the forecasts deviate from the standard of perfection (zero errors) but this is not necessarily a realistic yardstick. Other criteria are needed to take into account the properties of the series to be predicted and allow com-

parisons between forecasts covering different variables or periods. A popular approach relies on so-called "naïve models." The simplest of these (N1) says, in effect, that next period's value of any variable will equal this period's value plus a normally distributed random "error"; it thus assumes no "predictable" change over the interval concerned. Another naïve model (N2) specifies that next period's value will equal this period's value plus the change from the preceding to this period, plus a random error: here the "same change" assumption replaces the "same level" (or "no change") assumption of N1. It is possible to go much further than either of these models in utilizing the information provided by the past record of the time series for the forecast variable. To this end, a linear autoregression model (N3) may be employed, where the

forecast level is a function of several preceding levels of the series, plus a random error. (For GNP, only two preceding quarters were used, since earlier values yield no significant improvement.)

The tables which follow show how the forecasts mentioned above fare in terms of these measures and criteria of predictive accuracy.

#### AVERAGE ERRORS

Forecast errors are often expressed as a percentage of the level of the given variable; for example, the mean absolute error of \$13.8 billion (Table IV-6, line 1) would be described as approximately 3.5 per cent of the average level of GNP during the twelve-year period covered. However, this practice can be very misleading. Short-period changes in a

TABLE IV-6  
THREE SETS OF FORECASTS OF GROSS NATIONAL PRODUCT, SELECTED SUMMARY MEASURES OF ERROR,  
FOR DIFFERENT PERIODS AND SPANS OF FORECAST, 1947-62

Code of Forecast and Period	Span of Forecast	Mean Absolute Changes		Type of Error	Summary Measures of Error		
		Actual	Forecast		Mean Error $\bar{E}$	Mean Absolute Error $\overline{ E }$	Root Mean Square Error $M$
		(1)	(2)		(3)	(4)	(5)
Forecast A							
1. 1947-49, 1954-62	1 yr.	—	—	Level	-10.6	13.8	17.6
2. 1949, 1954-62	1 yr.	—	—	Level	-6.3	10.1	12.1
3. 1949, 1954-62	1 yr.	19.4	19.8	Change	-3.1	8.4	10.7
Forecast B							
4. 1953-62	1 yr.	—	—	Level	-1.2	8.8	10.2
5. 1953-62	1 yr.	21.1	19.8	Change	+0.1	7.6	9.3
Forecast A							
6. 1949, 1955-62	2 Q	3.4	2.3	% Change	-0.7	1.9	2.2
7. 1949, 1955-62	4 Q	5.2	3.9	% Change	-0.9	2.7	3.4
Forecast C							
8. 1958-62	1 Q	1.8	1.4	% Change	-0.3	1.0	1.2
9. 1958-62	2 Q	3.0	2.4	% Change	-0.6	1.7	2.0
10. 1958-62	3 Q	4.3	3.6	% Change	-0.8	2.1	2.6
11. 1958-62	4 Q	5.7	5.0	% Change	-0.8	2.6	3.2
12. 1958-62	5 Q	8.2	6.2	% Change	-2.0	3.4	4.7

NOTE: Numerical entries in lines 1-5 are in billions of dollars; those in lines 6-12 are in percentage points.



comprehensive aggregate such as GNP are generally small relative to already attained levels. Thus, during the twelve years in question, annual changes represented about 5 per cent of the average level of GNP, which implies that even the naïve model N1 would yield a mean absolute error of this fairly small size when compared with the aggregate. It is not surprising, therefore, that forecast errors usually appear quite small by this criterion.

The important question in short-term forecasting is what *change* will occur in an economic time series from its last known position. In this sense, all forecast errors are essentially errors in predicting changes. Compared with the average size of the recorded change in GNP, however, the mean errors of forecast (without regard to sign) are in the neighborhood of 30 to 40 per cent (cf. Table IV-6, lines 3 and 5, columns 1 and 5).

#### UNDERESTIMATION OF CHANGES

This bias, familiar from many studies of economic forecasts, is evident in most of the data we have examined so far. Thus the average changes in actual values of GNP generally exceed those in predicted values, both taken without regard to sign (cf. columns 1 and 2 in Table IV-6). When signs are recognized, underestimation still shows up: note that the mean errors of change in the table are as a rule negative (column 4).

The general source of such a tendency is probably the very fact that forecasts depend primarily on the data of the existing situation; they rely necessarily on the assumption of a partial stability of some determining factors, but the result is an exaggeration of the actual

stability. The forecasts turn out to be a smoothed or lagged function of the actual values, or both, so that the changes are underestimated.

Underestimation of increases usually results in underestimation of levels, while underestimation of decreases results in overestimation of levels. In series with strong upward trends, such as GNP, increases prevail and the levels are on the average understated (Table IV-6, column 4, lines 1, 2, and 4).

#### EFFECTS OF BUSINESS CYCLE

Recognition of the current cyclical position of the economy is certainly a major part of a forecaster's problem. However, this difficulty is greater at some times than at others. For example, it was eased for the forecasts made at the end of 1953 and 1957, because recessions began in midsummer in those years.

A major decline was apparently expected by many forecasters to develop in 1947 and again in 1948. These judgments reflected the widespread apprehension, at the time, of an early postwar depression and accounted for the largest underestimation errors in the examined GNP forecast (cf. Table IV-6 lines 1 and 2).

Failures to recognize business cycle turns promptly or in advance are clearly evident in some of the forecasts (particularly those for 1960), and so are failures to anticipate the magnitude and duration of cyclical movements. When forecast errors are averaged separately for different stages of the business cycle, it turns out that the levels of GNP are underestimated most in the first year of expansion (see tabulation below). Later in the expansion,

	<i>Mean Forecast Error in Level (<math>\bar{E}</math>)</i>			
	<i>(\$ billions)</i>			
	Expansion			
	Total	First Year	Later	Contraction
Forecast A, 1949, 1955-63	-11.2	-19.2	-4.4	+1.0
Forecast C, 1958-62	- 6.6	-14.0	+2.9	+4.6

TABLE IV-7

COMPARISON OF FORECASTS WITH NAÏVE MODELS, PERCENTAGE CHANGE  
IN GROSS NATIONAL PRODUCT, 1955-62 AND 1958-62

Code, Period, and Span of Forecast	Root Mean Square Error of Forecast (percentage points) <i>M</i> (1)	Ratio of Forecast Error to Naïve Model Error <sup>a</sup>		
		<i>R</i> <sub>1</sub> (2)	<i>R</i> <sub>2</sub> (3)	<i>R</i> <sub>3</sub> (4)
1. Forecast A, 1955-62, 1 yr.	2.69	.46	.55	.79
2. Forecast B, 1955-62, 1 yr.	2.29	.40	.47	.67
3. Forecast A, 1958-62, 1 yr.	1.83	.32	.35	.53
4. Forecast C <sup>b</sup> 1958-62, 1 yr.	2.23	.39	.42	.64
Forecast A, 1955-62				
5. Two quarters	2.45	.63	.59	.72
6. Four quarters	3.79	.66	.58	1.06
Forecast C, 1958-62 <sup>c</sup>				
7. One quarter	1.21	.58	.66	.74
8. Two quarters	2.03	.60	.57	.89
9. Three quarters	2.56	.53	.45	.86
10. Four quarters	3.24	.55	.46	1.08

<sup>a</sup>*R*<sub>1</sub>, *R*<sub>2</sub>, and *R*<sub>3</sub> are the ratios of the root mean square errors of forecast (col. 1) to the corresponding measures of error for the models N1, N2, and N3, respectively. See text for explanation of the models. All measures are based on errors of percentage change.

<sup>b</sup>Includes forecasts made at end of year only.

<sup>c</sup>Includes all quarterly forecasts available.

when the increases are usually smaller, the levels are underestimated much less and may even be overestimated (particularly in unexpected retardations such as in 1962). In contractions, overestimation of the levels is the rule either because the downturn is missed or because the decline turns out to be larger than predicted.

#### INCREASING ERRORS OF LONGER-RANGE FORECASTS

The longer the span of the forecast (within the range considered here), the larger its average error. Changes in GNP are predicted better over the next three months than over the next

six, and better over six months than over nine or twelve. This progression is seen in all the measures of error (Table IV-6, lines 6-12).

This suggests that in a gross sense the ability to forecast the future is a declining function of the forecast range—an important as well as plausible point. But how about the forecaster's ability to improve upon simple level or change extrapolations (N1 and N2) or more sophisticated autoregressive techniques (N3)? The annual average forecasts and the three-, six-, and nine-month forecasts are better than all three extrapolation models: the ratios in Table IV-7, columns 2-4, are all less than one. Of the three models, N3 is definitely the best, since the ratios in column 4 are consistently

larger than those in columns 2 and 3. The errors produced by the naïve models also increase when the period over which the extrapolations are made is lengthened, and they remain on the average larger than the errors of the forecasts proper. However, the performance of the autoregressive model N3 relative to the forecasts improves (the ratios in column 4 increase), and for the four-quarter span the forecast errors actually become larger than the errors of that model. In short, in our sample

the forecasts of where the economy would be a year hence did not prove as accurate as those produced by a mechanical (though fairly sophisticated) method.

#### ESTIMATES OF CURRENT POSITION

Our measurement of errors in forecasts of change has the effect of eliminating the error made in estimating the current position (the initial level from which the predicted change is measured). Such estimates are actually very

TABLE IV-8  
 ERRORS IN FORECAST OF MAJOR COMPONENTS OF GROSS NATIONAL PRODUCT,  
 1953-62 AND 1958-62

Code of Forecast, Period Covered, and Predicted Variable	Errors in Forecasts of Percentage Change			Ratios of Forecast Error to Naïve Model Error <sup>a</sup>	
	Mean Error $\bar{E}$ (1)	Mean Absolute Error $ \bar{E} $ (2)	Root Mean Square Error $M$ (3)	$R_1$ (4)	$R_2$ (5)
Forecast A, 1958-62					
PERCENTAGE POINTS					
1. Personal consumption expenditures	+0.2	1.0	1.1	.24	.32
2. Expenditures on consumer durable goods	+1.9	4.4	5.7	.88	.46
3. Gross private domestic investment	+3.9	9.9	13.6	.96	.35
4. Producers' durable equipment	-1.9	5.3	7.0	.48	.48
5. Construction	-2.7	2.8	4.0	.92	.53
6. Government purchases of goods and services	-1.3	2.9	3.7	.49	.70
7. Gross national product	+ .6	2.1	2.5	.49	.40
Forecast B, 1953-62					
8. Personal consumption expenditures	+0.1	1.1	1.4	.30	.44
9. Gross private domestic investment	-0.9	11.2	13.1	.85	.44
10. Plant and equipment	-3.4	6.6	8.4	.86	.67
11. Housing	-6.7	11.3	15.2	1.17	1.14
12. Government purchases of goods and services	+0.8	2.1	3.1	.43	.63
13. Gross national product	-0.1	1.8	2.2	.39	.48
Forecast C, 1958-62					
14. Personal consumption expenditures	-0.2	1.2	1.5	.32	.51
15. Gross private domestic investment	+3.3	9.1	10.4	.58	.39
16. Plant and equipment	+1.0	4.8	5.7	.56	.72
17. Housing	-1.4	6.0	9.8	.76	.96
18. Government purchases of goods and services	-1.4	1.8	2.6	.38	.74
19. Gross national product	+0.2	1.8	2.2	.39	.42

<sup>a</sup>See note a to Table IV-7.

	Root Mean Square Error of Forecast			Ratio to Naïve Model Error ( $R_1$ ), For Forecast		
	A	B	C	A	B	C
	(\$ billions)					
Gross private domestic investment	9.0	6.3	3.3	.99	.74	.68
Change in business inventories	8.2	3.1	1.8	1.26	.66	.80
Net foreign investment	3.3	1.8	2.2	1.04	.84	.75

short ("zero span") predictions, and as such should have typically smaller errors than any forecasts looking into the future. However, their accuracy is by no means always satisfactory. Improvements in the estimates of current position may bring about significant improvement of the forecasts, and we hope to contribute to this subject in the present study. Plans in this connection involve analysis and appraisal of the quality of data principally used in the forecasts and the effects of data revisions.

#### SECTORAL FORECASTS

Of the major components of GNP, personal consumption expenditure as a whole shows relatively small errors in forecasts of relative change, but spending on consumer durables is a source of large errors (Table IV-8). The forecasts of gross private domestic investment produce decidedly the largest errors. The record for housing is worse than that for plant and equipment in forecasts B and C, the record for producers' durable equipment worse than that for total construction in forecast A. The errors in predicting government expenditures are moderate: larger than those for consumption in two of the forecasts and smaller in one.

Forecasts A perform just a little better than the naïve model N1 for consumer durable expenditures, total domestic investment, and construction; and the same applies to total investment, and plant and equipment spending in forecasts B (Table IV-8, column 4). Both N1 and N2 are superior to forecasts B for housing.<sup>1</sup>

<sup>1</sup>It may be noted that N2 tends to be the more severe yardstick on relatively smooth series with strong trends (such as consumption), while N1, which makes smaller errors on turning points, is usually harder to beat on the more cyclical and irregular series (cf. Table IV-8, cols. 4 and 5).

An analysis of errors of absolute changes in those components of GNP that can be negative (investment in inventories and net foreign investment) suggests that forecasts are weaker here than in most other sectors. For example, the accompanying figures show that errors in these forecasts are larger relative to N1 than are the errors in total investment forecasts.

We have also analyzed some forecasts of industrial production and unemployment (not shown in the tables), and found that they are on the average considerably worse than the forecasts of GNP coming from the same source. Unemployment forecasts were particularly poor. It appears that the series with greater amplitude of change are the more difficult to predict. This is to be expected and should be allowed for in measures of errors (e.g., by comparison with naïve models).

VICTOR ZARNOWITZ

#### ECONOMETRIC MODEL FORECASTS

This portion of the forecasting study is designed to evaluate various short-term forecasts of aggregate economic activity made from simultaneous equation and single equation econometric models. Such an evaluation, when compared with the evaluation of other types of business and government forecasts, could serve as a measure of the present state of the econometric forecasting art, bringing into focus the more promising forecasting techniques and areas of possible improvement, as well as quantifying inherent structural limitations.

#### THE FUNCTION OF ECONOMETRIC MODELS

It should be noted at the outset that forecasting, per se, is not always the primary function of

econometric models. For example, in order to develop the implications of alternative policy measures, models of aggregate economic activity may have to be formulated differently and be tested differently from models designed primarily for forecasting. For such models, forecasting ability, especially when the policies in question do not change, is not necessarily a relevant measure of quality.<sup>2</sup> Realistic and useful econometric models, therefore, need not necessarily be good at forecasting. This study, however, is concerned only with one aspect of econometric models: their ability to forecast.

#### WORK IN PROGRESS

With the assistance of Stanley Diller, an analysis of several sets of published econometric forecasts of GNP and its components is underway. The forecasting errors for one such set are shown in Table IV-9. For each year, the error in forecasting the level of GNP in current dollars (column 1) is broken down into three components: the error in forecasting the annual change of GNP in constant dollars (column 2); the error in estimating the current year's GNP in constant dollars (column 3); and the error in forecasting next year's annual GNP price deflator (column 4).

The figures shown in Table IV-9 are all expressed in current dollar values, even though the models from which the data derive were largely formulated and the forecasts themselves often expressed in terms of constant dollar values. The forecasting errors shown here were in each case obtained by taking the difference between the forecasts and the figures reported in the first February issue of the *Survey of Current Business* following the year to which the forecast applies. These figures have an advantage over the later reports in that they are more consistent with the preliminary data which the forecaster must use to establish a starting point or base for his prediction. Occasionally, several forecasts were made for a

<sup>2</sup>More relevant measures in such cases would include tests of the consistency of the model with the underlying economic hypothesis or the quality of their spectral representation—either estimated from simulation data or calculated from estimated roots—when compared with the spectrum of the economic process under analysis.

particular year without the forecaster expressing or implying his particular preference. In 1958, for example, the data above were selected from a group of three distinct forecasts: one taken from the econometric model itself, a second obtained by inserting a single prediction of gross capital formation in place of the investment equations, and a third obtained by assuming about a 5 per cent decline in the level of investment from that of the previous year. Given the discretion involved in selecting the appropriate forecast and observed values, one should regard Table IV-9 as tentative.

Table IV-9 suggests that a significant part of the total forecast error is due to the difficulty in forecasting price movements.<sup>3</sup> As often as not, however, the price forecast erred in the opposite direction to that of the error of forecast change, thereby reducing the total error relative to its parts. The small negative correlations between the error of price on the one hand and the errors of base and change on the other reflect this situation. The importance of these correlations can be demonstrated by the fact that none of the best three econometric forecasts of change (1956, '61, '62) correspond to the best three forecasts of level (1957, '58, '60).

In addition to analysis of the published econometric forecasts, a number of sets of ex post forecasts will be computed from the published models. By controlling for factors such as data quality, knowledge of exogenous variables, forecast span, period of fit and method of estimation, we hope to identify factors which promote successful forecasting. These ex post forecasts should provide us with standardized structures of classification for the specification, estimation, and constraints that differentiate econometric forecasting models.

#### YARDSTICKS OF PERFORMANCE

Often in the past, the relative performance of econometric forecasts has been measured by comparison with forecasts from "naïve" models, which simply extrapolated either the most

<sup>3</sup>In this set of forecasts, the price level was forecast as an exogenous variable, except in 1953 and 1954.

TABLE IV-9

## ERRORS IN ECONOMETRIC FORECASTS OF GROSS NATIONAL PRODUCT

	<i>Components of Total Error<sup>a</sup></i>			
	Total Error (1)	Error of Change (2)	Error of Current Level (3)	Error of Price Level (4)
FORECAST YEAR	BILLIONS OF DOLLARS			
1953	10.5	-15.2	-1.2	26.9
1954	28.4	5.2	1.0	22.2
1955	-22.4	-20.7	2.1	-3.8
1956	-12.4	-2.1	6.3	-16.6
1957	0.9	6.4	-2.8	-2.6
1958	-0.6	8.0	1.1	-9.6
1959	-18.7	-11.3	-4.1	-3.3
1960	0.5	-7.2	-2.6	10.4
1961	-9.2	-3.4	0.0	-5.9
1962	2.9	0.1	-4.4	7.3
Mean Absolute Error	10.6	8.0	2.6	10.9
Mean Arithmetic Error	-2.0	-4.0	-0.5	2.5
Root Mean Square Error	15.0	10.5	3.3	14.2
COEFFICIENTS OF CORRELATION <sup>b</sup>				
Correlation of Errors				
Total	1.00	0.50	-0.14	-.75
Change		1.00	0.01	-0.16
Base			1.00	-0.39
Price				1.00
RATIOS OF ROOT MEAN SQUARE ERROR				
Naïve Models				
N1	0.50	0.40	1.25	5.89
N2	0.71	0.55	1.80	2.72

NOTE: When the 1953 and 1954 forecasts, which have the largest price-level errors, are excluded from the calculation of the summary statistics, the total mean absolute error drops from 10.6 to 8.4; the root mean square error declines from 15.0 to 11.7; and the correlation of total error with errors of change and with price level become 0.80 and 0.44 respectively.

