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basis are published by the employment security agencies of each state.

The long-term trend in a state appears to have the expected influence on the corrected state amplitude. For the 1948-1950-1953 cycle, the rank correlation between corrected amplitude and growth is -0.35 . In this cycle, therefore, the states with the more rapid long-term growth rates experienced smaller cyclical swings. In addition, analysis of variance tests indicate that growth has a significant influence on variability within size classes.

I am continuing this analysis on the relation between size, growth, and variability for the other three business cycles mentioned above. A brief report indicating how the analysis applies to a single state was published in the *Review of New Jersey Business*, January 1956, entitled, "Employment Cycles in New Jersey Manufacturing Industries."

GEORGE H. BORTS

OTHER STUDIES

Five studies were published during 1955 and early 1956:

Personal Income during Business Cycles, by Daniel Creamer

Consumption and Business Fluctuations: A Case Study of the Shoe, Leather, Hide Sequence, by Ruth P. Mack

Short-Term Economic Forecasting, Studies in Income and Wealth, Volume Seventeen

Policies to Combat Depression, Special Conference Series 7

The Korean War and United States Economic Activity, 1950-1952, Occasional Paper 49, by Bert G. Hickman

Two books are in press:

A Theory of the Consumption Function, by Milton Friedman

Measurement and Behavior of Unemployment, Special Conference Series 8

The monograph by Oskar Morgenstern, "International Financial Transactions and Business Cycles," will shortly be ready for review by the Board. Other manuscripts in preparation are "Harvest Cycles," by Geoffrey H. Moore, and "Cyclical Behavior of Federal Receipts and Expenditures since 1879," by John Firestone.

An exploratory study of the quality of credit in booms and depressions is reported in Section 4; Ilse Mintz reports on her study of cycles in foreign trade in Section 6.

2. National Income and Capital Formation

CAPITAL FORMATION AND FINANCING IN THE UNITED STATES

The results of this study of long-term trends and future prospects, initiated in 1950 with the aid of a grant from the Life Insurance Association of America, are being issued in a series of monographs and briefer papers as well as in a summary volume. The reports published to date are:

The Role of Federal Credit Aids in Residential Construction, Occasional Paper 39, by Leo Grebler

The Volume of Residential Construction, 1889-1950, Technical Paper 9, by David M. Blank

Capital and Output Trends in Manufacturing Industries, 1880-1948, Occasional Paper 41, by Daniel Creamer

The Share of Financial Intermediaries in National Wealth and National Assets, 1900-1949, Occasional Paper 42, by Raymond W. Goldsmith

Trends and Cycles in Capital Formation by United States Railroads, 1870-1950, Occasional Paper 43, by Melville J. Ulmer

The Growth of Physical Capital in Agriculture, 1870-1950, Occasional Paper 44, by Alvin S. Tostlebe

Capital and Output Trends in Mining Industries, 1870-1948, Occasional Paper 45, by Israel Borenstein

"Proportion of Capital Formation to National Products," by Simon Kuznets, *American Economic Association Proceedings*, May 1952

"Factors in the Demand for Capital Funds," by Simon Kuznets, *Investment of Life Insurance Funds*, edited by David McCahan, University of Pennsylvania Press, 1953

"Concepts and Assumptions in Long-Term Projections of National Product," by Simon Kuznets, *Long Range Economic Projection*, Studies in Income and Wealth, Volume Sixteen, 1954

"International Differences in Capital Formation and Financing," by Simon Kuznets, *Capital Formation and Economic Growth*, Special Conference Series 6, 1955

"Financial Structure and Economic Growth in Advanced Countries; An Experiment in Comparative Financial Morphology," by Raymond W. Goldsmith, *ibid.*

"Trends in Capital Formation and Financing in Agriculture," by Alvin S. Tostlebe, *The Journal of Finance*, May 1955

"Capital Formation and Financing Trends in Manufacturing and Mining, 1900-1953," by Sergei P. Dobrovolsky, *ibid.*

"Long-Term Trends in the Financing of Regulated Industries, 1870-1950," by Melville J. Ulmer, *ibid.*

The first of the following reports is in press and the second will soon go to press; the rest are being reviewed by the staff:

Capital Formation in Residential Real Estate: Trends and Prospects, by Leo Grebler, David M. Blank, and Louis Winnick

"Financial Intermediaries in the Saving and Investment Process in the American Economy, 1900-1952," by Raymond W. Goldsmith

"Capital Formation and Financing in Agriculture, 1870-1950," by Alvin S. Tostlebe

"The Economics of Industrial Growth: A Study of Capital Formation in Transportation and Public Utility Industries," by Melville J. Ulmer

"Capital Formation and Financing in Manufacturing and Mining," by Daniel Creamer, Israel Borenstein, and Sergei P. Dobrovolsky

The monograph, "Government Financial Capital Requirements," by Morris Copeland, is reported on below.