<sup>a</sup>Entries in columns 2 and 3 represent errors calculated in constant dollars, multiplied by the actual price index. For entries in column 4, errors in the GNP deflator were multiplied by the associated constant dollar forecasts of GNP, thereby producing price error measurements in billions of current dollars.

<sup>b</sup>Ratio of root-mean-square error of forecast to root-mean-square error of naïve model. For definition of the two types of naïve model (N1 and N2); see Zarnowitz' report, above.

recent level or a proportion of the most recent change of the series being forecast. Such comparisons are shown in the last two lines in the table, which indicate that, in terms of total forecast errors and errors of change, the econometric forecasts were superior to either type of naïve model, whereas this was not so for errors of current level or price level.

A more sophisticated yardstick of relative forecast performance is the autoregressive extrapolation model. Extending this idea, we will attempt to measure the relative forecast performance of econometric models in this study by a generalized autoregressive extrapolation model of the series being forecast. Just as a clear distinction must be drawn between the evaluation of econometric models for theorizing and for forecasting, so also must a clear distinction be drawn between the estimation of the "best" (minimum variance) coefficients of the theoretical autoregressive function—by use of the Z-transformation, for example—and the estimation of a "best" (minimum mean-square error) forecasting yardstick.

In order to make this distinction operational, the yardstick forecast of an economic indicator in this study is considered as the extrapolation of a nonstationary stochastic process consisting of three components: a systematic component represented by a linear combination of quantities over time; a linear autoregressive and moving average component measuring the significance of the interaction of the indicator with its recent history at a point in time; and a random component. The specification and estimation of this model is carried out in a manner intended to maximize the total spectral correlation<sup>4</sup> between the extrapolated model and the series being forecast. This is done by fitting the "best" linear forecasting yardstick to the postwar period and iterating the resulting autoregressive function to a maximum total spectral correlation.

JON CUNNYNGHAM

<sup>4</sup>For the origin of this concept, see Jon Cunyngnam, *The Spectral Analysis of Economic Time Series* (Working Paper No. 14), Washington, Bureau of the Census, 1963.

## BUSINESS CYCLE INDICATORS

In this phase of the forecasting study, two closely related questions are being investigated with a view to testing and improving the use and causal interpretation of the indicators.

The first is whether the current list and classification of indicators can be improved in the light of recent experience with their use, and improvements and extensions of data. As a first step, about 125 indicators of all types have been analyzed by the conventional NBER method, and their cyclical performance is being reviewed. An explicit scoring system is being set up to aid in appraising the indicators. The scoring system will assign weight to six factors: economic significance, statistical adequacy, the historical record on conformity and on timing, smoothness, and currency. It is recognized that this exercise will not provide a mechanical method of selecting indicators, but it is expected to provide some objective tests of the quality of different indicators from the standpoint of their value in forecasting.

In this connection, an investigation will be made of the variability in the timing of business cycle indicators: Which behave differently at peaks than at troughs? Which have consistently longer leads than others? Are there any other significant deviations from the familiar classification of leading, coincident, and lagging indicators? The result may be a set of indicators which consists of a common list for peaks and troughs, supplemented by some series that are good indicators at one turn but not at the other. For some preliminary results of the timing analysis, see Geoffrey H. Moore's report on statistical indicators, below.

The second question is why a decline in the leading indicators is sometimes followed by a business recession and at other times by a retardation or minor setback. The new classifications and data derived in the first exercise will be of aid in defining the periods when declines in the leading series were not followed by commensurate declines in the coincident series. As a first step in this part of the study, retardations in aggregate economic activity will be dated. Bench-mark dates based upon a com-

posite index of the leading indicators may also prove useful. These chronologies may be helpful in determining whether periods before retardations differ from periods before recessions with respect to the magnitudes of declines in the leading series and to the timing sequence and concentration of highs in the leading series. This approach may also shed some light on the origin and interpretation of the occasional long leads in certain series. The long leads may reflect extra cycles, in which the first high levels were not regained at the following leading indicator peaks.

As these statistical analyses are completed, various hypotheses which may explain variations in the timing of the different indicators and in the relations among them at different times will be tested against the new information compiled. Among the topics that may be considered for such tests will be the role of long swings in construction; investment in materials inventories versus investment in capital goods; backlogs of orders, capital appropriations, housing permits and perhaps other construction contracts; the rate of change in the money supply and related financial variables; the rate of secular growth; and the changing industry mix. The statistical data may also be helpful in testing the hypothesis that decisions affecting future production and employment are more or less simultaneous responses to certain causes which take different amounts of time to work out their effects.

JULIUS SHISKIN

## STATISTICAL INDICATORS

Further work has been done, partly in connection with the study of short-term economic forecasting, to develop a classification of indicators that would (1) distinguish between their timing behavior at business cycle peaks and at troughs, and (2) distinguish those that usually lead or lag business cycle turns by long intervals from those that do not. Insofar as such differences are of statistical and economic significance, the classification should prove useful. It should help to illuminate the process

whereby expansion in business activity turns into contraction as well as the process which converts recession into recovery.

Table IV-10 provides a tentative classification of the 52 indicators that currently appear in the Department of Commerce monthly publication, *Business Cycle Developments*. The series are classified in one of the following groups, separately for peaks and troughs: long lead, short lead, coincident, short lag, long lag. The provisional character of this table needs emphasis. It should be considered a working table, whose implications must be examined carefully and tested against other evidence. For want of space, only a small portion of the relevant statistical evidence is contained in the table. Nothing is shown about how variable or consistent the timing of each series has been; about the occasions when the series has reached a turn but the business cycle has not (or vice versa); about the uncertainties attached to the dates of turns in each series as well as those in the business cycle; about the more recent as compared with the earlier behavior of the series; about the extent to which the sequence of turns in different indicators at any given business cycle peak or trough has varied from the average sequence, and so on. Further, the table gives few clues to the factors causing related series to fall into different groups, and whether or not such inconsistencies are meaningful. Finally, since the classification is based solely on a statistical criterion, it does not tell whether the differences or similarities among series can be rationally accounted for by economic hypotheses, or whether they are sheer accidents. In short, it is not a table to be used mechanically or without regard to the qualifications mentioned.

In any statistical classification, borderline cases are likely. For example, in Table IV-10, "the average workweek in manufacturing," with a median lead of 6½ months at peaks, is classified as a long leader, whereas "new capital appropriations," with a median lead of 6 months at peaks, falls into the short-lead group. Such distinctions are doubtless trivial.

A substantial proportion of the indicators (19 out of 52) are classified in the same timing



TABLE IV-10

CLASSIFICATION OF FIFTY-TWO BUSINESS CYCLE INDICATORS ACCORDING TO TIMING AT PEAKS AND TROUGHS

Classification Based on Median Timing at Business Cycle	Classification Based on Median Timing at Business Cycle		Series <sup>a</sup> (3)	Median Lead (-) or Lag (+), in Months at:			Difference Between Peak and Trough Timings <sup>b</sup> (7)	No. of Timing Observations, All Turns <sup>c</sup> (8)	Period Covered by Timing Observations <sup>c</sup> (9)
	Peaks (1)	Troughs (2)		Peaks (4)	Troughs (5)	All Turns (6)			
1. Long lead (> 6 mos.)	Long lead (> 6 mos.)	14. Bus. failures, liabilities (i)	- 9½	- 7	- 7	N	36	1879-1961	
		25. Change, unfilled orders, durables	-17	- 8½	-11½	N	8	1948-61	
		32. Vendor performance	- 9½	- 7½	- 7½	N	8	1948-61	
		67. *Bank rates, bus. loans (Q) (i)	-23	- 9	-13½	S	18	1919-61	
2. Long lead (> 6 mos.)	Short lead (2-6 mos.)	1. Av. workweek, mfg.	- 6½	- 4	- 5	S	17	1921-61	
		2. Accession rate, mfg.	-10	- 4	- 4	N	21	1919-61	
		3. Layoff rate, mfg. (i)	-10½	- 6	- 7	S	20	1919-61	
		6. New orders, durables	- 8½	- 2	- 4	S	17	1920-61	
		24. New orders, mach. & equip.	- 8	- 4	- 6½	N	8	1948-61	
		10. Contracts & orders, pl. & equip.	- 8	- 3	- 5½	S	8	1948-61	
		7. Housing starts	-14	- 4	- 6	N	17	1918-61	
		29. Bldg. permits, housing	-16½	- 4	- 6	S	17	1918-61	
		12. Change, no. of businesses (Q)	-14	- 2	- 9	S	8	1945-61	
		17. Price/labor cost ratio, mfg.	- 7½	- 3	- 4	S	21	1919-61	
		18. Profit/sales ratio, mfg. (Q)	-16	- 3½	- 7	N	8	1948-61	
		22. Profit/income ratio, all corp. (Q)	-16	- 3½	- 7	N	8	1948-61	
		31. Change, mfg. & trade inventories	-14	- 6	- 7½	N	10	1945-61	
		20. Change, purch. materials inventories	-17	- 3	- 5	N	9	1945-61	
		26. Buying policy, prod. materials	-12	- 2	- 4½	S	6	1953-61	
		65. *Mfrs. inventories, fin. goods (i)	-32	- 6	-15	S	10	1945-61	

(continued)

TABLE IV-10 (continued)

Classification Based on Median Timing at Business Cycle	Series <sup>a</sup>		Median Lead (-) or Lag (+), in Months at:			Differ- ence Between Peak and Trough Timings <sup>b</sup> (7)	No. of Timing Observed All Turns (8)	Period Covered by Timing Observations <sup>c</sup> (9)
	Peaks (1)	Troughs (2)	Peaks (4)	Troughs (5)	All Turns (6)			
						S	14	1919-61
		62. *Unit labor cost, mfg. (i)	-13	-6	-7½	S		
		68. *Unit labor cost, real corporate GNP (Q) (i)	-23	-4	-8	S	7	1948-61
3. Long lead (> 6 mos.)	Coincident	30. Nonagr. placements	-11	-1	-3	S	9	1945-61
	(-1½ to +1½ mos.)	4. Temporary layoffs (i)	-13	-½	-9	S	7	1948-61
		5. Initial unemp. claims (i)	-17½	0	-6	S	9	1945-61
		9. Bldg. contracts, com. & indus.	-9	-1½	-2	S	15	1919-61
		21. Change in bus. inventories (Q)	-8	+½	-2	N	19	1921-61
		37. % reptg. higher inventories	-8	-1½	-4½	S	8	1948-61
		40. Unemp. rate, married males (i)	-15	+1	-5½	S	4	1957-61
		45. Insured unemp. rate (i)	-11	0	-2	S	7	1949-61
4. Short lead (2-6 mos.)	Short lead (2-6 mos.)	19. Stock price index	-4½	-4½	-4½	N	40	1873-1961
		11. New cap. approp., mfg. (Q)	-6	-3	-4½	N	6	1953-61
		13. New incorporations, no.	-4½	-6	-5	N	42	1860-1961
		15. Large bus. failures, no. (i)	-5	-6	-6	N	34	1894-1961
5. Short lead (2-6 mos.)	Coincident	16. Corporate profits (Q)	-6	-1½	-2	N	19	1920-61
	(-1½ to +1½ mos.)	23. Indus. materials prices	-6	-½	-2	S	19	1919-61
		42. Nonagr. employ., l.f. survey	-4	-1	-1½	N	10	1945-61
		46. Help wanted advertising	-3	0	0	N	19	1919-61
6. Short lead (2-6 mos.)	Short lag (2-6 mos.)	43. Unemployment rate (i)	-4	+2	0	S	13	1929-61
7. Coincident (-1½ to + 1½ mos.)	Short lead (2-6 mos.)	50. GNP in constant \$ (Q)	0	-3	0	N	13	1921-38, 1948-61
		51. Bank debits outside N.Y.C.	+1½	-3	-1	S	33	1879-1961
		52. Personal income	+1	-2	-1	S	17	1921-61

(continued)

TABLE IV-10 (concluded)

Classification Based on Median Timing at Business Cycle	Peaks (1)	Troughs (2)	Series <sup>a</sup> (3)	Median Lead (-) or Lag (+), in Months at:			Difference Between Peak and Trough Timings <sup>b</sup> (7)	No. of Timing Observations, All Turns (8)	Period Covered by Timing Observations <sup>c</sup> (9)
				Peaks (4)	Troughs (5)	All Turns (6)			
8. Coincident									
(-1½ to +1½ mos.)		Coincident (-1½ to +1½ mos.)	41. Nonagr. employ., estab. survey	- 1	0	0	S	23	1914-61
			47. Industrial production	0	- 1	- 1	N	36	1890-1961
			49. GNP in current \$ (Q)	0	- 1	0	N	15	1921-61
			54. Retail sales	+ 1	- ½	+ ½	N	12	1919-61
			53. Labor income, min., mfg., constr.	0	0	0	N	20	1929-61
			55. Wh. prices ex. farm & food	0	+ 1	+ 1	N	14	1913-61
9. Coincident									
(-1½ to +1½ mos.)		Short lag (2-6 mos.)	61. Plant & equip. expenditures (Q)	+ ½	+ 2	+ 1	N	14	1918-38, 1948-61
10. Short lag									
(2-6 mos.)		Coincident (-1½ to +1½ mos.)	57. Final sales (Q)	+ 3	- 1½	+ 1	N	15	1921-61
11. Short lag									
(2-6 mos.)		Short lag (2-6 mos.)	64. Mfrs. inventories, total	+ 2½	+ 3	+ 3	N	16	1926-61
			65. *Mfrs. inventories, fin. goods	+ 5	+ 4½	+ 5	N	11	1938-61
			66. Cons. instal. credit outs.	+ 6	+ 3	+ 4½	N	10	1921-61
			67. *Bank rates, bus. loans (Q)	+ 5	+ 5	+ 5	N	18	1919-61
12. Long lag									
(> 6 mos.)		Long lag (> 6 mos.)	62. *Unit labor cost, mfg.	+ 7	+ 9	+ 7½	N	14	1919-61
			68. *Unit labor cost, real corporate GNP (Q)	+ 7	+ 8	+ 7	N	8	1948-61

<sup>a</sup>All series except those marked quarterly (Q) are monthly. Series marked (i) are treated as conforming invertedly to business cycles (troughs in the series are matched with business cycle peaks, and peaks with troughs). The numbers preceding the titles of the series are the identification numbers used in *Business Cycle Developments*, Dept. of Commerce. For further identification, see the back cover page of that publication. In a number of instances, historical data for a closely related series are used prior to the initial date covered by the series used currently. The principal instances of this sort are: 7 (prior to 1939, resid. bldg. contracts, fl. sp.); 15 (prior to 1948, mfg. only); 29 (prior to 1954, resid. bldg. contracts, fl. sp.); 41 (prior to 1929, mfg. only); 47 (prior to 1919, Babson's index of bus. activity); 51 (prior to 1919, clearings outside N. Y. C.); 54 (prior to 1955, dept. store sales); 61 (prior to 1947, mfg. only).

<sup>b</sup>Difference between mean (not median) timing at peaks and at troughs significant (S) or not significant (N), according to *t* test at .05 level.

<sup>c</sup>Period from first to last business cycle turn covered by or matched with the series.

\*Double analysis: treated as conforming positively with a lag and invertedly (i) with a lead.

**TABLE IV-11**  
**SUMMARY CROSS-CLASSIFICATION OF FIFTY-TWO INDICATORS,**  
**BY TIMING AT PEAKS AND TROUGHS**

<i>Median Timing at Business Cycle Peaks</i>	<i>Median Timing at Business Cycle Troughs</i>					Total
	Long Lead (>6 mos.)	Short Lead (2-6 mos.)	Coin- cident (-1½ to +1½ mos.)	Short Lag (2-6 mos.)	Long Lag (>6 mos.)	
	NUMBER OF SERIES					
Long lead (>6 mos.)	3	15	8			26
Short lead (2-6 mos.)		4	4	1		9
Coincident (-1½ to +1½ mos.)		3	6	1		10
Short lag (2-6 mos.)			1	4		5
Long lag (>6 mos.)					2	2
Total	3	22	19	6	2	52

NOTE: The four series treated both positively and invertedly in Table IV-10 are here counted only on a positive basis.

group at peaks and at troughs (Table IV-11). There is a decided tendency for peak and trough behavior to be correlated. In part, however, this is owing to the effort, in the original selection of these indicators, to choose those that behaved in roughly similar fashion at both peaks and troughs. In the general population of economic time series, the correlation doubtless would be less marked, though still present. Another notable result is that, where the peak and trough timing classification is different, it is generally in the direction of later timing at troughs. Only 4 series of the 52 are classified in an earlier group at troughs than at peaks (groups 7 and 10 in Table IV-10).

Where the peak and trough timing of a series is different, the difference is not always significant. Column 7 in Table IV-10 is an aid in judging significance but not fully reliable, either. The results reported in that column take account only of the information provided by the individual series for the period it covers (column 9). The behavior of a closely related series, which may extend over a longer period, have a somewhat different coverage, or be available monthly instead of only quarterly, sometimes suggests a different conclusion.

In considering the similarities or differences in timing of the several indicators, caution is especially required when the periods covered are not the same. For example, the 'median lead at peaks for the total unemployment rate is 4 months, for the insured unemployment rate, 11 months, and for married males alone, 15 months. But these medians are based on six peaks, three peaks, and two peaks, respectively. Examination of the series themselves for the period when all three are available suggests that the medians exaggerate the differences among them. Nevertheless, all three unemployment rates show a median lead at peaks and a lag or coincidence at troughs, confirming what one would expect of series with roughly horizontal long-run trends.

In order to determine whether use of the same period for all series would substantially alter the classification, and also to test whether use of a recent period would yield very different results, an alternative table was constructed in which all series were classified by their median leads and lags 1948-61. Of the 41 series that extended farther back than 1948, 11 fell into a different group at peaks and 9 into a different group at troughs. That is, about

three-fourths remained in the same group whether classified on the basis of the full period covered or 1948-61. The shifts were always to an adjacent group, i.e., from coincident to short lead, or short lead to long lead, never from lead to lag. Furthermore, in nearly every instance the full period classification of the series seemed more representative of the series' typical behavior, either on economic grounds or because the shorter-period results were more affected by extreme observations. This type of comparison is not particularly sensitive to changes in behavior, since the shorter period is included in the longer. Nevertheless, it appears that such secular changes in cyclical timing as occurred are not obtrusive enough among these series to affect seriously a classification based, as in Table IV-10, on the entire historical record of each series.

Four series are entered in the table both as leaders and as laggers. In general, when a series' troughs and peaks consistently lag behind business cycle troughs and peaks,<sup>5</sup> the troughs can also be said to lead business cycle peaks and the peaks to lead business cycle troughs. In some cases, the rationale for such "inverted" comparisons is clear. Unit labor costs and bank interest rates usually are pulled up, with some lag, by the processes that come into play as a business recovery begins. But increases in costs and rates can also exert a depressing influence on decisions to invest, hence becoming part of the process bringing business expansion to an end. Similarly, as a consequence of a decline in production and sales, manufacturers' finished-goods inventories eventually turn down, but the reduction in these stocks is one of the factors helping to pave the way for a later upturn in production. We have not subjected to a double analysis all the series that might conceivably be so treated, but only those for which the rationale and the evidence seemed to be clearest.

Compared with the classification used in *Business Cycle Developments* (30 leading, 15 roughly coincident, 7 lagging), which does not distinguish peak and trough behavior, the present grouping is not very different at peaks. The 30 series in the leading group are all to

be found in either the long lead or the short lead class in Table IV-10. Of the 15 roughly coincident, 2 become long leaders (insured unemployment and married male unemployment rates), 3 short leaders (total unemployment rate, help-wanted advertising, and non-farm employment, labor force survey), 1 short lagger (final sales), while 9 remain coincident. And 6 of the 7 lagging series are short or long laggers, one moving to the coincident class (plant and equipment expenditure). Hence in all only 7 series are shifted significantly. The unemployment rates and help-wanted advertising series clearly belong among those that lead, at least briefly, at peaks. Plant and equipment spending has shown only a barely perceptible tendency to lag at peaks, hence its coincident classification at peaks is not unreasonable.<sup>5</sup> The most doubtful shift is that of nonfarm employment (labor force survey) to the short-lead group. This is not consistent with the coincident classification of the establishment survey series, which is longer, smoother, and has more sharply defined cyclical swings. Nevertheless, in the 1948-61 period alone, the establishment series does fall into the short-lead group at peaks.

The grouping according to timing at troughs differs more widely from the *Business Cycle Developments* classification. Three of the 30 leaders are long leaders, 19 are short leaders, 8 are coincident. Actually, the medians for 6 of the 8 coincident series are leads, but none exceeds a month and a half. Evidently there are slight tendencies among these 8 series to turn promptly with or shortly before an upturn in business activity. Most of them have counterparts among the series classified as leaders at troughs. But our criterion for coincidence, which allows a median lead or lag up to a month and a half, does not permit this tendency to be recognized in the classification.

As for the 15 roughly coincident series in *Business Cycle Developments*, 11 appear in the coincident group at troughs, 3 become

<sup>5</sup>The record shows 5 lags (3 of only one month each), 4 coincidences, and 1 lead. Since the series is quarterly rather than monthly (but is compared with the monthly business cycle dates), the timing observations lack some precision.

short leaders (GNP in constant dollars, bank debits outside New York City, and personal income), and one a short lagger (unemployment rate). The three short leaders have strong upward trends and relatively slight cyclical amplitudes because of their broad coverage, which may explain their early upturns. Note, however, that in the postwar period constant dollar and current dollar GNP have reached troughs in the same quarters; the medians differ because the current dollar series extends further back. The short lags in the unemployment rate seem reasonable, as noted above. The 7 lagging series in *Business Cycle Developments* are divided between the long lag and the short lag groups at troughs.

To sum up, the provisional classification in Table IV-10 gives recognition to the tendencies among these 52 indicators for leads to be

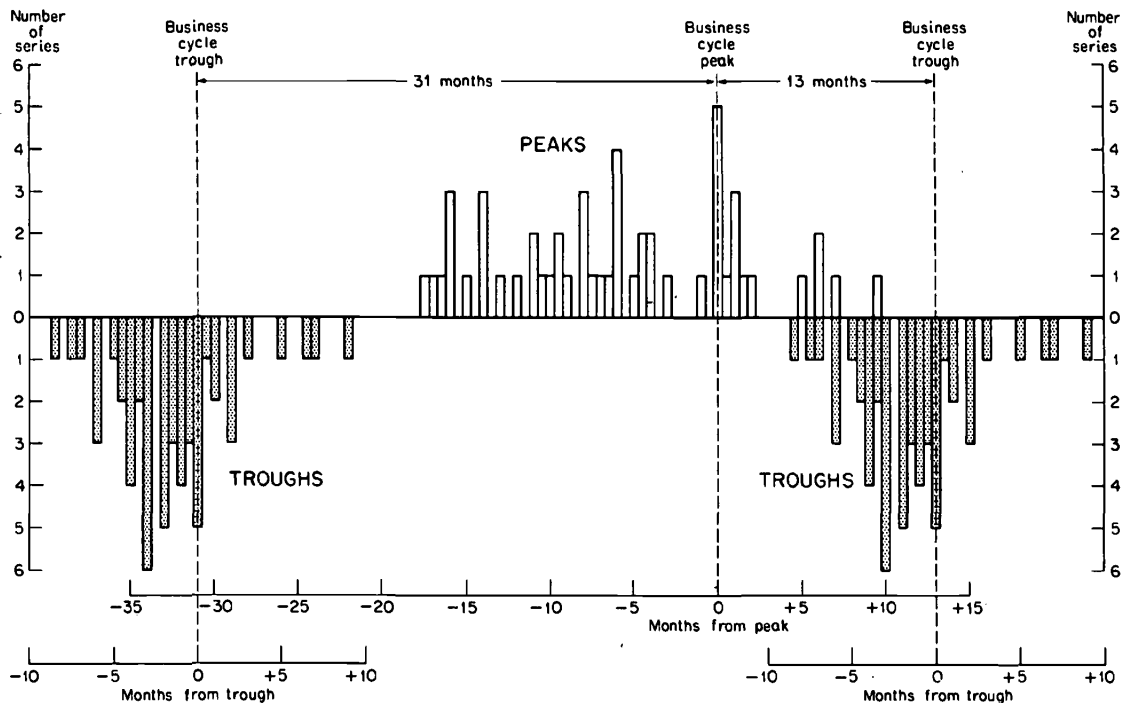
longer at peaks than at troughs,<sup>6</sup> for leads or lags to be longer in some series than in others, and for some series to lead at peaks and lag at troughs, or vice versa. It recognizes the possibility of regarding lags as inverted leads. In general, it brings out the fact that the typical sequence of change in economic processes in the vicinity of business cycle peaks is similar to but not precisely the same as the sequence at troughs.

The table also demonstrates that, typically, a long period elapses between the initial downturn associated with a business cycle peak and the final downturn, while at upturns the interval

<sup>6</sup>This tendency has appeared in the postwar period. Before World War II it did not seem to be characteristic of the series we had analyzed. Indeed, leads appeared to be longer at troughs (see *Business Cycle Indicators*, 1961, pp. 217-220). Since the prewar tendency has been reversed, the postwar tendency may eventually share the same fate.

CHART IV-1

Distribution of Median Leads and Lags of Fifty-Two Indicators During an Average Business Cycle



NOTE: The time scale is based on the median duration of 10 business cycle expansions (31 months) and 10 contractions (13 months), 1919-61. The four series treated both positively and invertedly in Table IV-10 are counted only on a positive basis.

is shorter but still not brief. This point illuminates a vital aspect of business cycles: their continuity. When the median leads or lags at peaks of the 52 indicators are arrayed, they range from a lead of 17½ months to a lag of 9½ months (ignoring the leads in the four series treated both invertedly and positively). Now, 17½ months is about half the length of an "average" business cycle expansion, and 9½ months is more than half an "average" contraction. In the 10 cycles from 1919 to 1961, the average (median) expansion was 31 months, the average contraction 13 months. On the other hand, the medians at troughs range from a lead of 8½ months, which is a bit more than one-half the average contraction, to a lag of 9 months, which is nearly one-third of the average expansion. The picture, then, is of cyclical turns in different processes spread throughout the cycle in a nearly continuous round. It is, of course, a schematic picture, since we are dealing with averages and abstracting from the wide cycle-to-cycle variations in the length of expansions and contractions as well as in the leads and lags.

Chart IV-1 displays the medians of the 52 indicators on a time scale based on the above averages. The wide scatter at both turns, the virtual overlapping of the peak with the trough distributions, the greater concentration at troughs, and the greater frequency of leads than of lags in this collection of indicators are all revealed. The business cycle of experience is far more than a movement up and down in aggregate economic activity. Lagged responses of different economic processes are a vital element. It is hoped the chart and the table upon which it is based, provisional though they are, may contribute to an understanding of that element.

GEOFFREY H. MOORE

## MONEY AND BANKING

With the publication of *A Monetary History* in November 1963, we turned our full attention to revision of the draft of "Trends and Cycles in the Stock of Money," a companion study.

The study presents and analyzes statistical evidence on the behavior of the money stock and related economic magnitudes during business cycles and over longer time spans, and on the demand for money.

The cyclical studies in the existing draft, based on monthly data for money beginning 1907 and annual or semiannual data for earlier years back to 1867, deal with timing relations between changes in money and several measures of business conditions, and comparisons of amplitude changes in cyclical phases in the two sets of variables.

Because of the saw-tooth behavior characteristic of monthly change series, we are now experimenting with quarterly change series in their original and smoothed forms. We have compiled a quarterly change series for money stock back to 1867, and expanded the list of series that money might have influenced or been influenced by. In analyzing the data, we plan to use results obtained from electronic computer programs.

In addition to supplementing the studies in the existing draft on cyclical and secular behavior of the money stock and on the analysis of the demand for money, we plan to present results of spectral analysis.

Phillip Cagan's monograph, "Determinants and Effects of Changes in the Stock of Money, 1875-1955," has been approved by the Board of Directors and will shortly go to press.

ANNA J. SCHWARTZ  
MILTON FRIEDMAN

## LABOR TURNOVER

This study deals with the analysis of labor turnover during business cycles in the United States. Labor turnover rates measure components of changes in employment, and employment fluctuations are, of course, a major aspect of cyclical fluctuations in labor input. A study of the cyclical behavior of labor turnover may thus enlarge our understanding of employment cycles. Moreover, analysis of labor turnover is instructive in its own right—as a reflection of labor mobility, as a factor of labor cost to

the employer, as a measure of frictional unemployment, as an indicator of current and impending economic activity, and in several other ways.

An important factor in the explanation of the behavior of labor turnover, particularly that of new hires and voluntary quits, is the number of existing job openings. Thus the analysis will be concerned, in part, with measures of these vacancies and their cyclical behavior.

Data on major labor turnover rates in manufacturing, on job openings at employment offices, on help-wanted advertising, and on other related activities have been collected,

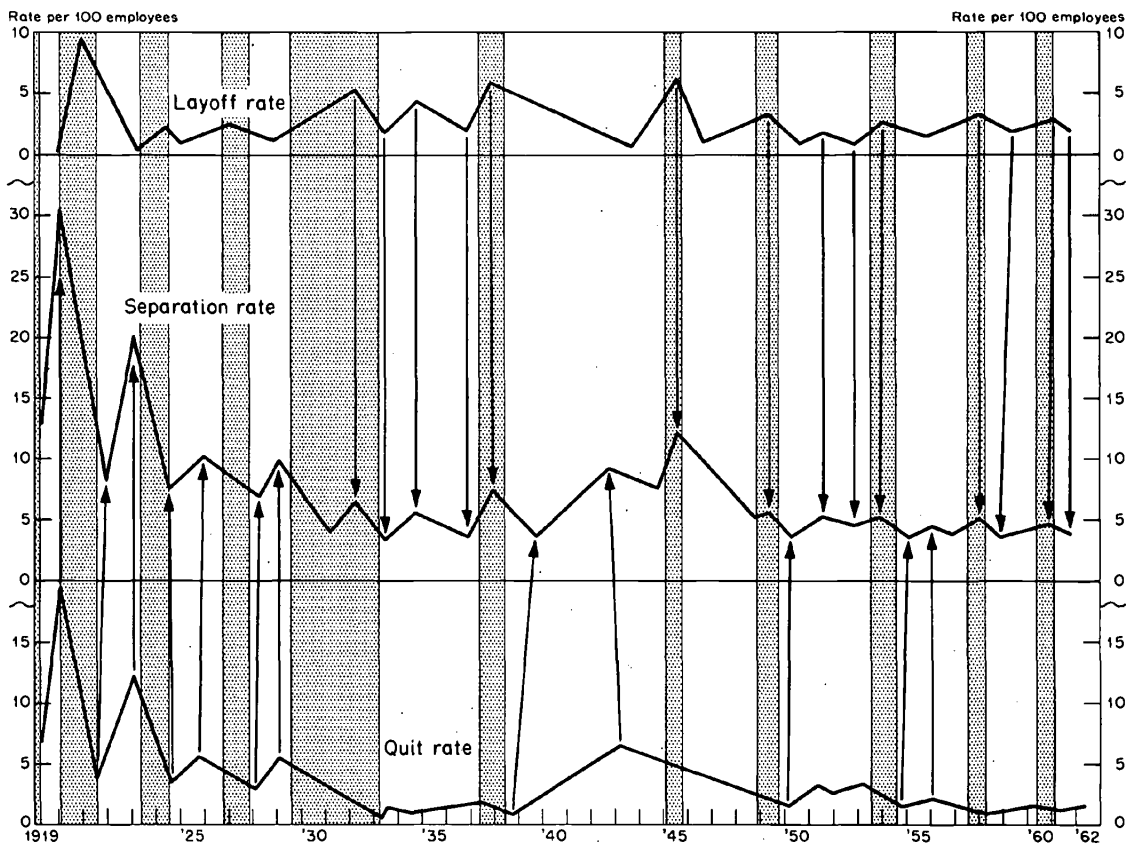
seasonally adjusted, charted, and subjected to standard business cycle analysis. The first part of the cyclical analysis deals with the conformity of labor turnover rates to cycles in the economy at large. Some elements of the behavior of the separation rate and the gross accession rate, the two components of the net accession rate, are reported below.

#### SEPARATION RATE

The major components of the separation rate (number of persons leaving their jobs, per 100 employees) move cyclically in opposite directions, quits in direct conformity with general

CHART IV-2

Separation Rate and Its Components, Manufacturing, Simplified Movements, 1919-62



Shaded areas represent business cycle contractions; unshaded areas, expansions.



business conditions and layoffs inversely. Hence, the question arises whether one of the components is either large enough or has large enough amplitude to dominate the total. It has been claimed that the separation rate is dominated by quits rather than by layoffs and is thus positively related to cyclical changes in the economy as a whole. However, it would be surprising if, during severe depressions, separations were dominated by voluntary quits. If separations were dominated by quits, it would seem curious also that, after 1929, separations have tended to lag business cycle turns while quits tended to show leads at peaks

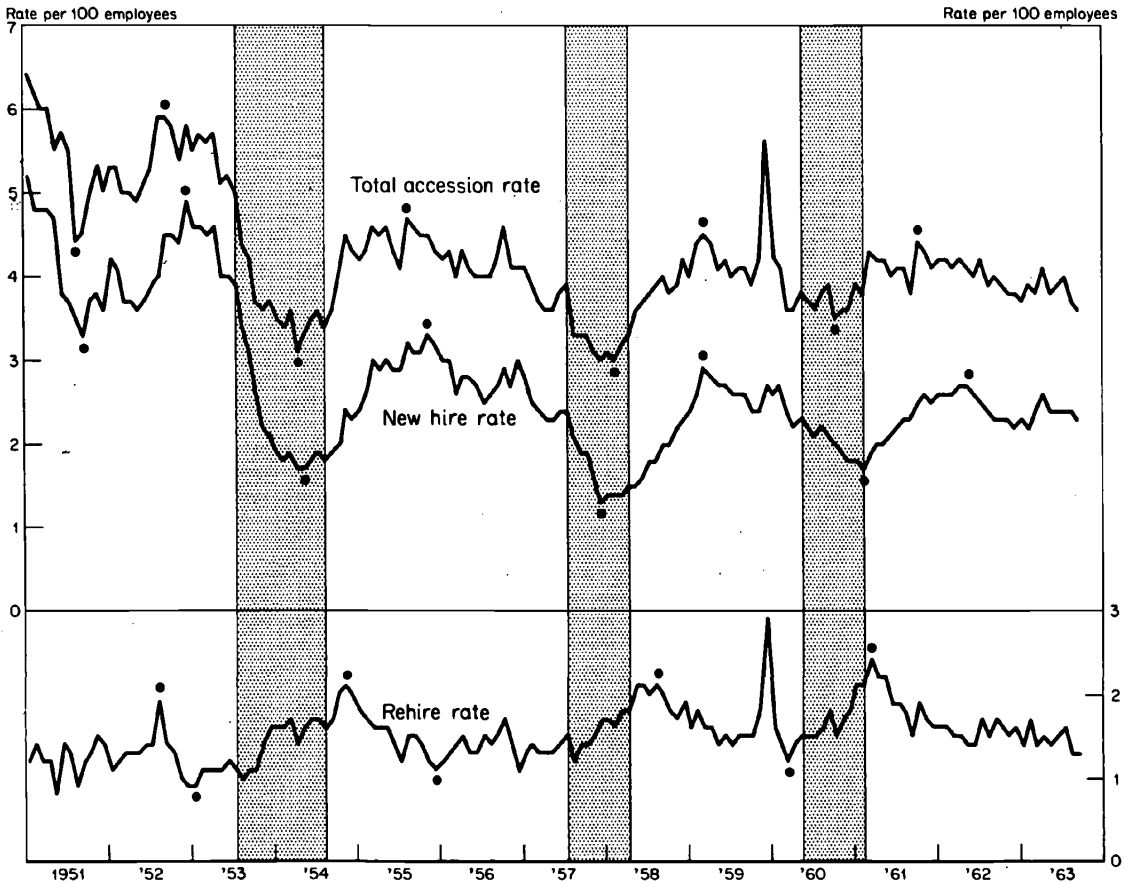
and lags only at troughs. The relative importance of quits and layoffs seems to merit examination.

Chart IV-2 presents a simplified version of the three seasonally adjusted time series. Only the levels (3-month averages) at specific peaks and troughs are connected; all intermediate movements are left out. The vertical lines, connecting the turns in separations to apparently associated turns in either quits or layoffs, show how the cyclical turns of the total are affected by those of the components.

Up to 1929, the quit rates obviously dominated the total. During the Great Depression

CHART IV-3

Accession Rate and Its Components, Manufacturing, 1951-63



NOTE: Shaded areas represent business cycle contractions; unshaded areas, expansions. Dots identify peaks and troughs of specific cycles.

and up to World War II, the layoff rate was governing. During the war, quits again dominated, but the postwar demobilization was of course largely brought about by layoffs. Since then, the picture has been mixed. It is thus clear that the relative importance of quits and layoffs is a function of the dominant labor-market forces. In view of historical experience since 1929, the thesis of the dominance of separations by quits must be abandoned.