The summary volume on long-term trends in capital formation and financing is being written. The scope of the volume is suggested by the following outline:

Part I, the introductory part of the volume, has been completed. Chapter 1 discusses the concepts of capital formation, and the problem of financing; and Chapter 2, the meaning of long-term trends.

Part II will deal with trends in capital formation since 1869. Chapter 3 will discuss the relations between capital formation and national product; Chapter 4, the structure of capital formation by type, and the major ultimate users; and Chapter 5, the record for the private sectors of the domestic economy.

Part III will deal with trends in financing since 1900. Chapter 6 will discuss the main saver groups and the main forms of savings; Chapter 7, the broad trends in financing the major user groups, and industrial sectors; and Chapter 8, the changes in the importance of various groups of financial intermediaries and their possible effects on the availability of capital funds for various users.

Part IV will deal with the long swings in the rate of secular change. Chapter 9 will discuss the long swings in population, national product, and capital formation; and Chapter 10, long swings in financial flows and prices, for which the evidence is much more limited.

Part V will point out various implications of the findings. Chapter 11 will discuss the implications for the methodology of projection — the importance of the distinction between long-term trends and long swings, and the interrelations among the various trends and swings; and Chapter 12 will present the major elements in the historical past and the foreseeable future.

Like all outlines, the one above is subject to revision. The attempt throughout will be not only to set forth the major findings suggested by the estimates but also to explore the possibilities of various explanatory hypotheses. Both aims can be only incompletely realized. I hope that a draft will be completed before the end of 1956.

Work on the broad statistical framework of estimates of population, national product, and components — on a countrywide basis from 1869 to date — is completed. This part of the manuscript has been mimeographed and will be issued either as a supplement to the summary volume or as a second volume.

SIMON KUZNETS

Government

Work on "Government Financial Capital Requirements" was resumed during 1955 after an interruption of nearly a year.

Drafts of the first three chapters had previously been completed. These chapters deal with the nature of government financial requirements; the relation of such requirements to budget deficits; and approximate patterns in state and local requirements. During 1955, drafts of three more chapters were substantially completed and work on Chapter 7 — the last chapter except for a brief summary — was begun.

Chapter 4 traces the development of restrictions on state and local borrowing powers and the shifts in the apportionment of functions and of the responsibilities for financing them among different types of government units. Chapter 5 deals with the assumption by the federal government of some responsibility for maintaining a high and stable level of employment and examines the experience since 1929 with the problems and financial requirements this responsibility has entailed. Chapter 6 is mainly concerned with emergency fiscal procedures developed during the two world wars and the decade of the 1930's. It deals also with the growth of government financial assets, particularly in connection with the development of social insurance programs and of federal credit agencies. Chapter 7 is concerned with wartime deficit financing, international aid as a source of federal financial requirements, and certain considerations relating to debt retirement.

Assistance on this study during the year was provided by a small grant from the Ely Lilly Fund of the Cornell Social Science Research Center.

MORRIS A. COPELAND

CAPITAL FINANCING IN PETROLEUM AND STEEL

Our study of capital financing in the petroleum and steel industries was directed toward several objectives: (1) to establish how financing

patterns of individual firms differed from those of the industries as a whole; (2) to explain differences in patterns between firms in the same industry and to find the reasons for changes in financing patterns; (3) to see what effect the availability of funds from "internal" sources had on the volume of gross capital expenditures; and (4) to compare, to the extent possible, charges for depreciation with replacement requirements.

Our data consist of sources and uses of funds for a sample of twenty-four oil companies and seventeen steel companies covering the period 1921-1953. The smallest oil company in our sample had total assets in 1953 of \$16.0 million and the smallest steel company, \$24.9 million. With the exception of certain capital expenditure breakdowns for the petroleum companies, all of the data were developed from published financial statements.