The analysis also suggests that, in spite of a measured perfect positive conformity, if a half-year lag is taken into consideration, the separation rate does not really respond in a consistent fashion to the ups and downs of business activity. Depending upon the domination of the separation rate by quits or by layoffs, the conformity is sometimes positive, sometimes inverse, and the measured lags must, on occasion, be understood as inverted leads associated with turns in the layoff rate.

#### ACCESSION RATE

Total accessions may also be regarded as a resultant of two components, new hires and rehires. A breakdown of the total accession rate into the new-hire rate and the rehire rate is available only from 1951 on. The hiring of new employees, understandably, moves in direct conformity with business cycles: the new-hire rate rose in all expansions and declined in all contractions.

The rehire rate also might be expected to be positively related to cycles in general business conditions since, presumably, laid-off workers would be rehired when business conditions pick up and the demand for labor increases. That this expectation is not borne out by historical experience can be seen in Chart IV-3. In fact, in every business cycle contraction since July 1953, the rehire rate increased, and in every expansion it declined. How can this countercyclical behavior be explained? There are two major reasons for it, one related to the behavior of firms laying off workers, the other to the behavior of the laid-off workers.

The technology of most industries and plants is such that the workforce cannot be reduced

easily by dismissing workers here and there and letting the rest continue to work. Employment is often reduced by shutting down an entire plant or department or production line for a short period (until existing inventories are used up or new orders are received) and then rehiring most employees and working again with a normal complement. Obviously, for plants that adjust their labor input in the described way, rehires may increase during business cycle contractions when layoffs rise, and decline in expansion when layoffs fall. During contractions the rehire rate, while increasing, may remain below the layoff rate with a net negative effect on employment; during expansions employment increases are brought about through high levels of the new-hire rate. The practice of short layoffs is, of course, not necessarily followed for all operations or at all times. It often happens that workers are laid off until business improves. In that case, workers will tend to seek other employment and become "new hires." The longer such layoffs last, the smaller the chance that the laid-off workers will still be available for rehiring. These two forces act together in such a way that the majority of rehires occur relatively soon after layoffs. This explains the perfect inverse conformity of the rehire rate.

Since new hires conform positively to the business cycle and rehires inversely, total accessions, like total separations, consist of two cyclically divergent segments. However, while layoffs and quits—the major components of separations—are to a considerable extent independently determined, new hires and rehires are not. The primary determinant of accessions, at least during expansion periods, is the need for additional labor—a need satisfied by rehires, if former employees are available, and by new hires otherwise. Hence there can be no doubt about the positive cyclical conformity of total accessions, despite the fact that one of its components conforms inversely.

During most of the period since 1951, the level of the rehire rate was lower than that of the new-hire rate and, as Chart IV-3 shows, the movements of the new-hire rate are similar to those of the total accession rate. The excep-

tions to this rule are short-term episodic movements. When there is a very short slack in the demand for labor—as, for instance, the one caused by the steel strike at the end of 1959—a large number of workers are rehired soon after they are laid off and the change in total accessions consists almost entirely of a change in rehires.

CHARLOTTE BOSCHAN

#### **SOURCE BOOK OF STATISTICS RELATING TO INVESTMENT IN THE UNITED STATES**

The purpose of this project, which is supported by a grant from the National Science Foundation, is to make available to the public the broad collection of historical series on physical investment contained in the National Bureau's files, supplemented, when necessary, with newly compiled data. These are to be presented with seasonal adjustments, summary measures of cyclical behavior, and descriptions of sources, of methods of collection, and other characteristics.

The scope of the source book has been revised in two respects. In order to provide data useful not only for cyclical analysis but also for historical studies of economic growth, we have added to the more than 200 monthly and quarterly series about 200 annual series which extend farther back or fill certain gaps in content. At the same time, we decided to omit series on stocks of capital assets, limiting the coverage to new investment. The revised list has been sent to a number of economists for review, and their comments and suggestions will be helpful as the work proceeds.

Work to date has been concentrated on the construction series, which include contract awards, building permits, starts, and expenditures for approximately twenty categories and subcategories of construction. Most of the compilation has been done and writing of descriptions has been completed for series on construction contracts and on value of construction put in place. Publication of the section on construction series before completion

of the entire work is under consideration.

A plan has been formulated for tabular presentation of information on cyclical behavior of the investment series. Most of these measures will be available from the National Bureau's electronic computer program of cycle analysis.

According to the plan, the following will be shown for each of a selected list of series:

#### **Table 1, Specific Cycle Analysis**

Specific cycles covered by averages: number, period  
Average duration of specific cycles, in months: expansions, contractions, cycle  
Average amplitude of specific cycles, in cycle relatives: total rise or fall; per month rise or fall  
Average percentage rate of growth per month between specific cycle bases

#### **Table 2, Reference Cycle Analysis**

Business cycles covered: number of expansions and contractions; period  
Timing at business cycle peaks and troughs: number of timing comparisons; median lead or lag in months  
Indexes of conformity to business cycles, based on: synchronous timing; median timing  
Average standing, in cycle relatives, at stages I through IX

ROBERT E. LIPSEY  
DORIS PRESTON

#### **RESEARCH ON ELECTRONIC COMPUTER APPLICATIONS**

Plans have been drawn and work started on a series of Technical Papers dealing with application of electronic computers to economic research. The reports are designed to acquaint potential users of our programs with the basic elements of the techniques, to guide them in operational problems, and to assist them in the interpretation of output tables. The first topic will be the National Bureau's business cycle analysis. In the past, use of this analysis has been limited by the volume of computations required. The computational problems have disappeared with the availability of our electronic computer program. The proposed paper

will briefly describe the main features of the technique and illustrate some of our experiences with its application.<sup>7</sup> It will of course contain the technical detail necessary for using the computer program. Technical Papers on other subjects are also planned.

As in prior years, we provided assistance in the electronic processing of statistical analyses for other National Bureau projects. Among the projects using substantial amounts of machine and programming time were studies of mortgage interest rates (Gutentag, Beck), business cycles and forecasting (Moore, Shiskin), long swings in labor force growth (Eastlerin), automobile financing (Shay), and purchases of consumers' durables (Juster). In connection with the mortgage rates study we wrote some special purpose programs. They involved computation of effective interest rates, with consideration of contract rates, discount rates, term of loan, and repayment period. We also programmed the computation of analytic measures of loan characteristics for a wide variety of cross-classifications.

A binomial expansion program was prepared for use in determining the probabilities with which (1) conformity of specific activities to business cycles might occur due to chance, and (2) leads or lags around business cycle turning points might cluster in designated groups. We also wrote a small program to measure the dispersion of leads and lags around business cycle peaks and troughs. The programs can be applied also to other problems.

We have adapted for the IBM 7090 the X-9 version of the Census Bureau's seasonal adjustment program. One of the advantages of this version over the original Census II program is that the seasonal factors for current years are more stable. Furthermore, in the derivation of seasonal factors from the ratios to moving average, extreme values are replaced by averages of adjacent ratios, rather than by averages of the extreme and the adjacent ratios. So far, the program is available only for multiplicative seasonal analysis.

<sup>7</sup>The basic description of the technique is contained in Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, New York, NBER, 1946.

Our programs are being used by other academic institutions and government agencies. Apart from sustained demand for the various seasonal adjustment programs, requests have been met for the business cycle analysis program and for the frequency and income distribution program. The latter was used by the Internal Revenue Service in connection with long-term projections of tax revenue. Through SHARE, the appropriate users' organization, the following programs are available (IBM-709/90): multiplicative seasonal analysis (distribution no. 1310), additive seasonal analysis (1464), frequency distribution analysis (1400), and business cycle analysis.

Among our plans for the current year is addition of the following programs to our basic stock: correlation analysis with programmed selection of variables, analysis of variance, diffusion index analysis. We plan to write a program which will permit evaluation of the effect of varying time spans of first differences on the regression and correlation between two variables. Wherever possible, we shall use or modify existing programs. In addition, we have a backlog of modifications of our standard programs, including seasonal adjustments by regression method and incorporation of causal variables into the seasonal adjustment process. Finally, we plan to investigate existing equipment for electronic charting and its potential application to National Bureau needs.

This research program is supported by a grant from the International Business Machines Corporation as well as by general funds of the National Bureau.

CHARLOTTE BOSCHAN  
GERHARD BRY

#### OTHER STUDIES

*Trends and Cycles in the Commercial Paper Market* (Occasional Paper 85), by Richard T. Selden, a report growing out of the study of consumer finance, was published. Thor Hultgren's manuscript, "Cost, Prices, and Profits: Their Cyclical Relations," is being prepared

for press. Ruth Mack is revising the draft of her report, "Fluctuation in Materials Stocks on Hand and on Order." Victor Zarnowitz has nearly completed the draft of his study, "Orders and Production in Manufacturing Industries: Cyclical Analyses." Thomas M. Stanback's work on capital appropriations, investment

expenditures, and profits has been interrupted while he is engaged in the study of the effect of tax laws on modernization expenditures in the textile industry (see section 1).

For other reports on business cycle studies see those by Cagan, Earley, and Atkinson in section 4 and by Mintz in section 5.

## 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 and determinants of interest rates. The objectives and some of the preliminary findings of the several projects are described below. A fuller account of the study as a whole appears in Part II. Manuscripts nearing completion are "The Cyclical Behavior of the Term Structure of Interest Rates," by Reuben A. Kessel; "Yield Differentials Between Newly Issued and Seasoned Securities," by Joseph W. Conard; "Seasonal Variations in Interest Rates," by William H. Brown, Jr.; "Cyclical Variations in Interest Rates," by Phillip Cagan; and "Yields on Direct Placements," by Avery Cohan.

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; W. A. Clarke, W. A. Clarke Mortgage Company; George T. Conklin, Jr., Guardian Life Insurance Company of America; Milton Friedman, University of Chicago; Raymond W. Goldsmith, National Bureau of Economic Research; 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, National Bureau of Economic Research; James J. O'Leary, Life Insurance Association of America; Roy L. Reiersen, Bankers Trust Company; Eli Shapiro, Harvard University; Henry C. Wallich, Yale University; C. Richard Youngdahl, Aubrey G. Lanston and Company.

JOSEPH W. CONARD

WILLIAM H. BROWN, JR.

### CHANGES IN THE CYCLICAL BEHAVIOR OF INTEREST RATES SINCE 1878

Dramatic changes have occurred in the cyclical behavior of interest rates since the 1880's. Analysis of a broad group of rates shows that some rates have been subject to special developments, such as the diminished role of the call loan market, and some periods to special influences, such as the Federal Reserve bond support program in the 1940's. Apart from these instances, interest rates have generally conformed closely to business cycles, but the cyclical pattern displays significant changes in timing and amplitude.

The lag in turning points of bond yields relative to business peaks and troughs, which was quite long before World War I, has shortened considerably. In recent cycles the lag has virtually disappeared. Changes in the timing of short-term rates are less clear, but their lag appears somewhat shorter in the 1950's compared with the 1920's. The amplitude of cycles in interest rates (in terms of basis points) has

increased over time. For most bond yields, amplitude increased fairly steadily. It was greater in the 1920's than the pre-1914 period, and greater in the 1950's than the 1920's. Since the latter 1800's the amplitude of bond yields has approximately doubled. An increase about half as great has occurred in short rates also, but mainly since the 1920's.

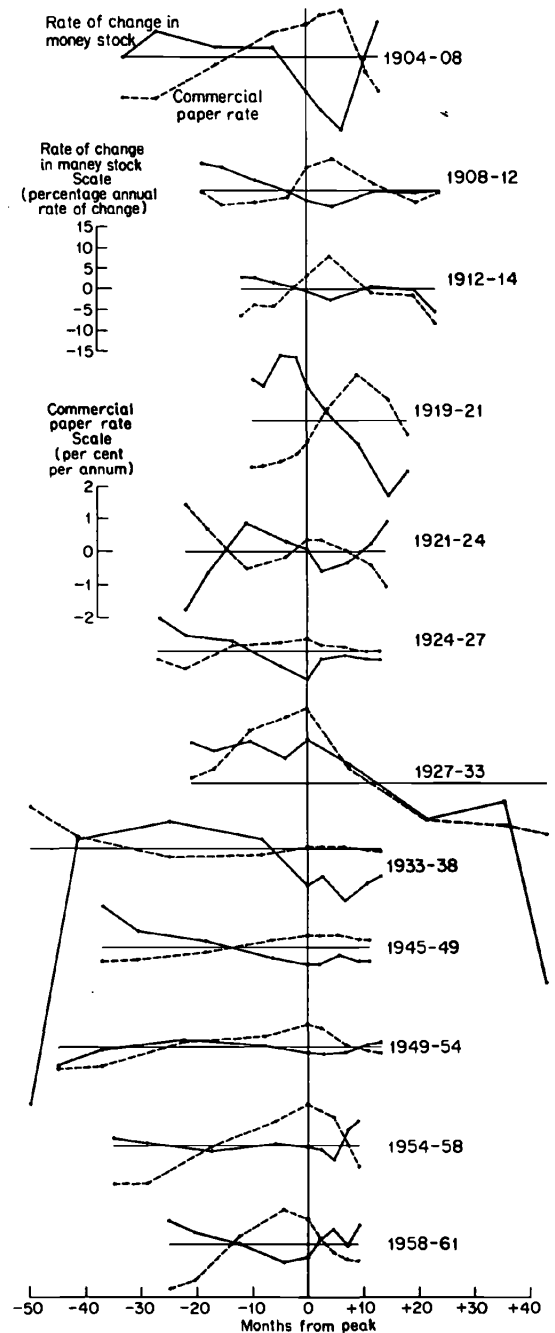
The amplitude increases are not simply a result of the shortened lag, because they show up more strongly measured over specific cycles in the rates than measured over reference cycles. A regression analysis which adjusts amplitudes by the severity of the corresponding movement in business activity shows the same increase. Since it is likely that the total demand to borrow funds for investment expenditures is closely correlated with the severity of cycles in business, this demand does not appear to explain the secular shift in amplitude and particularly in timing of interest rates. Factors affecting the supply of loanable funds offer a more promising explanation.

One important source of the supply of funds is commercial banks. The funds they supply to the capital market are represented by the rate of growth of the money stock. Cycles in that growth rate correspond to reference cycles, but the timing varies considerably. Yet, on an inverted basis, the rate of monetary growth correlates closely with most interest rates. The accompanying chart shows the association with commercial paper rates. The only major divergence from an inverted relation during the 1904-61 period was in the 1929-33 reference contraction. Otherwise, the inverted association is generally strong, particularly for movements in the two series not conforming to reference cycles, which rules against a spurious relation reflecting common responses to business cycles. Regression analysis supports this conclusion. The association is most plausibly explained as the effect of the monetary growth rate on interest rates. The reverse effect would produce a positive relation.

Analysis of the association with other interest-rate series and for earlier cycles confirms the inverted association. Furthermore, changes in the cyclical timing of the monetary growth

CHART IV-4

Reference Cycle Patterns of Commercial Paper Rate and Rate of Change in Money Stock, 1904-14, 1919-38, 1945-61 (absolute deviations from cycle averages)



rate (inverted) help to explain the shortened lag of interest rates described above. Cycles in monetary growth also contributed to the increased amplitude of interest rates, though apparently other factors play a role, too.

A detailed report on the findings is in preparation.

PHILLIP CAGAN

#### YIELDS ON DIRECT PLACEMENTS

The prime purpose of this study has been to measure changes since 1950 in yields on direct placements and in quality of those placements. Direct placements are long-term debt issues sold directly by corporate borrowers to financial institutions — mainly life insurance companies. All the data on which the study is based were supplied by insurance companies.

In general, regression analysis is being used in an attempt to isolate the variables that tend to be responsible for differences in yield. The variables are then being used to classify issues. The hope is, of course, that such a procedure will produce series on yields which are reasonably homogeneous through time. Separate series for industrials, public utilities, and finance companies are planned.

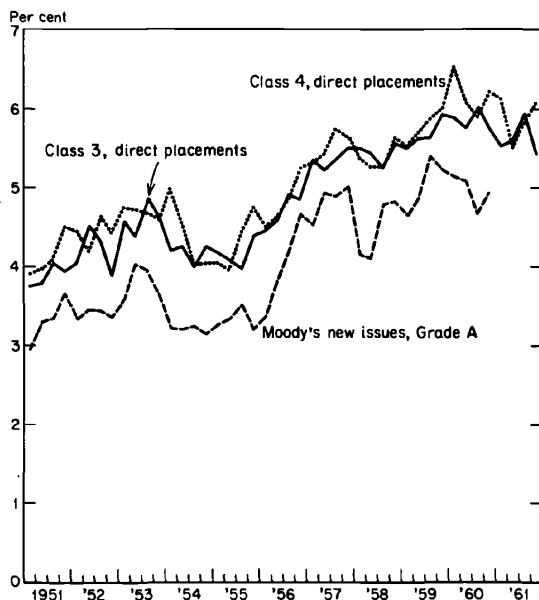
All regressions on industrials have now been run and preliminary quarterly yield series constructed for four out of six quality classes. These series contain some inconsistencies but, by and large, they follow closely the major movements in series on yields on new publicly placed issues of roughly comparable quality. Yields for classes 3 and 4, representing yields on medium-quality direct placements, are shown in Chart IV-5, together with Moody's yields on new public offerings of Grade A issues.

Other findings of interest on industrials are, thus far:

1. The variables that exert the most influence on yield are total capitalization, times interest earned, earnings before interest and taxes, the size of the issue, duration of the issue (as measured by both maturity and average term), and type of security (senior debentures, subordinated debentures, mortgage bonds, etc.).

CHART IV-5

Industrials, Yields on Direct Placements, Classes 3 and 4, and Moody's Yields on New Issues, Grade A, Quarterly, 1951-61



2. The effects of these variables on yields were all in the expected direction except, perhaps, maturity. On the average, we find that the longer the maturity of an issue, the lower the yield. (I had, incidentally, been warned by insurance company financial managers that I would find this to be so.)

3. Yields do not seem to be affected appreciably by past growth in earnings. The two growth variables—the five-year relative trend in earnings and the five-year relative trend in the ratio of earnings to sales—appeared, after other influences had been taken into account, to be virtually without influence on yield.

4. The ratio of working capital to long-term debt, and the ratio of debt to equity (both of which are highly correlated with times interest earned) showed no appreciable effect on yield.

A brief report on the foregoing findings was presented for discussion at the September meetings of the American Statistical Association.

The next step, so far as industrials are concerned, will be an attempt to isolate the source

of the "inconsistencies" in the behavior of the time series, noted above. In constructing the preliminary series, only four variables were held constant explicitly: total capitalization, times charges earned, maturity, and type of security. The other variables (see above), were left free to vary and are doubtless responsible for the observed inconsistencies.

In addition, twenty-two regressions have now been run on public utilities—with highly satisfactory results. These regressions represented the same hypothesis used for industrials, with one relatively minor exception: the ratio of working capital to long-term debt was omitted, primarily because public utilities, in general, have no working capital (i.e., the difference between current assets and current liabilities is negative in most cases).