The analysis of financing patterns was based first on variations between companies, and over time for individual companies, in the relative roles of gross reinvested earnings (including the portion charged to depreciation) and of net changes in the value of preferred stock, long-term debt, and common stock (adjusted for revaluations) minus reinvested earnings. Then we examined changes in the roles of each of the components of gross reinvested earnings and of funds secured from the sale of securities. The relationships between these sources of funds were analyzed in terms of the effect upon them of the following variables: the size of the company, the capital expenditure rate (measured by the ratio of cumulated gross capital expenditures to book value of fixed property at the beginning of the period), the stability of earnings (measured by the ratio of average changes in earnings, from peak to trough and trough to peak in earnings, to average earnings for the period), and balance sheet debt to equity ratios. This was done for the periods 1921-1930, 1931-1940, and 1947-1953 (in some cases, the period 1946-1953 was employed).

The larger a company was, the more stable was its financing pattern. But size differences did not explain differences among companies

in the relative importance to them of the different sources of funds. Differences in capital expenditure rates between companies and for particular companies over time appeared to be the most important variable in explaining variations in the role of internal financing. The higher the capital expenditure rate, the greater tended to be the relative role of funds secured from the sale of securities.

The stability of earnings over time did not contribute to explaining differences between companies in the ratio of debt to equity capital as sources of funds. Indeed, the relationship appeared on the whole to be mildly negative (companies with less stable earnings plus interest tended to finance a somewhat larger share of their financial needs through debt).

Balance sheet ratios of debt to equity as of the end of 1946 seemed to have a clear relationship to the ratio of debt and equity capital as sources of funds in the 1947-1953 period. Companies with lower balance sheet debt ratios tended to finance more of their capital requirements through debt in the subsequent years. For 1921-1940, the relationship is obscured by a number of factors such as the frequent occurrence of negative earnings.

To explore further the relationship of differences in capital expenditure rates to patterns of financing, we aggregated data for years in which capital expenditures fell below the median rate in that period and for those in which they fell above it for each company in each of three periods. This was done for the several sources of funds as well as for working capital and capital expenditures.

Except for preferred stock, the volume of each source of funds was usually greater in high capital expenditure years than in low. Preferred stock conformed neither positively nor negatively to changes in capital expenditures; working capital, negatively.

If we turn from the direction of change to its amplitude, debt and common stock as sources of funds for oil companies fluctuated more widely, on the average, than capital expenditures between high and low capital expenditure years; depreciation and retained earnings, more narrowly. For steel companies,

debt fluctuated again more widely than capital expenditures, depreciation and retained earnings less widely, with the pattern for common stock unclear because of variations between the three intervals into which the 1921-1953 period was broken.

When ratios for individual companies of gross reinvested earnings to gross capital expenditures were correlated with capital expenditure rates, the resulting rank correlations were either negative or roughly zero. There was no instance of a significant positive correlation for the relationship for either industry when cumulated data were used for each of three periods, 1921-1930, 1931-1940, and 1947-1953. This suggests that internal sources of funds have a relatively passive role in relation to the volume of gross capital expenditure — a conclusion reinforced by the finding that internal financing declines in relative importance in years of high capital expenditures.

Average capital financing patterns for the two industries were not representative of the financing patterns of individual firms comprising these industries. When each source of funds is expressed as a ratio to total sources, the dispersion in the resultant ratios proves to be very wide. The coefficient of variation for most ratios and in most time intervals exceeded a value of .5, and in some cases exceeded unity. However, there appeared to be some narrowing of variation in the post-World War II period. Changes in aggregate industry financing patterns were associated with almost as many cases of individual company changes in an opposite direction from those of the aggregates as cases of the same direction of change. This evidence suggests that for the categories of companies with which our study was concerned, industry characteristics do not play a significant role in determining capital financing patterns. We are currently pursuing further the analysis of the effects of profitability on the character of financing for our sample of companies.

Some experiments were made in measuring "real" replacement requirements for petroleum refining with the ultimate objective of comparing them to depreciation charges. On

the basis of cross-section data, the relationship between gross capital expenditures on petroleum refining, cumulated for groups of years, and net additions to petroleum refining capacity was examined. The former were expressed as a ratio to average capacity during the period, and the latter as a ratio to initial year capacity. A curve was fitted to the observations for a sample of companies. The estimated value of gross capital expenditures that corresponds to a zero increment in capacity may be taken to represent expenditures on replacement. This concept of replacement differs from the familiar concept of capital consumption. Deflating for price changes in capital goods, we found that expenditures on replacement per unit of capacity, measured by the above method, were 1.56 times as large in the 1947-1953 period as they were in the 1937-1939 one. This is probably largely the result of a positive relation between capital expenditures on replacement and on expansion, though differences in the quality of equipment in the two periods may have also affected replacement costs (a factor for which allowances are not made in the price index used as a deflator).

MICHAEL GORT

ECONOMIC GROWTH IN THE UNITED STATES

I spent the fall months on a review of the more general estimates of long-term movements of output, labor and capital input, and productivity. I presented a paper entitled: "Resource and Output Trends in the United States since 1870" at the Christmas meetings of the American Economic Association. It will be published in the Association's *Proceedings* and reprints will subsequently be distributed by the National Bureau as Occasional Paper 52.

I shall spend the next months studying the data on assets, liabilities, capital formation, and output compiled in connection with the study of capital formation and financing. By observing the movement of these series during economic fluctuations of different duration, I hope I can throw some light on the question whether there are significant cycles longer than those recognized in the National Bureau busi-

ness cycle chronology, see whether there are any systematic features in the longer movements, and perhaps learn something more about the antecedents of serious depressions. It seems reasonable that if there are economic developments (other than secular developments) that carry over from one short business cycle to another, they are likely to show themselves in capital assets and liabilities considered in relation to measures of activity or to prices and yields.

MOSES ABRAMOVITZ

INTERSTATE DIFFERENCES IN ECONOMIC GROWTH

The two analyses outlined below form a part of the University of Pennsylvania Study of Population Redistribution and Economic Growth directed by Simon Kuznets and Dorothy S. Thomas. These analyses, together with other analytical results of the Study and the basic figures, will be published in a forthcoming volume of *Memoirs* of the American Philosophical Society. Work on the first analysis was begun in September 1955 and will commence on the second in the near future.

Long-term movements in state income, population, and capital. For four points in time, 1880, 1900, 1919-1921 and 1949-1951, data have been organized for each state on total personal income, service income (the sum of wages, salaries, and proprietors' income), and property income (the sum of rental income, personal interest income, and dividends). Each of these is expressed in both total and per capita terms. In addition, the service income figures have been subdivided into income originating in agriculture and in nonagriculture, and the respective industry estimates have been placed on a per worker basis. The data have been adjusted for changes over time in the national price level but not for differences among the various states in price level or trend.

These data will be used to analyze questions such as the following:

How has the geographical distribution of personal income changed since 1880? Are the states closer together or farther apart in their

per capita total, service, and property incomes? In service income per worker in agriculture, in nonagriculture, and in all industry?

What were the components that made for relatively high or low levels of per capita income in each state at each date? For relative growth or decline?

For each state and date, data have also been assembled on the state's total population and on the total, agricultural, and nonagricultural capital located there (except for 1949 to 1951, for which no data are available). The change in population between successive dates has been divided into that due to natural increase and that due to net migration; and the change in nonagricultural capital, into the share financed by residents of the given state and the share attributable to the net inflow of capital from other states.

Among the questions these data will be used to analyze are the following:

How has the geographical distribution of population changed since 1880? Did natural increase or did net migration make for growth (decline) in population in each state?

What changes have occurred in the country-wide distribution of total capital? To what extent was nonagricultural capital accumulation financed by residents of the state? By net external investment?

Finally, the data on state income, population, and capital will be brought together to examine more general questions:

To what extent were high rates of growth of income during this period associated with high rates of population growth and capital accumulation? What was the relation, if any, between interstate differences in levels and rates of change of per capita or per worker income and differences in net migration of persons and in net external investment?

The bulk of the data were compiled by members of the staff of the University of Pennsylvania Study of Population Redistribution and Economic Growth. The migration estimates were done by Everett S. Lee, the labor force estimates by Carol Brainerd and Ann Ratner Miller, and I made the income and capital estimates.

Interstate differences in the growth and characteristics of manufacturing. Data have been assembled for each state for the decennial census dates from 1879 to 1939 and for 1947 on the number of establishments, the average number of wage earners, total wages, value added, the value of products (available only through 1939), and total capital (available through 1919). These data will be used to analyze shifts in the location of manufacturing activity since 1879 and to compare the various states with respect to levels and trends in such characteristics as value added per wage earner, capital per wage earner, and capital per unit of product (net and gross).

The data to be used were also derived in the course of the University of Pennsylvania Study and are to be published in the volume previously mentioned. They are taken from the decennial manufacturing censuses but have been adjusted to improve comparability.

In addition, for about seventy individual manufacturing industries, comparable, though fairly broad, industrial classifications covering this period have been developed. Data on wages and wage earners in these individual industries in 1879, 1899, 1919, and 1947 are now being transcribed. These figures will make it possible to find out approximately how much the redistribution of manufacturing as a whole was caused by differences in the national growth rates of industries that differed in their initial location and how much by shifts in the geographical distribution of given industries.