The next step, so far as utilities are concerned, will be an attempt to isolate the significant variables and, provided this endeavor produces satisfactory results, to construct preliminary series.

Data collection and checking have been virtually completed on the issues of finance companies and a regression analysis on these issues will be run shortly.

AVERY B. COHAN

#### THE MORTGAGE MARKET

Study of the mortgage market includes analysis of factors underlying changes in mortgage yields and other terms (the time-series problem) and analysis of factors determining the structure of yields and terms, at one or more points in time (the cross-section problem). Early in the study it was decided that the time-series problem could not be explored adequately with the data then available, and plans were made to construct new series for the period since 1951 by sampling the records of large life insurance companies. In addition, as bench marks for the sample and to aid the cross-section study, we obtained complete coverage of loans authorized by participating lenders in two separate months.

Substantial progress has been made in compiling the time series for residential mortgage

loans (we hope also to cover nonresidential loans, on a much more limited scale). The loan characteristics covered include rates, net discounts, service fees, loan-to-value ratios, and maturities. The data will be broken down by type of loan (FHA, VA, and conventional), and by geographic area. Transcription and verification of data (covering roughly 150,000 loans) are almost completed, and machine processing is under way. The entire statistical operation should be completed this spring. In the meantime, we are preparing a Technical Paper in which we examine the various technical and analytical problems involved in constructing mortgage yield series and assess the usefulness and limitations of the series we are compiling.

In the cross-section study, we have applied multiple regression analysis to some 7,100 residential mortgage loans authorized by six life insurance companies in February 1960, and to 7,200 loans authorized by five companies in June 1953 (these are the time-series benchmark months). The two most important yield-determining influences turned out to be the location of property by census region, and the individual lender making the loan. The second factor embraces a variety of possible influences that we are trying to disentangle. Characteristics of the mortgage (downpayment, value of property, and loan-value ratio) had statistically significant effects on yield in some cases, but invariably the effects were small. This probably reflects a tendency of life insurance companies to limit their lending to a relatively narrow band of the risk spectrum. Variability in terms is relatively small, and what there is does not carry the risk and associated interest-rate variability characteristics of loans made by some other types of lender.

JACK GUTTENTAG  
MORRIS BECK

#### SPREADS BETWEEN YIELDS ON NEW AND OUTSTANDING CORPORATE BONDS

The Advisory Committee, reviewing a draft report on this study, recommended that we explore a number of additional questions.



Those explorations are virtually completed. A brief report on our major findings is given in my essay in Part II, above.

JOSEPH W. CONARD

#### SEASONAL VARIATION IN INTEREST RATES; HOLDING-PERIOD YIELDS

A draft of a manuscript on seasonal variation in interest rates is nearing completion. The behavior of short-term rates over the past year has tended to confirm our previous analysis. Explicitly, the seasonal in Treasury bill rates during the decade of the 1950's largely reflected seasonal unbalance in Treasury receipts. During the past few years, the seasonal appears to have been sharply reduced, primarily because of a sizable reduction in the variation of the supply of bills made available to the public and the smaller variation within the year of net cash borrowing.

A preliminary study has been undertaken on holding-period yields: that is, the annual income plus or minus the capital gain or loss for a defined period shorter than the term to maturity. Traditionally, interest-rate series have been stated in terms of yield to maturity but, for many purposes, the holding-period yield is the relevant variable in the decision of the individual investor.

There are, of course, many reasons holding-period yields are not often calculated. First, for many securities there is a large possible number of holding periods: a day, a week, a month, and so on. Second, for many investors, the holding period itself depends on past changes in market yields, expected future changes, and the investor's tax status.

A number of experiments have been carried out. They have consisted primarily of calculating realized rates of return on long-term government securities over short periods of time. Yields have been calculated for holding periods of 13 weeks, 26 weeks, 1 year, and 2-years on long-term governments and corporates. As would be expected, the shorter the holding period, the greater the variability in the realized yield. But the variability of yields

has been extremely high, ranging, for example, on a 1-year holding period from +20 per cent to -10 per cent. It is hoped that a short Technical Paper will make available a variety of series on holding-period yields for the use of other investigators.

WILLIAM H. BROWN, JR.

#### CONSUMER CREDIT

The broad objective of this study is to assess the role of consumer credit in the functioning of the economy of the United States. Attention is centered on analysis of consumer behavior, the level and structure of finance rates and costs, and the functioning of the credit markets as affected by economic forces and legislative action. The study is under the direction of Robert P. Shay and is supported by general grants from several finance companies.

During the past year, some projects were completed and work continued on others. Richard T. Selden's *Trends and Cycles in the Commercial Paper Market* (Occasional Paper 85) was published in September. *New-Automobile Finance Rates, 1924-62*, by Robert P. Shay, was published in the September issue of the *Journal of Finance* and has been reprinted as Occasional Paper 86. Paul F. Smith's book, *Consumer Credit Costs, 1949-59*, is in press. *Consumer Sensitivity to Finance Rates*, an Occasional Paper by F. Thomas Juster and Robert P. Shay, is also in press.

Wallace P. Mors's monograph, "Consumer Credit Finance Charges: Rate Information and Quotation," is under review. Philip A. Klein has completed a revision of his manuscript "Financial Adjustments to Unemployment," proposed for publication as an Occasional Paper. A summary report on the entire study is being planned. Progress on studies under way is described below.

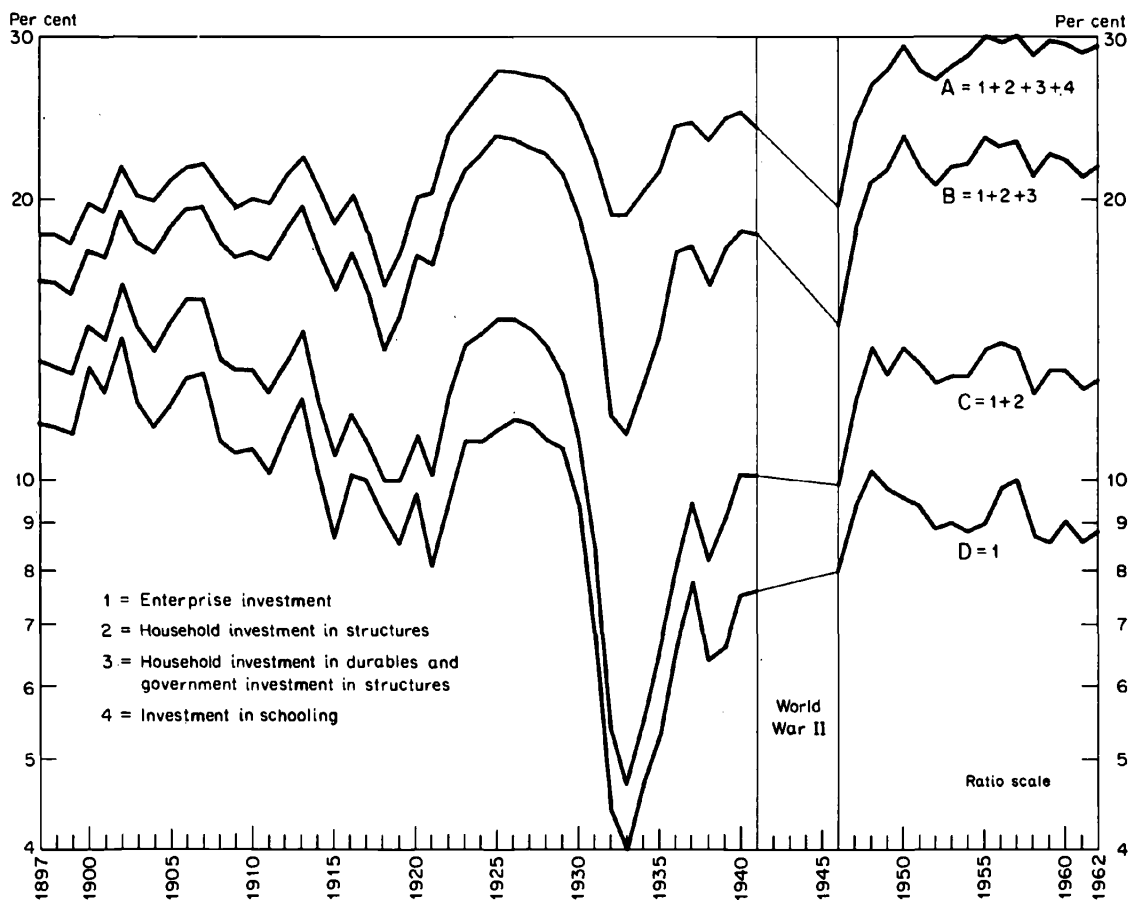
#### CONSUMER FINANCES

Work on one major area of investigation has been largely completed and a report prepared. Data on long-term trends in household capital

formation (major consumer durables and owner-occupied housing) and in the financing of these household investments have been carefully examined, and several tendencies emerge rather clearly. First, there has been a dramatic shift in the location of total gross fixed capital formation in the U.S. economy during the twentieth century. Gross fixed capital formation by business enterprises (equipment and structures, including rental housing) has declined steadily relative to gross national product (line D on Chart IV-6). Gross capital forma-

tion by households, and to some extent by governments, has more than offset the decline in the business enterprise sector. Line C in the chart shows the effect of adding to business enterprises the gross investment by households in owner-occupied housing. Line B includes, in addition, gross investment in consumer durables and in government civilian structures. Finally, line A includes all the above plus gross investment in formal schooling. Both A and B show an upward trend through time, in contrast with the downward trend shown by line D.

**CHART IV-6**  
**Alternative Concepts of Gross Fixed Capital Formation,**  
**as Ratios to GNP, 1897-1962**  
 (current dollars)

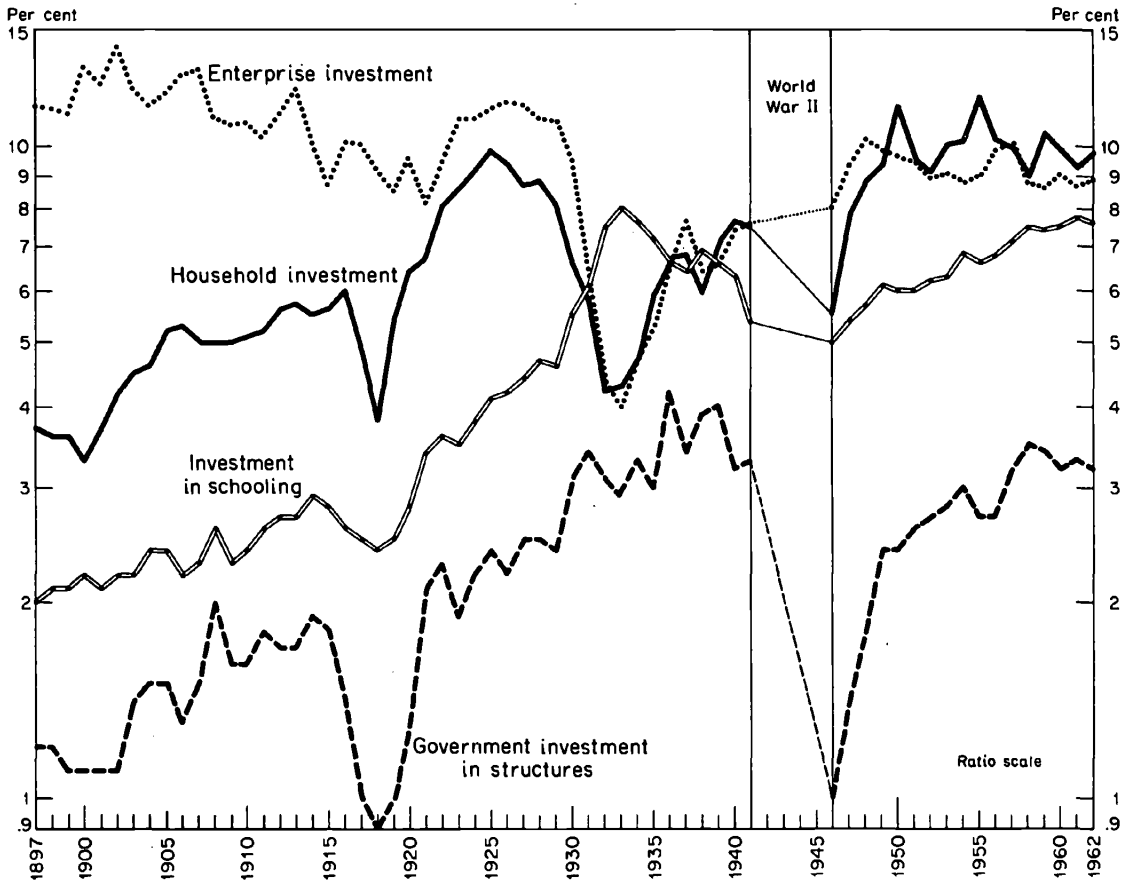


In Chart IV-7, the major sectors are plotted separately, and the disparity in long-term trends is shown even more clearly. The top line represents business enterprise gross investment in equipment  $E_a$  and structures  $E_s$ ; the second line, gross investment by households in owner-occupied housing  $H_s$  and major durable equipment  $H_a$ ; the third line, gross investment in formal schooling  $S$ ; and the last line, government gross investment in civilian structures  $G_s$ , all as ratios to GNP in current prices. Household gross fixed investment has a strong upward trend (which shows some signs of

leveling off), while business enterprise gross investment has an equally strong downward trend. Since 1950, household investment has exceeded that of business enterprise. The other sectors show considerable secular growth, reached their peak values in the 1930's (mainly because GNP declined sharply), and show rapid expansion after World War II.

I have also constructed estimates of net imputed income from household equity in durable assets and of the gross rental value of household durable assets. Existing national income estimates include only net imputed

**CHART IV-7**  
**Major Components of Gross Capital Formation,**  
**as Ratios to GNP, 1897-1962**  
 (current dollars)



income on owner-occupied housing. When income imputed to durable assets is included, the total amount of net imputed income grows somewhat more rapidly than conventionally defined income, amounting to about 10 per cent of national income by the late 1950's compared with about 5 per cent around 1900. About 30 per cent of total consumption takes the form of the gross rental value of household tangible assets by the late 1950's, compared with about 17 per cent around 1900. Both estimates are obviously very rough approximations.

Investigation of the cyclical variability of the several investment sectors reveals that, before the First World War, capital goods output in the business enterprise sector rose and fell far more than in the household sector, measuring cyclical variability as the annual deviation from secular trend. During the 1920's and 1930's, the enterprise sector remained a more important source of cyclical variability than the household sector. But after World War II the household sector shows roughly twice the cyclical variability of the enterprise sector.

I have started an analysis of the relation between household expenditures on capital assets (houses, cars, and major household durables) and credit. It seems clear that the rapid growth of such expenditures is attributable in some measure to developments in the market for consumer credit. These developments take the form of a secular rise in the use of credit as maturities on credit contracts have expanded steadily and finance rates have tended to decline.

F. THOMAS JUSTER

#### THE RATE STRUCTURE IN AUTOMOBILE FINANCING

The manuscript was revised during the year to incorporate an investigation of the importance of credit terms, including finance rates, to the demand for passenger car sales and automobile credit. As now constituted, the volume will be devoted, first, to a historical review of the development of automobile financing; second, to the analysis of finance-

rate movements since 1924; third, to analyses of factors affecting finance-rate levels in 1954-55 and 1958-59; and finally, to the importance of finance rates and other credit terms to the demand for automobiles and automobile credit between 1929 and 1962. A draft of the manuscript should be ready by midyear.

To investigate the importance of credit terms to new-automobile sales and credit extensions, I utilized a model originated by Daniel B. Suits and modified by Marc Nerlove.<sup>1</sup> In place of the credit terms data utilized by Suits and Nerlove, I substituted some alternative series which permitted a better appraisal of the role of selected credit variables in relation to new-automobile sales. The analysis covers the periods 1929-41 and 1949-60.

The results suggest that changes in total number of cars sold, number sold on credit, and dollar magnitudes of credit extended are all significantly related to changes in real disposable income, used-car stock, and average maturity of credit contracts. Higher income and longer maturities on credit contracts are associated with higher sales; increases in the stock of used cars are associated with lower sales. Changes in real price are inversely related to changes in sales and credit extended but not at acceptable confidence levels. Production restraints during 1941 and 1952 were associated with significantly lower total retail sales, but only to a lesser extent with lower credit sales and credit extended. Changes in downpayment ratios and finance rates did not appear to have a significant influence.

Further work is under way to test some implications of these results.

ROBERT P. SHAY

#### RATE QUOTATION AND RATE CEILINGS

"Consumer Credit Finance Charges: Rate Information and Quotation" is being revised to give greater emphasis to quotation of finance

<sup>1</sup>Suits, "The Demand for New Automobiles in the United States, 1929-56," *Review of Economics and Statistics*, Aug. 1958; Nerlove, Hearings on *Administered Prices*, Committee on the Judiciary, Senate, 85th Cong., 2d sess., Part 7, Appendix pp. 3998 and 3999.

charges in dollars, and to sharpen the distinction between computing and quoting finance charges. The manuscript on "Economic Effects of State Legal Ceilings upon Finance Rates" is progressing. A chapter on new-car rates is substantially complete. Chapters on used-car rates and finance company rates to consumers remain to be written.

WALLACE P. MORS

#### CONSUMER CREDIT AND THE FLOW OF FUNDS

This is the second and larger phase of my study of the flow of funds into consumer credit in the United States since 1946. The first phase was completed with publication in September 1963 of Occasional Paper 85, *Trends and Cycles in the Commercial Paper Market*, which contains an examination of developments in one of the credit markets used by finance companies. The current study is built around data for the period 1946-61 made available to the National Bureau by 70 sales finance and personal loan companies. The companies have been classified by size, and a large number of debt and other ratios have been computed. Analysis of the ratios is proceeding, and a draft summarizing results from this aspect of the study should be completed during the summer of 1964.

Other aspects of the flow of funds into consumer credit to be explored in this study have not been determined definitely, but they will probably include cyclical analysis of Federal Reserve monthly data on consumer credit outstanding, and changes therein, 1953-63. In addition, monthly data are available on sources of funds for a number of finance companies. These materials are expected to provide the basis for a study of the role of consumer credit in recent business cycles.

RICHARD T. SELDEN

#### THE QUALITY OF CREDIT IN BOOMS AND DEPRESSIONS

The evolution and scope of this program of studies were described in detail in the 1963

Annual Report (pp. 10-17). I have nearly completed a draft of an Occasional Paper, "The Quality of Postwar Credit in the United States," which surveys the main findings of the group of studies as a whole. The report is a broad summary of the relationships discovered between loan and borrower characteristics, on the one hand, and loan performance, on the other, in bank loans to business, trade credit, agricultural lending, consumer installment loans, residential mortgages, and corporate bonds. The report also summarizes the still tentative and partial findings relating to the temporal behavior of credit quality—loan and borrower characteristics, and loan performance—over the postwar years, and attempts to assess the degree to which credit quality in these several fields may have changed over the period and as compared with prewar years.

The status of the several studies in progress on individual credit sectors is as follows:

1. Martin Seiden's Occasional Paper, *The Quality of Trade Credit*, was published in April.

2. Geoffrey Moore's and Philip Klein's study of the quality of consumer installment credit has been completed in draft form and is undergoing minor revision and updating.

3. Thomas Atkinson's proposed Occasional Paper, "Postwar Corporate Bond Quality," is being reviewed by the staff. Some of the findings are summarized by Atkinson in a separate report below.

4. George Brinegar plans to submit soon a draft of his study of Federal Land Bank mortgage quality, and is revising his study of the quality of the farm loans of production credit associations.

5. Work is actively under way on a new study of the factors related to residential mortgage delinquency and foreclosure, which John Herzog and I are making with the financial and data-gathering help of the three leading associations of residential mortgage lenders. A brief progress report on this study follows.

JAMES S. EARLEY

**POSTWAR RESIDENTIAL MORTGAGE QUALITY**

This investigation is concerned mainly with the incidence and seriousness of mortgage delinquency and foreclosure as related to such variables as the loan-to-value ratio, amount of loan, amount of monthly amortization payment, borrower income, income-to-mortgage payment ratio, and maturity of loan. We have already assembled aggregate data showing postwar changes in many of these variables, as well as in delinquency and foreclosure series. The data show substantial postwar changes in some of the variables, including rising loan-to-value ratios and loan maturities; and they also show a generally worsening loan experience in very recent years. What these measures have not demonstrated is whether there are or are not statistically significant relationships between differential loan, borrower, and property characteristics, on the one hand, and worsening loan experience, on the other. That is the main task of the present study. Some studies by the Federal Housing Administration and the Veterans Administration suggest that such relationships exist, but more definite proof is required, especially for conventional mortgages, quantitatively the most important type.

Our plan is to use new sample data collected from their members by the U.S. Savings and

Loan League, Mortgage Bankers Association, and the National Association of Mutual Savings Banks—supplemented by data provided by the FHA and VA—to make a thoroughgoing statistical analysis of those relationships. We are not yet certain what combination of analytical techniques will prove most fruitful, but we are planning to use discriminant function analysis, multiple regression, and analysis of variance, in addition to simple cross-classification of the data. The surveys are not identical in form, but there appears to be enough overlapping of the variables studied to give them a rather extensive common ground. On the basis of that common ground, we hope to combine and reclassify the data from the various sources and conduct common analyses of them all.

Pending receipt of all the sample data and as a preliminary to more extensive tests, we have used a simple cross-classification of the U.S. Savings and Loan League data on several thousand loans to gain some insight into the more important relationships. This preliminary analysis shows a number of interesting patterns.

First, it appears that delinquencies are strongly and positively correlated with loan-to-purchase price ratios and contract interest rates, and inversely correlated with purchase prices (Table IV-12). Another factor which

**TABLE IV-12**

**RELATIONS BETWEEN LOAN AND PROPERTY CHARACTERISTICS AND MORTGAGE LOAN DELINQUENCY, AS INDICATED BY PERCENTAGE DISTRIBUTIONS OF DELINQUENT AND NONDELINQUENT LOAN SAMPLES**

Date Loan Closed	Non-delinquent	Delinquent	Ratio <sup>a</sup>	Original Balance	Non-delinquent	Delinquent	Ratio <sup>a</sup>
Before 1950	1.0%	0.9%	0.90	Under \$5,000	10.4%	12.0%	1.15
1950-51	2.3	1.1	0.48	\$5,000- 7,499	15.4	14.0	0.93
1952-53	5.2	3.9	0.75	7,500- 9,999	17.7	18.3	1.59
1954-55	9.3	7.2	0.77	10,000-12,499	18.3	18.8	1.03
1956-57	15.6	13.6	0.87	12,500-14,999	12.9	15.0	1.16
1958-59	23.7	30.6	1.29	15,000-17,499	10.8	8.8	0.81
1960-61	28.5	33.6	1.18	17,500-19,999	5.0	5.2	1.04
1962 and later	14.3	9.0	0.63	20,000-24,999	5.3	5.0	0.94
				25,000 and over	4.4	3.0	0.68
<b>Total</b>	<b>100.0</b>	<b>100.0</b>		<b>Total</b>	<b>100.0</b>	<b>100.0</b>	

(continued)

TABLE IV-12 (concluded)

Contract Interest Rate	Non-delinquent	Delinquent	Ratio <sup>a</sup>	Ratio, Loan to Purchase Price	Non-delinquent	Delinquent	Ratio <sup>a</sup>
Under 5.50%	14.1%	8.2%	0.58	Under 25%	1.8%	1.1%	0.61
5.50	15.8	10.5	0.66	25-49	9.0	5.9	0.66
5.75	7.9	5.8	0.73	50-59	13.0	11.7	0.90
6.00	32.9	34.4	1.05	60-69	26.7	23.4	0.88
6.25	3.4	3.9	1.15	70-79	32.7	38.4	1.17
6.50	10.9	15.4	1.41	80-89	10.5	11.3	1.08
6.60	9.4	12.6	1.34	90 and over	6.3	8.2	1.30
6.75	0.8	1.2	1.50				
7.00 and over	4.7	7.9	1.68				
Total	100.0	100.0		Total	100.0	100.0	

Purchase Price	Non-delinquent	Delinquent	Ratio <sup>a</sup>	Monthly Payment	Non-delinquent	Delinquent	Ratio <sup>a</sup>
Under \$5,000	1.7%	2.7%	1.59	Under \$30	2.6%	2.4%	0.92
5,000- 9,999	15.8	17.5	1.11	30-49	12.6	12.4	0.98
10,000-14,999	28.7	33.2	1.16	50-69	24.5	23.0	0.94
15,000-19,999	26.0	24.7	0.95	70-89	22.2	24.7	1.11
20,000-24,999	13.6	10.4	0.76	90-109	16.9	17.7	1.05
25,000-29,999	6.5	5.4	0.83	110-129	10.4	9.2	0.88
30,000 and over	7.7	6.0	0.78	130-149	3.9	3.8	0.97
				150-169	2.8	2.9	1.04
				170-189	1.2	1.5	1.25
				190 and over	2.9	2.4	0.83
Total	100.0	100.0		Total	100.0	100.0	

Loan Maturity (years)	Non-delinquent	Delinquent	Ratio <sup>a</sup>
Under 10	3.4%	4.3%	1.26
10-14	13.2	12.7	0.96
15-19	24.5	25.5	1.04
20-24	42.4	44.7	1.05
25-29	14.7	11.7	0.80
30 and over	1.8	1.0	0.56
Total	100.0	100.0	

SOURCE: U.S. Savings and Loan League sample survey, 1962.

NOTE: Totals may not add to 100% because of rounding.

<sup>a</sup>Delinquent to nondelinquent.

appears to have considerable influence on delinquency is the purpose of loan. The sample reveals, for example, that while 58.1 per cent of the nondelinquent loans were for home purchase, only 47.3 per cent of the loans in the delinquent files were made for that purpose. Where refinancing was listed as the purpose,

the per cent in the delinquent file (28.8) far exceeded the per cent in the nondelinquent loan sample (17.2). Thus, it would appear that the percentage of loans made for refinancing which subsequently turn up delinquent is about twice as high as the percentage for home purchase loans.

TABLE IV-13

RELATIONS BETWEEN BORROWER CHARACTERISTICS AND MORTGAGE LOAN DELINQUENCY,  
AS INDICATED BY PERCENTAGE DISTRIBUTIONS OF DELINQUENT AND NONDELINQUENT LOAN SAMPLES

Borrower Income	Non-delinquent	Delinquent	Ratio <sup>a</sup>	Ratio, Monthly Payment to Income		Non-delinquent	Delinquent	Ratio <sup>a</sup>	No. of Jobs in Past 5 Years	Non-delinquent	Delinquent	Ratio <sup>a</sup>
				Under 15%	15-19							
Under \$2,500	11.5%	15.5%	1.35	Under 15%	55.2%	52.5%	0.95	0	0.8%	0.6%	0.75	
2,500- 4,999	14.4	13.2	0.92	15-19	30.6	33.5	1.09	1	75.0	68.2	0.91	
5,000- 7,499	29.0	29.7	1.02	20-24	9.4	8.8	0.94	2	20.5	24.9	1.21	
7,500- 9,999	19.6	19.7	1.01	25-29	2.7	3.0	1.11	3	3.1	5.2	1.68	
10,000-14,999	16.2	14.2	0.88	30 and over	2.1	2.2	1.05	4 or more	0.5	1.1	2.20	
15,000-19,999	4.4	4.0	0.91									
20,000 and over	4.9	3.7	0.76									
Total	100.0	100.0		Total	100.0	100.0		Total	100.0	100.0		

Years on Main Job	Non-delinquent	Delinquent	Ratio <sup>a</sup>	Age of Household Head		Non-delinquent	Delinquent	Ratio <sup>a</sup>	Years in State of Residence	Non-delinquent	Delinquent	Ratio <sup>a</sup>
				21-29	30-34							
Under 1 year	9.0%	10.2%	1.13	21-29	13.9%	16.8%	1.21	Under 1	4.8%	3.9%	0.81	
1-2	13.1	18.0	1.37	30-34	15.7	18.2	1.16	1-2	4.6	5.0	1.09	
3-4	13.5	16.4	1.21	35-39	17.5	21.1	1.21	3-4	5.3	5.6	1.06	
5-9	25.1	25.9	1.03	40-44	16.6	16.4	0.99	5-6	7.6	7.7	1.01	
10-14	16.7	15.2	0.91	45-49	14.9	11.8	0.79	7-8	6.3	5.3	0.84	
15 and over	22.6	14.4	0.64	50-54	9.9	7.6	0.77	9-10	6.5	6.1	0.94	
				55-59	5.3	4.8	0.91	11 and over	64.9	66.4	1.02	
				60 and over	6.2	3.3	0.53					
Total	100.0	100.0		Total	100.0	100.0		Total	100.0	100.0		

SOURCE: Same as for Table 1.  
<sup>a</sup>Delinquent to nondelinquent.



The data also reveal some tendency of older loans to be less subject to delinquency—except that loans less than one year old show little delinquency. Length of maturity and original loan balance appear, if anything, to be inversely associated with delinquency in this sample. Size of monthly payment does not appear to be associated with delinquency rate.

The patterns with respect to borrower characteristics (Table IV-13) reveal a strong inverse relation between delinquency and age of borrower, income, and job stability. On the other hand, the monthly payment-to-income ratio and the length of time in the state appear to be relatively poor predictors of delinquency.

The reader should be cautioned that we have not tested the statistical significance of these relationships or determined whether they will hold up under further cross-classification of the data. We are merely calling attention to crude patterns, which we are using as a basis to begin more extensive analysis and verification.

JAMES S. EARLEY  
JOHN HERZOG

#### POSTWAR CORPORATE BOND QUALITY

Since the monumental work by W. Braddock Hickman detailing investor experience with corporate bonds from 1900 to 1943, there has been no review of quality indicators of currently offered corporate debt obligations. The present study is an attempt to remedy that omission, although with realization that nearly all the postwar quality data are measures of potential risk exposure rather than ex post measures of default or loss.

The principal substantive findings of the study are as follows.

1. The average default rate on bonds outstanding in the postwar period has been one-tenth of 1 per cent. While this rate is minuscule compared with that from 1900 to 1943, defaults continue to show cyclical response as they did in the earlier period: offering dates of defaulting bonds tend to be concentrated one or two years in advance of years containing business cycle peaks; and the years with the

greatest default incidence are one year later than years containing business cycle troughs.

2. According to ex ante measures of risk exposure—agency ratings, times-charges-earned, security, market rating—it would appear that corporate bond quality since World War II has been appreciably higher than it was before the war. Only in the proportion of the dollar volume of offerings that are unsecured obligations does the postwar period show general deterioration from the 1900-43 period. Because the presence or absence of specific collateral seemed, in the Hickman study, related not to default but to losses and recoveries on defaulted bonds, the relatively high proportion of unsecured offerings in the postwar period has perhaps only a minor quality significance.

3. In general, quality measures of the universe of corporate bond offerings were high at the end of World War II but subsequently deteriorated, with the greatest deterioration occurring in the 1955-59 period of capital building by U.S. industry. The poorest aggregate measures of quality of offerings occurred neither in the years of greatest monetary ease nor at the peak of the business cycle. Instead, the poorest quality offerings tended to occur in the first or second year of the general boom period of postwar capital building extending from 1955 to 1959. Since 1959, bond quality has apparently improved somewhat.

4. Convertible bond offerings have been a conspicuous feature of the postwar period, and that naturally brings up the question of the association of the convertible feature with quality. Special tabulations of the Hickman data show that in the 1920's convertibles had a default rate roughly three times the default rate of nonconvertible bonds. In the postwar period, ex ante quality measures for the universe of convertible bond offerings were generally lower than for nonconvertible offerings. The volume of convertibles generally rose during the 1955-59 boom in capital building but has since declined.

5. Another outstanding feature of the postwar corporate bond situation has been the pre-eminence of direct or private placements in contrast to those offered to the public at

large. The 1900-43 default experience of direct placements was generally better than for public issues. In the postwar period, ex ante quality measures have generally been better for bonds marketed privately to one or only a few investors than for those sold publicly.

The above findings are tentative and await review. They suggest, but do not prove, that the corporate bond area has not been subject to appreciable quality deterioration except in comparison with the very best quality levels reached shortly after World War II. They also suggest that deterioration of credit quality is not solely associated with monetary ease but rather may occur in periods of relative tightness of monetary policy, if the latter occurs during a period of extensive capital building.

The completed manuscript is now being circulated to a staff reading committee.

THOMAS R. ATKINSON

## THE INDIVIDUAL INCOME TAX

In our series of studies of the personal income tax, of which four have been published,<sup>2</sup> three additional reports are now approaching publication. C. Harry Kahn's "Business and Professional Income Under the Personal Income Tax" is in press; his "Tax Treatment of Income from Employment Under the Personal Income Tax" is being prepared for submission to the Directors. "The Personal Exemptions in the Federal Income Tax," by Seltzer, has been reviewed by the staff and is undergoing final revision.

Since my 1951 volume, *The Nature and Tax Treatment of Capital Gains and Losses*, covered the period only through the last war, I have been looking into the quantitative record in the postwar period and exploring the possibility of a study of that experience. I comment below on recent experience with the current

limitations upon the allowance for capital losses.

The preferential tax treatment of capital gains has usually been accompanied by a roughly corresponding or greater limitation upon the allowance for capital losses. In the United States, since 1916, capital losses have invariably been allowed in full up to at least the amount of a taxpayer's capital gains of similar character or holding period. The deductibility of net capital losses—the excess of a taxpayer's capital losses over his capital gains—from otherwise taxable income, however, has been arbitrarily limited at various times since 1934 to \$2,000 or \$1,000 or, in the case of short-term net capital losses, has at times been absent altogether. A limited carryover of net capital losses against future capital gains and ordinary income has been in effect since 1942. The principal practical reasons for limiting the allowance for capital losses have been (1) to protect income-tax revenues from the large deductions that would otherwise be possible from time to time by reason of major and often temporary declines in the market values of common stocks and other capital assets; and (2) to limit the ability of individuals to reduce their income-tax liabilities, in years when their ordinary incomes are large, by concentrated sales of depreciated assets, often accompanied by the purchase of other but similar assets.

While these reasons for limiting the deductibility of net capital losses go far to explain Congressional policy in this regard, they do not necessarily justify it. By weighting the tax odds against the risk taker, the policy tends to discourage risky investment. It is particularly unfavorable, also, to individuals who make infrequent investments and incur losses on them, and to those who lose much of their resources in an investment, for they have smaller opportunities for obtaining offsetting capital gains in the future.

The maximum allowance of \$1,000 against ordinary income for net capital losses in any one year, in force since 1942, is the smallest since 1917. But the fact that capital losses not deducted in the year of realization may be car-

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<sup>2</sup>*Interest as a Source of Personal Income and Tax Revenue*, by Lawrence H. Seltzer (1955); *The Income-Tax Burden on Stockholders*, by Daniel M. Holland (1958); *Personal Deductions in the Federal Income Tax*, by C. Harry Kahn (1960); *Dividends Under the Income Tax*, by Daniel M. Holland (1962).

ried forward for the next five years and used in any of them to offset net capital gains, and up to \$1,000 of other income, moderates the stringency of the limitation in some degree. An unlimited carryover of net capital losses against future capital gains, and up to \$1,000 or ordinary income in any one year, was proposed by President Kennedy and incorporated in the Revenue Bill of 1963 as passed by the House.

Some new light is shed on the quantitative importance of the current carryforward provision by a set of unpublished worksheets of data from the individual income tax returns of 1953-60, recently made available to us by the Statistics Division, Internal Revenue Service. These data, some of which are summarized in

Table IV-14, indicate that the actual annual allowances for net capital losses, including the amounts for losses carried forward from the preceding five years, averaged somewhat more than 50 per cent of the current year net capital losses in those eight years. But they averaged only 29 per cent of the annual totals of current year and carried over net capital losses. The data do not reflect the extent to which net capital losses of previous years have been offset by subsequent capital gains of individuals who enjoyed *net* capital gains in subsequent years, or the amounts of net capital losses on which the five-year carryover period had expired.

LAWRENCE H. SELTZER

TABLE IV-14  
INDIVIDUAL RETURNS WITH NET LOSS FROM SALE OF CAPITAL ASSETS, 1953 TO 1960

	1953	1954	1955	1956	1957	1958	1959	1960
<b>Capital loss fully allowed</b>								
Number of returns (thousands)	519.1	438.4	438.1	558.6	652.3	594.6	596.1	741.8
Number of returns with loss carryover from preceding 5 years (thousands)	45.5	51.8	44.0	32.4	56.6	89.9	64.9	48.2
Amount of loss carryover from preceding 5 years (\$ millions)	32.2	39.6	34.3	30.8	39.8	63.1	59.8	47.3
Current year 100% capital loss (\$ millions)	166.4	125.5	135.7	194.4	226.0	180.2	184.5	268.7
Net capital loss allowed (\$ millions)	192.5	153.8	159.3	213.5	256.8	223.2	218.1	298.0
<b>Capital loss greater than allowable deduction</b>								
Number of returns (thousands)	270.2	225.7	216.0	225.0	385.9	326.0	304.0	412.5
Number of returns with loss carryover from preceding 5 years (thousands)	75.4	91.1	82.0	64.9	104.8	132.5	108.8	111.4
Amount of loss carryover from preceding 5 years (\$ millions)	601.2	586.1	533.5	477.6	766.3	978.1	891.0	954.4
Current year 100% capital loss (\$ millions)	894.2	543.2	555.5	657.9	1,081.0	883.1	863.6	1,245.3
Net capital loss allowed (\$ millions)	270.2	225.6	215.9	224.9	385.9	325.9	304.0	406.3

SOURCE: A set of unpublished worksheets of data from individual income tax returns, 1953-60, prepared by the Statistics Division, Internal Revenue Service.