The data for manufacturing as a whole and for individual manufacturing industries are also to be used to throw further light on the analysis of long-term movements in state income.

RICHARD EASTERLIN

OTHER STUDIES

Three conference proceedings volumes were published during 1955 and three are in press: *Capital Formation and Economic Growth*, Special Conference Series 6

Short-Term Economic Forecasting, Studies in Income and Wealth, Volume Seventeen

Input-Output Analysis: An Appraisal, Studies in Income and Wealth, Volume Eighteen

Capital Formation: Concepts, Measurement, and Controlling Factors, Studies in Income and Wealth, Volume Nineteen (in press)

Problems in the International Comparison of Economic Accounts, Studies in Income and Wealth, Volume Twenty (in press)

Regional Income, Studies in Income and Wealth, Volume Twenty-one (in press)

A special conference on consumption and economic development was held in October, and the November meeting of the Conference on Research in Income and Wealth was devoted to a review of the national income esti-

mates of the Department of Commerce. The proceedings at these conferences are described in Part Two. The meeting of the Conference on Research in Income and Wealth, in March 1956, was concerned with an appraisal of the 1950 census income data (see Part Two).

Milton Friedman's book, *A Theory of the Consumption Function*, is in press, and George Garvy's exploratory report on research in income size distribution is being edited. For a report on the study of postwar capital markets and on the exploratory study of credit and savings facilities see Section 4.

3. Wages, Employment, and Productivity

UNION MEMBERSHIP BY STATE, 1939 AND 1953

The most important gap in American statistics of union membership has been the absence of data showing the distribution of membership by state and region. This deficiency has now been repaired. With the cooperation of union officials, who have made their records available to him, and the use of published union records, Leo Troy has constructed reliable estimates of union membership in each state for 1939 and 1953. The figures and the percentage increases are shown in Table 6.

TABLE 6

TRADE UNION MEMBERSHIP IN THE
UNITED STATES, BY STATE, 1939 AND 1953

	Membership (thousands)		Increase (per cent)
	1939	1953	
United States	6,517.7	16,217.3	148.8
New York	959.8	2,051.8	113.8
Pennsylvania	738.6	1,540.7	108.6
California	424.0	1,392.5	228.4
Illinois	590.7	1,358.7	130.0
Ohio	429.3	1,162.6	170.8
Michigan	269.1	1,062.0	294.6
New Jersey	200.6	645.4	221.7
Indiana	176.7	569.6	222.4
Massachusetts	208.9	546.1	161.4
Missouri	180.0	510.5	183.6
Wisconsin	193.9	418.7	115.9
Washington	175.3	393.6	124.5
Texas	110.5	374.8	239.2
Minnesota	133.5	327.6	145.4
Connecticut	63.2	232.1	267.2

	Membership (thousands)		Increase (per cent)
	1939	1953	
West Virginia	153.5	223.9	45.9
Maryland	58.5	203.6	248.0
Oregon	77.4	201.5	160.3
Tennessee	71.0	187.3	163.8
Alabama	63.9	168.3	163.4
Iowa	73.9	159.2	115.4
Virginia	68.4	156.1	128.2
Kentucky	84.7	155.1	83.1
Florida	43.6	135.9	211.7
Georgia	35.7	135.8	280.4
Louisiana	37.8	135.8	259.3
Kansas	39.3	130.8	232.8
Colorado	40.2	114.2	184.1
District of Columbia	71.1	107.8	51.6
Oklahoma	33.7	86.7	157.3
North Carolina	25.7	83.8	226.1
Rhode Island	24.7	82.8	235.2
Montana	39.8	72.5	82.2
Nebraska	27.1	68.6	153.1
Arkansas	25.0	67.9	171.6
Maine	15.2	58.9	287.5
Utah	21.3	56.9	167.1
Arizona	15.6	55.7	257.1
Mississippi	13.0	50.0	284.6
South Carolina	12.2	49.7	307.4
New Hampshire	10.6	43.1	306.6
Idaho	11.5	29.1	153.0
Delaware	5.8	25.8	344.8
New Mexico	8.8	25.0	184.1
Wyoming	14.4	24.2	68.1
Nevada	6.3	21.8	246.0
Vermont	8.5	19.6	130.6
South Dakota	6.1	17.4	185.2
North Dakota	7.9	17.3	119.0
Not distributed	411.4	458.5	