## OTHER STUDIES

Books published are: *A Monetary History of the United States, 1867-1960*, by Milton Friedman and Anna Jacobson Schwartz; *Studies in the National Balance Sheet of the United States*, by Raymond W. Goldsmith, Robert E. Lipsey, and Morris Mendelson; *Capital and Rates of Return in Manufacturing Industries*, by George J. Stigler. The conference report, *The State of Monetary Economics*, was published as a supplement to the *Review of Economics and Statistics*, February 1963.

"The Measurement of Corporate Sources and Uses of Funds" (Technical Paper 18),

by David Meiselman and Eli Shapiro, is in press. Two reports are soon to go to press: "Determinants and Effects of Changes in the Stock of Money, 1875-1955," by Phillip Cagan; and "The Flow of Capital Funds in the Postwar Economy," by Raymond W. Goldsmith. Eli Shapiro expects to complete this spring his manuscript, "The Market for Corporate Securities and Loans."

For other reports on studies of financial institutions and processes, see those by Ture and others in section 1; by Becker, Murray, Holland, Dickinson, and Nelson in section 2; and by Friedman and Schwartz and by Lipsey in section 3.

## 5. INTERNATIONAL ECONOMIC RELATIONS

### IMPORTS OF MANUFACTURES FROM LESS DEVELOPED COUNTRIES AND FROM JAPAN

This subject is relevant to a number of problems: the development prospects of the less developed countries; the productivity of labor and the problem of inflation in the developed countries; the willingness of countries to make further reductions in trade barriers; and the pressures on the United States international payments position in recent years. A brief analysis relating mainly to the last of these problems was included in my volume, *Problems of the United States as World Trader and Banker* (pp. 77-79). Partly as an outgrowth of that study and partly also with a view to some of the issues confronting the two major international trade conferences meeting this year, it has seemed useful to have a closer look at the relevant statistics and see what conclusions or questions they may suggest.

It is a characteristic of the status of the less developed countries that their exports of manufactures are small. And yet, in principle, their low income levels might be expected to give them a certain competitive advantage in manufacturing goods requiring large inputs of labor in relation to capital. These industries are,

however, also among those most likely to be protected in the advanced countries precisely because they may be vulnerable to "low-wage competition." For these reasons, interest in this survey tends to focus on manufactures produced by labor-oriented industries in the less developed countries as distinguished from the products of resource-oriented industries, in which export strength derives chiefly from mineral deposits, climate, or other natural conditions. In terms of the Standard International Trade Classification, taken as the basis for this survey, the largest resource-oriented item excluded from imports from the less developed countries is nonferrous metals (no. 68). The SITC chemicals section (no. 5) is also left out on the ground that most such imports from less developed countries are also resource-oriented.<sup>1</sup> Most food manufactures would not be excluded by this distinction, but they are not covered in the present note.

One of the questions needing study is whether imports of manufactures from the less

<sup>1</sup>Still another much smaller exclusion is SITC item 671, largely comprised of ferro-manganese and other ferro-alloys but more fully described as "pig-iron, spiegeleisen, sponge iron, iron and steel powders and shot and ferro-alloys." Other adjustments in the figures are indicated in the notes to Table IV-15.

TABLE IV-15

IMPORTS OF LARGELY LABOR-ORIENTED MANUFACTURES, EXCLUDING FOOD PRODUCTS, BY THE UNITED STATES  
AND LEADING WESTERN EUROPEAN COUNTRIES, 1962  
(millions of dollars)

	Imports from	U.S., EFTA, and EEC, Total	European Economic Community							Belgium, Luxembourg
			United States	United Kingdom	Other <sup>a</sup> EFTA	West Germany	France	Italy	Netherlands	
<b>Total</b>	World	28,503.9 <sup>b</sup>	5,669.1	2,788.8	6,345.6	4,120.2	2,648.3	2,159.8	2,795.2	1,966.6
	Hong Kong	354.7	149.7	145.2	19.1	31.9	0.8	3.5	3.0	1.5
	Other LDC's <sup>c</sup>	772.6 <sup>b</sup>	388.0	168.5	46.7	78.1	32.5	11.1	17.2	20.2
	Japan	1,436.6	1,143.3	42.0	96.8	73.8	8.5	21.0	25.5	25.7
<b>I. Products for use in industry and construction</b>	World	7,253.2	1,853.2	715.5	1,257.5	1,169.9	698.6	607.7	611.6	339.2
	Hong Kong	12.7	7.8	2.7	0.5	1.0	—	0.3	0.2	0.2
	Other LDC's	165.4	78.8	47.7	2.4	11.2	17.9	5.0	1.1	1.3
	Japan	328.5	293.7	9.6	2.5	8.0	0.3	7.1	1.9	5.4
<b>II. Machinery and transport equipment</b>	World	10,350.8	1,214.9	853.4	2,836.8	1,251.4	1,200.8	1,028.8	1,043.3	921.4
	Hong Kong	0.4	0.4	—	—	—	—	—	—	—
	Other LDC's	11.3	0.8	7.7	—	0.7	1.0	0.8	0.3	—
	Japan	64.5	27.3	1.6	20.7	4.2	0.8	0.5	0.7	8.7
<b>III. Textiles and apparel</b>	World	4,348.7	1,017.4	528.8	914.4	938.1	171.1	118.6	416.9	243.4
	Hong Kong	233.2	83.2	103.2	16.6	26.3	—	2.2	1.5	0.2
	Other LDC's	447.2	248.5	87.1	33.3	52.4	5.7	4.3	8.3	7.6
	Japan	360.1	276.7	8.2	35.5	24.5	2.7	3.5	5.9	3.1
<b>IV. Consumer durables and other miscellaneous manufactures</b>	World	6,551.2 <sup>b</sup>	1,583.6	691.1	1,336.9	760.8	577.8	404.7	723.4	462.6
	Hong Kong	108.4	58.3	39.3	2.0	4.6	0.8	1.0	1.3	1.1
	Other LDC's	148.7 <sup>b</sup>	59.9	26.0	11.0	13.8	7.9	1.0	7.5	11.3
	Japan	683.5	545.6	22.6	38.1	37.1	4.7	9.9	17.0	8.5

## NOTES TO TABLE IV-15

**GENERAL NOTE:** The list of labor-oriented imports included in the figures is subject to revision.

**NOTE ON THE COMPOSITION OF PRODUCT GROUPS** (in terms of numbers used in the standard international trade classification): In general, the table excludes: all foods; chemicals (SITC 5); ferro-manganese, etc. (SITC 671); nonferrous metals (SITC 68); works of art, collectors' pieces, and antiques (SITC 896).

**Group I:** Includes SITC 611, 613, 621, 63, 64, 661 through 664, 672 through 679, 691 through 694, 698, 812.

**Group II:** Includes, except as noted below, 711 through 723, 726, 731 through 735.

Exceptions: (1) The figures exclude all imports of the following items from less-developed countries (Ec. C1. II): 711 (primarily aircraft engines); 732 (primarily lorries); 734 (aircraft) and 735 (ships and boats). (2) Items 717.3 (sewing machines) and 732.9 (motorcycles) are included in Group IV.

**Group III:** Includes SITC 651 through 657, 84.

**Group IV:** Includes, except as noted below, SITC 612, 629, 665 through 667, 695 through 697, 717.3, 724, 725, 729, 732.9, 821, 831, 851, 861 through 864, 891 through 895, 897, 899.

Exception: Reported imports of SITC 667 (pearls, and precious and semiprecious stones, unworked or worked) have been adjusted in a number of ways too detailed to cover fully here. In general, the adjustments are aimed at: (1) eliminating rough and uncut gems so far as this could be judged from figures on country of origin; and (2) using export figures as reported by other countries, in the absence of import figures for the United Kingdom (which treats these data as secret), and supplementing those for the Netherlands.

**SOURCE:** United Nations, *Commodity Trade Statistics*, Series D, Vol. XII, various numbers.

<sup>a</sup> Includes Sweden, Switzerland, Denmark, Norway, Austria; excludes Portugal.

<sup>b</sup> Exceeds sum of country figures shown by amount of excess of Israel's reported diamond exports to Switzerland (\$13.3 million) over Switzerland's reported imports of diamonds from Israel (\$3.0 million).

<sup>c</sup> Corresponds to the United Nations "Economic Class II" minus Hong Kong.

developed countries are low because of those countries' limited supply capacity, or whether their capacity fails to develop because of the lack of market outlets. From this point of view, it is useful to consider also imports from Japan, which, though it is far from being one of the less developed countries, faces many of the same export obstacles as they do and at the same time leaves no room for doubts as to its supply capacity.

As importers, only the United States and the members of the European Economic Community and the European Free Trade Association are considered here. They not only make up the major part of the market in the developed part of the world but also can be expected to exercise a determining influence on the evolution of commercial policies.

Imports of manufactures from the less developed countries by the United States and Western Europe are rather narrowly concentrated by origin, destination, and product. Of the 1962 total of \$1,127 million given by Table IV-15 (i.e., the sum of imports from Hong Kong and from other LDC's), 47.7 per cent was taken by the United States and 27.8 per cent by the United Kingdom. Sixty per cent of the total consisted of textiles and clothing. Imports from Hong Kong alone accounted for 31 per cent of the total and, together with imports from Israel—mainly cut diamonds—for more than 40 per cent. Exclusion of these two rather untypical members of the United Nations' numerous family of less developed countries emphasizes the small size of the imports from the remainder of the group, some \$670 million and their concentration to the extent of over 50 per cent in the United States.

Imports of labor-oriented nonfood manufactures from Japan are even more sharply concentrated. The United States alone took four-fifths of the combined total of these imports in 1962 by the United States and Western Europe.<sup>2</sup>

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<sup>2</sup>Both the relative and the absolute size of the United States imports from the less developed countries and Japan would appear still larger if, as in European countries, they were valued inclusive of freight and insurance.

All together, imports from the less developed countries and Japan made up almost 30 per cent of total United States imports of labor-oriented nonfood manufactures in 1962. The corresponding figure for the United Kingdom is 12.8 per cent, most of which is accounted for by Hong Kong, India, and other Commonwealth countries.

Among Continental European countries West Germany shows the highest ratio, 4.5 per cent, of imports from the less developed countries and Japan to total imports of labor-oriented nonfood manufactures. The ratio is in the range of 2 to 3 per cent for most other European countries but falls to only 1.6 per cent for France, Italy, and the Netherlands, and to 1.2 per cent for Austria.

Such a low figure for France would be noteworthy, in any event, and is all the more so as an indication of the almost complete absence of manufacturing for export in the former French territories and especially in Algeria, considered for many years to be an integral part of France. It is perhaps even more surprising that all the smaller European countries import such small amounts of manufactures from the less developed countries and Japan.

To judge from data covering only a portion of the year, 1963 seems to have brought large percentage increases in imports from the less developed countries and from Japan by the United States, the United Kingdom, and the EEC. In the latter, much of the increase was in Italy's imports of iron and steel from Japan and may not survive the measures taken by the Common Market early in 1964 to discourage those imports. Elsewhere in Continental Western Europe, the gains from 1962 to 1963 seem to have been widely dispersed in small amounts without significantly changing the pattern of imports from the less developed countries and Japan.

It is expected that this pattern of trade will be more fully examined in an Occasional Paper, which will serve to pose some pertinent questions for further study. One such question would be why it is that Hong Kong remains so unique among the less developed countries as an exporter of manufactured products. To

say that Hong Kong's position is special in many respects does not altogether explain why other countries have not been able to do better than they have, at least in the U.S. market. Another question would be why it is that European countries (with the exception of the United Kingdom's imports from Commonwealth countries) fill such a small part of their total import demands from the less developed countries. The example of Hong Kong and, even more, the experience of Japan indicate that the answer cannot simply be the lack of goods of interest to European consumers. But the question does not relate merely to European commercial policies, or the policies of European business, toward these two countries. The broader question is why it is that, in the countries on the periphery of the Continent or enjoying close trade connections with it, there has been so little development of manufacturing based on exports to Europe.

Reports on several other studies under way in the international field follow.

HAL B. LARY

#### UNITED STATES PERFORMANCE IN INTERNATIONAL COMPETITION

We have concentrated on developing standardized statistical series for each of the twelve foreign industrial countries covered by our study.<sup>3</sup> For each of these countries and for each of the 150 commodity groups of our end-use classification system the following information has been developed for the period 1953-62: (1) production in current prices; (2) wholesale price indexes; (3) imports from the United States; and (4) imports from the world minus the United States. In addition, for each of our commodity groups we have: (5) U.S. wholesale prices (in place of U.S. export prices) and (6) U.S. production in current prices.

The conversion of the original statistics to this classification system necessitated the reweighting of several hundred series and the study of a wide range of national sources.

<sup>3</sup>The countries included are those listed in Table IV-17.

The standardized series which we have developed on prices, production, and imports have been put on magnetic tape and are being processed with a view to deriving the following information for each commodity group and country covered: (1) ratio of U.S. price to the domestic price; (2) ratio of U.S. production to domestic production; (3) ratio of prices in all industrial countries to domestic prices; (4) ratio of production in all industrial countries to domestic production; (5) ratio of imports from world minus United States to domestic production; (6) ratio of imports from the U.S. to domestic production.

In the foregoing, "domestic prices" refer in each case to the wholesale price index of each country; "prices in all industrial countries" and "production in all industrial countries" refer to indexes compiled for all the industrial countries minus the country which is being analyzed each time. Since 12 industrial countries are being analyzed, there are in most cases 12 different price indexes and 12 different production indexes for each of the commodity groups. As supplementary checks, we are estimating various demand equations for imports from the United States and from other sources by individual industrial countries.

A number of technical computing problems are still being investigated, and no final results of the computations can be reported at this juncture. Instead, the following comments expand on some of the findings previously reported regarding the behavior of the U.S. share of the market for manufactures in other industrial countries.

Table IV-16 gives a summary view of changes in market shares from 1953-55 to 1960-61. The commodities are divided into three groups according to whether their share of the total rose, remained the same, or fell; and commodities are ranked within each group according to the magnitude of loss of market shares by the United States.

As the totals in columns 2 and 5 of the table show, the share supplied by the United States decreased, and that supplied by the rest of the world increased, by roughly 9 percentage points over the period considered. The



TABLE IV-16

IMPORTS OF SELECTED MANUFACTURES BY TWELVE LEADING FOREIGN COUNTRIES: PERCENTAGE SHARE OF EACH COMMODITY IN THE TOTAL AND DIVISION OF THE SHARE BETWEEN IMPORTS FROM THE UNITED STATES AND FROM THE REST OF THE WORLD, ANNUAL AVERAGES, 1953-55 AND 1960-61

<i>Commodity and Code Number</i>	<i>1953-55 Average</i>			<i>1960-61 Average</i>		
	Total Share (1)	Share Supplied by United States (2)	Share Supplied by Rest of World (3)	Total Share (4)	Share Supplied by United States (5)	Share Supplied by Rest of World (6)
Selected manufactures, total	100.0	35.0	65.0	100.0	26.3	73.7
Group I						
Mining, construction, and other industrial machinery (85)	14.4	5.8	8.6	14.7	4.8	9.9
Electrical machinery, apparatus, and appliances (80)	8.4	3.1	5.3	9.7	2.7	7.0
Passenger cars (90)	3.6	0.9	2.7	5.4	0.5	4.9
Other nondurable consumer goods, not elsewhere specified (95)	5.7	2.3	3.4	6.5	1.9	4.6
Other durable consumer goods, not elsewhere specified (91)	8.4	2.0	6.4	8.6	1.8	6.8
Clothing (92)	2.5	0.3	2.2	3.1	0.2	2.9
Office machinery (81)	1.2	0.6	0.6	2.3	0.9	1.4
Organic chemicals (21)	2.8	0.9	1.9	3.8	1.2	2.6
Group II						
Power generating machinery, excluding electrical (83)	4.5	2.1	2.4	4.5	1.5	3.0
Footwear and other textile manufactures other than clothing (93)	2.4	0.3	2.1	2.4	0.2	2.2
Medical and pharmaceutical products (94)	1.4	0.5	0.9	1.4	0.4	1.0
Prefabricated buildings and building fixtures (52)	0.5	0.2	0.3	0.5	0.1	0.4
Group III						
Steel mill products (62)	14.5	3.1	11.4	13.8	1.4	12.4
Road motor vehicles other than passenger cars (86)	6.3	3.4	2.9	4.2	1.9	2.3
Metal manufactures, excluding ordnance (70)	5.4	2.2	3.2	4.4	1.3	3.1
Agricultural machinery and tractors (82)	3.4	2.0	1.4	2.9	1.3	1.6
Metalworking machinery (84)	3.8	1.7	2.1	3.1	1.1	2.0
Inorganic chemicals (20)	2.9	0.9	2.0	2.3	0.5	1.8
Ordnance (71)	0.7	0.1	0.6	0.3	0.1	0.2
Aircraft, railway vehicles, and ships (87)	6.9	2.5	4.4	6.1	2.6	3.5

NOTE: Group I, commodities which increased their share in total imports of manufactures between 1953-55 and 1960-61. Group II, commodities which retained a constant share between 1953-55 and 1960-61. Group III, commodities in which United States registered gains in market shares between 1953-55 and 1960-61.

Commodities are ranked within each group according to magnitude of U.S. losses. Countries included are listed in Table IV-17.

United States registered over-all gains in only the two commodities listed at the end of group III. In one of them, 87, the gains of the United States reflect the near-monopoly position which it has so far enjoyed in the production of long-range jet aircraft.

Table IV-17 gives, for each commodity, the share taken from the United States and from the rest of the world by each of the leading industrial countries or country groups during the two periods under review. The arrangement of commodities in the table is the same as in Table IV-16. The general impression conveyed by this table is that the decline in the U.S. share of the market for manufactures can be mainly attributed to (1) a reduction in the relative size of Canada's imports, and (2) the relatively small shares initially held by the United States in the more rapidly expanding markets.

Canada, it will be seen, accounted for a significant part of total imports of each of the 20 commodities by the 12 countries in 1953-55, and the United States was the principal supplier of most of these commodities to Canada. In 1960-61, the part taken by Canada of total imports by the 12 countries was smaller, in most cases drastically smaller, with respect to all of these commodities except nonelectrical power-generating machinery (83). The effect of this relative shrinkage of Canada's imports in reducing the United States share of world exports was reinforced, in most of the commodities specified, by a relative shift away from the United States as a supplier to Canada.

The country of the 12 which registered during the period the largest and most general increase in its relative position as an importer of the commodities considered was Germany. The increase extended to all three groups in the table and to all the individual commodities, with the minor exception of ordnance (71). The United Kingdom also increased its relative position as an importer of some of these commodities, but those increases were mainly in group I and were accompanied by a decrease in the relative size of the United Kingdom's imports of some other commodities. Perhaps

the most interesting observation to be made with regard to Germany, the United Kingdom, and the other countries or country groups distinguished is that in most cases where the relative size of imports increased the share supplied by the United States either tended to increase also or at least to remain about the same. There are a number of exceptions, notably in automobiles, but the statement nevertheless seems to hold as a broad generalization. In most cases where imports from the U.S. gained or held their own in relative position, however, they made up only a small part of total imports of the 12 countries and were far from offsetting the effect of developments in the Canadian market.

A possible hypothesis emerging from this review is that the tendency of the United States' share of the market to fall in Canada and to rise in a number of other countries may be related to the considerable contrast between the initial size of those shares.

H. G. GEORGIADIS

#### INTERNATIONAL PRICE COMPARISON STUDY

There has been a great deal of speculation in the last few years about the price competitiveness of American products in international markets. However, almost no data exist that would permit price comparisons for particular products at a given time, and even price trends must now be inferred from indirect or seriously deficient information, such as domestic prices or unit value indexes.

The present study, financed by a grant from the National Science Foundation, is aimed at exploring various methods for making place-to-place price comparisons for internationally traded goods and for improving on the crude measures of comparative price trends now available. The present plan is to cover all metals and metal products, including machinery and vehicles, to go back in time to 1953 wherever possible, and to compare United States prices with those of the United Kingdom,

IMPORTS OF SELECTED MANUFACTURES BY TWELVE LEADING FOREIGN  
EACH COMMODITY BY THE GROUP AND DIVISION OF ITS SHARE BETWEEN

Commodity and Code Number	Origin of Imports	Twelve Countries, Total		Canada		Japan	
		1953-55	1960-61	1953-55	1960-61	1953-55	1960-61
<b>Group I</b>							
(1) Mining, construction, and other industrial machinery (85)	Total	100.0	100.0	27.9	18.3	3.8	3.7
	United States	40.4	32.4	24.6	15.9	2.6	2.1
	Rest of world	59.6	67.6	3.3	2.4	1.2	1.6
(2) Electrical machinery, apparatus, and appliances (80)	Total	100.0	100.0	30.6	15.1	1.9	1.9
	United States	36.9	27.4	26.8	11.6	1.3	1.5
	Rest of world	63.1	72.6	3.8	3.5	0.6	0.4
(3) Passenger cars (90)	Total	100.0	100.0	22.0	17.2	3.7	0.5
	United States	23.8	9.4	14.9	5.1	2.0	0.3
	Rest of world	76.2	90.6	7.1	12.0	1.7	0.2
(4) Nondurable consumer goods, not elsewhere specified (95)	Total	100.0	100.0	37.1	20.2	1.5	1.3
	United States	39.9	29.3	32.5	15.6	0.9	0.7
	Rest of world	60.1	70.7	4.6	4.6	0.6	0.6
(5) Durable consumer goods, not elsewhere specified (91)	Total	100.0	100.0	21.7	15.8	2.1	2.7
	United States	23.8	21.3	14.8	10.3	0.9	1.6
	Rest of world	76.2	78.7	6.9	5.5	1.2	1.1
(6) Clothing (92)	Total	100.0	100.0	18.1	11.3	1.5	0.3
	United States	12.5	7.7	8.7	2.5	0.9	0.2
	Rest of world	87.5	92.3	9.4	8.8	0.6	0.1
(7) Office machinery (81)	Total	100.0	100.0	16.0	10.9	8.3	9.4
	United States	43.5	37.9	13.6	8.9	6.5	6.3
	Rest of world	56.5	62.1	2.4	2.0	1.8	3.1
(8) Organic chemicals (21)	Total	100.0	100.0	13.1	3.2	5.7	6.2
	United States	33.7	31.7	12.1	2.3	4.1	4.5
	Rest of world	66.3	58.3	1.0	0.9	1.6	1.7
<b>Group II</b>							
(9) Power generating machinery, excluding electrical (83)	Total	100.0	100.0	25.6	29.4	2.9	4.9
	United States	46.5	33.4	21.5	12.0	2.2	4.3
	Rest of world	53.5	66.6	4.1	17.4	0.7	0.6
(10) Footwear, other textile manufactures, other than clothing (93)	Total	100.0	100.0	29.8	15.0	1.3	0.4
	United States	13.1	7.0	10.7	5.7	0.3	0.1
	Rest of world	86.9	93.0	19.1	9.3	1.0	0.3
(11) Medical and pharmaceutical products (94)	Total	100.0	100.0	13.4	8.9	7.1	5.6
	United States	36.3	26.6	11.1	6.5	4.7	2.5
	Rest of world	63.7	73.4	2.3	2.4	2.4	3.1
(12) Prefabricated buildings and building fixtures (52)	Total	100.0	100.0	37.9	25.6	0.8	0.5
	United States	36.1	21.7	34.3	19.6	0.6	0.3
	Rest of world	63.9	78.3	3.6	6.0	0.2	0.2
<b>Group III</b>							
(13) Steel mill products (62)	Total	100.0	100.0	14.5	7.2	0.9	2.4
	United States	21.3	10.0	11.4	4.5	0.5	0.6
	Rest of world	78.7	90.0	3.1	2.7	0.4	1.8
(14) Motor vehicles, other than passenger cars (86)	Total	100.0	100.0	42.9	40.1	2.7	1.0
	United States	53.8	45.0	41.7	37.8	0.8	0.8
	Rest of world	46.2	55.0	1.2	2.3	1.9	0.2
(15) Metal manufactures, excluding ordnance (70)	Total	100.0	100.0	41.9	27.8	1.4	1.1
	United States	41.1	29.9	35.9	22.8	0.9	0.6
	Rest of world	58.9	70.1	6.0	5.0	0.5	0.5
(16) Agricultural machinery and tractors (82)	Total	100.0	100.0	56.9	40.8	0.5	0.6
	United States	60.1	45.0	54.9	37.3	0.3	0.3
	Rest of world	34.9	55.0	2.0	3.5	0.2	0.3
(17) Metalworking machinery (84)	Total	100.0	100.0	17.0	7.2	5.7	12.0
	United States	43.8	34.7	13.9	5.6	3.8	6.5
	Rest of world	56.2	65.3	3.1	1.6	1.9	5.5
(18) Inorganic chemicals (20)	Total	100.0	100.0	11.5	7.3	7.5	3.5
	United States	30.0	21.9	9.1	5.3	7.4	2.3
	Rest of world	70.0	78.1	2.4	2.0	0.1	1.2
(19) Ordnance (71)	Total	100.0	100.0	18.7	7.8	0.4	1.4
	United States	18.5	29.9	14.0	5.1	0.2	1.2
	Rest of world	81.5	70.1	4.7	2.7	0.2	0.2
(20) Aircraft, railway vehicles, and ships (87)	Total	100.0	100.0	24.4	15.1	2.5	4.7
	United States	36.3	42.4	21.9	12.0	1.5	2.7
	Rest of world	63.7	57.6	2.5	3.1	1.0	2.0

\*Including Austria, Denmark, Norway, and Sweden; excluding Switzerland and Portugal.

COUNTRIES: PERCENTAGE SHARE OF EACH COUNTRY IN TOTAL IMPORTS OF  
IMPORTS FROM THE UNITED STATES AND FROM REST OF WORLD, 1953-55 AND 1960-61

<i>European Free Trade Area</i>				<i>European Economic Community</i>					
<i>U. K.</i>		<i>Others</i>		<i>Germany</i>		<i>France</i>		<i>Other<sup>b</sup></i>	
1953-55	1960-61	1953-55	1960-61	1953-55	1960-61	1953-55	1960-61	1953-55	1960-61
8.0	11.2	16.6	17.5	5.2	12.1	10.8	11.0	27.7	26.2 (1)
2.8	3.7	2.2	1.9	1.1	2.6	2.7	2.4	4.3	3.8
5.2	7.5	14.4	15.6	4.1	9.5	8.1	8.6	23.4	22.4
6.0	8.7	19.1	20.8	4.0	11.1	7.6	9.4	30.8	33.0 (2)
1.2	2.9	1.1	2.0	0.5	2.5	2.2	3.5	3.8	3.4
4.8	5.8	18.0	18.8	3.5	8.6	5.4	5.9	27.0	29.6
2.6	3.9	44.8	29.7	2.6	8.0	4.2	7.4	20.1	33.3 (3)
0.2	0.1	3.7	1.2	0.1	0.3	2.2	0.4	0.8	2.0
2.4	3.8	41.1	28.6	2.5	7.7	2.0	7.0	19.3	31.3
9.9	13.9	14.0	14.4	5.5	20.8	7.9	7.6	24.0	21.8 (4)
1.5	3.2	1.4	1.2	0.4	5.9	1.3	1.3	1.8	1.4
8.4	10.7	12.6	13.2	5.1	14.9	6.6	6.3	22.2	20.4
7.9	11.1	17.7	16.3	7.5	13.2	8.1	8.9	34.9	32.0 (5)
1.3	2.0	0.9	1.4	1.9	1.7	1.3	1.4	2.6	2.9
6.6	9.1	16.8	14.9	5.6	11.5	6.8	7.5	32.3	29.1
10.3	18.8	28.3	19.0	12.6	22.2	3.5	6.2	25.8	22.2 (6)
0.5	1.0	0.2	0.7	0.1	1.0	1.2	1.9	1.0	0.4
9.8	17.8	28.1	18.3	12.5	21.2	2.3	4.3	24.8	21.8
14.6	13.8	11.6	13.6	10.7	18.3	16.4	16.8	22.5	17.2 (7)
6.8	5.3	1.8	3.0	3.5	5.7	5.1	4.5	6.3	4.2
7.8	8.5	9.8	10.6	7.2	12.6	11.3	12.3	16.2	13.0
20.7	15.3	10.9	11.5	9.3	17.3	13.2	12.3	26.9	34.2 (8)
4.3	4.3	1.3	1.8	3.1	7.3	2.4	3.4	6.4	8.1
16.4	11.0	9.6	9.7	6.2	10.0	10.8	8.9	20.5	26.1
18.5	13.3	12.4	11.8	2.3	8.8	9.3	9.3	28.9	22.5 (9)
12.4	3.3	0.9	3.1	0.3	2.7	2.7	3.1	6.4	4.9
6.1	10.0	11.5	8.7	2.0	6.1	6.6	6.2	22.5	17.6
21.4	19.3	16.1	17.7	8.4	25.4	6.3	5.3	16.8	17.0 (10)
0.5	0.6	—	0.1	0.2	0.1	0.6	0.2	0.8	0.2
20.9	18.7	16.1	17.6	8.2	25.3	5.7	5.1	16.0	16.8
15.9	5.5	13.4	19.6	8.3	12.7	11.2	11.9	30.8	35.8 (11)
5.4	1.6	1.8	2.4	1.3	2.8	2.8	2.1	9.2	8.7
10.5	3.9	11.6	17.2	7.0	9.9	8.4	9.8	21.6	27.1
7.3	1.5	15.9	15.6	3.6	18.6	5.2	9.6	29.2	28.6 (12)
0.6	0.4	0.4	0.2	—	0.3	—	0.4	0.2	0.5
6.7	1.1	15.5	15.4	3.6	18.3	5.2	9.2	29.0	28.1
13.1	7.6	20.2	17.9	18.2	21.0	5.3	15.1	27.8	28.8 (13)
3.5	1.4	1.6	0.8	0.6	1.1	0.5	0.2	3.2	1.4
9.6	6.2	18.6	17.1	17.6	19.9	4.8	14.9	24.6	27.4
6.1	5.0	20.2	22.5	1.3	5.4	2.1	4.0	24.8	22.0 (14)
1.0	0.9	3.2	2.3	0.2	0.7	0.6	0.9	6.4	1.6
5.1	4.1	17.0	20.2	1.1	4.7	1.5	3.1	18.4	20.4
4.6	8.6	18.9	18.1	2.4	9.0	4.7	8.9	26.1	26.5 (15)
0.6	1.9	0.9	0.8	0.3	0.9	0.8	1.3	1.8	1.6
4.0	6.7	18.0	17.3	2.1	8.1	3.9	7.6	24.3	24.9
3.0	4.2	14.2	19.1	1.6	6.8	8.4	15.6	15.4	12.9 (16)
0.7	1.4	1.6	2.4	—	0.6	1.1	2.1	1.5	0.9
2.3	2.8	12.6	16.7	1.6	6.2	7.3	13.5	13.9	12.0
23.2	14.4	10.4	15.2	6.7	15.0	16.5	14.0	20.9	22.2 (17)
9.9	6.0	1.5	2.9	2.6	5.0	6.3	3.2	5.9	5.5
13.3	8.4	8.9	12.3	4.1	10.0	10.2	10.8	15.0	16.7
16.9	14.1	22.5	26.7	9.7	13.9	9.4	10.9	22.5	23.6 (18)
3.8	3.3	1.7	1.6	1.6	2.8	3.9	3.2	2.6	3.4
13.1	10.8	20.8	25.1	8.1	11.1	5.5	7.7	19.9	20.2
10.2	20.2	19.2	33.9	6.0	2.7	0.8	3.8	44.9	30.2 (19)
1.5	7.6	0.6	9.6	—	1.2	—	0.7	2.3	4.5
8.7	12.6	18.6	24.3	6.0	1.5	0.8	3.1	42.6	25.7
11.7	8.8	35.8	31.2	2.9	7.8	9.7	9.7	13.1	22.7 (20)
2.6	4.5	1.6	2.9	0.5	4.2	4.1	5.9	4.1	10.2
9.1	4.3	34.2	28.3	2.4	3.6	5.6	3.8	9.0	12.5

<sup>b</sup>Belgium-Luxembourg, Italy, and Netherlands.

the Common Market countries, and Japan. Much of the effort will be spent in devising methods for measurement in what is so far an uncharted territory. One main object is to construct and test measures of price competitiveness in the hope that other agencies will be encouraged to broaden the commodity coverage of price comparisons and to carry them forward in time on a continuing basis. There are strong indications, even now, that a successful outcome of this study would lead to further work in the area.

The data so far have been mainly from two types of source. American companies that sell metal and machinery products in international trade have supplied time series of export prices and comparisons of their prices with those of foreign competitors, or more frequently, of their own overseas affiliates. A larger group of companies, many outside the metal-product and machinery industries, have provided us with data on purchases: comparisons of offers by American and foreign suppliers or of actual purchases from both sources, such as comparisons of prices paid by parent companies in this country with prices paid by affiliates in foreign countries. Some international companies, it was found in the course of our interviewing, keep systematic accounts of costs of specific products in various countries, and several have been generous in supplying these records to the National Bureau. Further data on purchase offers are being collected from federal agencies and others who buy internationally through formal competitive bidding.

Prospects for the success of the measurement effort and for the testing of several types of data against each other have improved greatly during the past year. Several new sources of information have been uncovered which will fill what originally threatened to be serious gaps in coverage. The limiting factor on the study is no longer the existence of relevant data but the resources to collect and analyse it.

Foreign governments or firms are a further possible source of comparative price information. One collection effort has been initiated abroad, and it is hoped that other such studies can be arranged.

The schedule for the study now calls for continued emphasis on data collection until the summer of 1964 and for another year devoted to analysis of the data and preparation of a report.

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## FOREIGN TRADE AND BUSINESS CYCLES

Is a flourishing home market an obstacle to, or a necessary condition for, a thriving export trade? To throw light on this much-debated question is one of the aims of my investigation of the historical relations between exports and business cycles in the United States since 1880. Economic theory, it is true, told us long ago that a buoyant home market diverts resources away from exports. Yet, there are those who consider this traditional view a great fallacy and who argue that the surge in productivity which accompanies rising home demand stimulates rather than stifles exports.

Neither this theory nor the traditional one has thus far been supported by more than fragmentary empirical evidence. Some information concerning the United States is now provided by my analysis of the behavior of the values, quantities, and prices of four large classes of exports—finished manufactures, semimanufactures, crude materials, and foods—during U.S. business cycles. The export movements have, further, been related to fluctuations in foreign demand, so that we are able to distinguish to a certain extent between variations caused by world cycles and those brought on by domestic conditions. Combination of the National Bureau's method of cyclical analysis with partial correlation techniques is particularly useful in this context. A preliminary study of total export value was published in 1961 (*American Exports During Business Cycles, 1879-1958*, Occasional Paper 76). In the main study, the statistical work and the draft of the report have been com-

pleted, and the introduction and summary remain to be written.

One of the findings is that, since 1921, quantities, prices, and thus values of our total exports and of the crude materials and manufactures classes (but not foods) tended to rise more often and more rapidly during domestic business expansions than during contractions. Furthermore, the more vigorous the domestic expansion, the more likely was a large rise in the export series, and the more severe the business recession, the more likely a sharp fall of exports. Can this behavior be attributed to world demand rising and falling together with the domestic business swings and thus be reconciled with the expectations of traditional theory?

There is no doubt that the export series moved closely in step with total foreign imports, which I take to represent foreign demand. Though the response of export quantities to world cycles was much stronger and more regular than that of prices, the latter, too, were typically higher at peaks than at troughs of world imports. With demand pulling quantities and prices in the same direction, export values underwent large conforming swings. In aggregate export value, as much as 80 per cent of the total cyclical variation is accounted for by world import cycles, a very high figure as this measure goes.

But to what extent does the close relation of exports to foreign cycles explain their positive relation to domestic cycles? The former run parallel to the latter only part of the time. For instance, during 1952-54 and partly in the 1920's, world trade and U.S. business moved in opposite directions. Thus, one may doubt whether the positive relation of exports to world trade can explain their positive relation to domestic cycles.

By partial correlation analysis of cycle amplitudes and by other methods, we obtain some

answers to this question. First and foremost, we find that correlation of total export value and U.S. business cycles is near zero, when the influence of variations in world demand is eliminated. Expansion or contraction of the home economy does not seem to have any systematic independent effect on the total value of exports. Since total value is the strategic figure from the balance of payments point of view, this finding has important policy implications. To regard it as refutation of traditional theory, however, would be mistaken since theory, correctly interpreted, refers to export quantities, not values. And the impact of a thriving home economy on the total quantity of exports tends, indeed, to be a depressing one. What restricts quantities, however, also raises export prices and the two effects offset each other, on the average, in the resulting dollar value of exports. The result thus accords with expectations of traditional theory: domestic business expansion with a given foreign demand raises prices and reduces the volume of exports. What could not be foreseen, of course, is that the two effects are about equal, on the average, so that prosperity is about as likely to be accompanied by a rise as by a fall in export value.

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## OTHER STUDIES

Herbert B. Woolley's study, "Measuring Transactions Between World Areas," has been approved for publication by the Directors and will be sent to press after final revisions have been completed. Walther P. Michael has completed a redraft of his supporting manuscript, "International Capital Movements, 1950-54."

