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Chapter Author: Albert R. Koch

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FACTORS INFLUENCING THE DEMAND FOR FUNDS  
BY BUSINESS ENTERPRISES, AND THE PROBLEM OF  
PROJECTING BUSINESS CAPITAL REQUIREMENTS

PART 2 — *A Method of Projecting Expenditures and  
Financial Requirements of Manufacturing Corporations  
under Full-Employment Conditions\**

ALBERT R. KOCH  
*Board of Governors of the  
Federal Reserve System*

I INTRODUCTION

The purpose of this part is to apply the basic method of projecting business expenditures and financial requirements under full-employment conditions, outlined in general terms in Part 1 of the paper, to a specific segment of the business population for a selected future period of time. It should be stressed at the outset that the projected figures and remarks that follow are based on 1) certain assumptions concerning future business and economic conditions, and 2) certain relationships among the various aspects of business and financial behavior as reflected in the statistics covering prior years.

The projected figures should in no sense be considered forecasts or predictions. There is no discussion in this paper of either the problem of transition from the present to the projected level of manufacturing spending and financing, or of the relationship between the manufacturing activ-

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ity with which the projections are concerned and the achievement or lack of achievement of the assumed full-employment conditions.

The segment of American business selected for analysis is the universe of manufacturing corporations. This selection was made mainly because more adequate financial statistics are available in this area than in any other. The time period chosen for the analysis is the five-year period 1950-54. The annual average sources and uses of funds of these corporations are projected for this period.

The computations assume conditions of relatively full employment in the nation over the next five years; specifically, conditions similar to those that characterized 1948. They assume no cyclical depression or recession and subsequent recovery: in other words, a period of relatively stable economic growth. The development of a sizable cyclical fluctuation in business during this period would, of course, alter the figures and conclusions significantly. The method utilized, however, is flexible enough to take account of different sets of assumptions regarding future business conditions. The assumptions have been adopted in part for reasons of simplicity, but also in part because steady growth can be thought of as a goal for the economy.

The computations are in terms of average 1949 prices. In that year the wholesale price index of commodities other than farm products and foods was about 80 percent above that of 1939 and 4 percent below its postwar peak in late 1948. An assumption of a moderate increase in prices would raise expenditures and financial requirements somewhat, but would not significantly alter the basic conclusions of this study. This would not, of course, be true if prices rose substantially again, say as they did during the years 1945-48.

This study is based on aggregate data of all manufacturing corporations considered as a group, and therefore has the shortcomings of all analyses based on aggregates. The results are not necessarily applicable to groups of corporations within major or minor industrial divisions, or to size groups of manufacturing, or to individual manufacturing corporations. Analyses similar to that made here could and should be made for narrower segments of the population of manufacturing corporations. Such future studies would not only provide useful information on the expenditures and financial requirements of the more specific segments of the population of manufacturing corporations, but would also provide data to test the significance of the use of aggregate data for this type of analysis. It could very well be true that as the economy grows, shifts of activities and financing among significant manufacturing industries or among manufacturing cor-

porations of varying size would invalidate analyses utilizing aggregate data.

More specifically, this second part of the article attempts to answer questions such as the following: Under relative prosperity and a stable growth of business, what would be the required volume of expenditures by manufacturing corporations on plant, equipment, inventory accumulation and customer financing, on the average, over the next five years? How large could their profits, retained earnings and internal financing be expected to be? Under conditions such as these, what volume of funds would they require from such outside sources as banks, insurance companies, mortgage and security markets? What volume of equity financing through stock sales would be required in order to maintain a sound equity-to-debt relationship?

The specific way in which the basic method outlined earlier was used is described in Section II of this paper. It involved projecting the dollar volume of sales of manufacturing corporations from projections of manufacturing production and the gross national product. The different types of expenditures, or uses of funds, of these corporations, such as plant and equipment outlays, inventory accumulation and customer financing, were then estimated, in the main, on the basis of these projected sales data. These estimates involved principally projections of historical relationships between each of the different types of expenditures and sales.

The projected volumes of funds available from suppliers (increase in trade debt) and from internal financing (undistributed profits and depreciation allowances) were estimated on a similar basis. The difference between the volume of expenditures and that of trade and internal financing was assumed to be the additional outside financing required from such sources as banks, insurance companies, and the mortgage and securities markets. The breakdown of this additional outside financing into debt and equity money was determined in such a way as to maintain the present debt-to-equity ratio of manufacturing corporations.

Basically, this method involves the criterion that the financial position of manufacturing corporations, measured by the debt-to-equity ratio, does not deteriorate. The method is, of course, flexible enough to permit substituting other debt-to-equity ratios or financial criteria other than the debt-to-equity ratio.

Average, high, and low projections of spending, profits, and internal and external sources of funds have been made. That is to say, separate sets of projections of sources and uses of funds have been included in the analysis involving:

- 1) Average uses and average internal sources of funds and the resulting external sources
- 2) High uses and high internal sources of funds and the resulting external sources
- 3) Low uses and low internal sources of funds and the resulting external sources
- 4) High uses and low internal sources of funds and the resulting external sources

Other combinations of assumptions could be developed to test other possible hypotheses. The ones included in the text should be considered only as illustrative.

## II THE DERIVATION OF THE PROJECTIONS

Many of the projected specific expenditures and sources of funds of manufacturing corporations were made on the basis of an assumed relationship of such variables to changes in the dollar volume of manufacturing sales. It was felt that the change in sales was a reasonable measure of changes in the operating, or transactions, needs of these enterprises and that many business expenditures and financial requirements varied with such changing needs.

The projections of manufacturing sales were derived from a projected index of manufacturing production, which in turn was derived from projections of the gross national product. The derivation of the production index from the gross national product was made by the Bureau of Labor Statistics, using the techniques developed in the Inter-Industry Relations Study, sometimes referred to as the "input-output" study. Since it was assumed that there would be no significant price change, sales were projected to increase proportionately with the production index.

A gross national product of \$305 billion was assumed for 1954. This is the mid-point in the range of the gross national product as projected by the Council of Economic Advisers in its current studies of economic growth objectives for the economy. It allows for only minor variation in prices from the 1949 level. A gross national product of \$305 billion in 1954 would mean a 21 percent increase in the physical volume of manufacturing output over 1948, a year of relatively full employment, according to the "input-output" calculations of the Bureau of Labor Statistics.<sup>1</sup> Assuming no significant change in prices from 1949 through 1954, this

<sup>1</sup> These calculations assumed some slight decrease in manufacturing and increase in service activity from 1948 to 1954.

level of manufacturing production by 1954 implies a level of manufacturing sales of \$247 billion in 1954 and \$227 billion on the average during the years 1950-54.

The projection of each of the specific expenditures and financial sources were derived as follows.

#### PLANT AND EQUIPMENT EXPENDITURES

The projections of plant and equipment expenditures were based on the combination of methods developed at the Council of Economic Advisers and described in Part 1 of this paper. These methods involved 1) the use of the McGraw-Hill survey data on capacity and actual and anticipated plant and equipment outlays classified by utilization either for expansion or replacement and modernization, 2) the historical relationship between plant and equipment outlays and growth in capacity as indicated by growth of output between selected years of presumed high utilization of capacity, and 3) extension of long-term trends and the relationship between expenditures and the gross national product and industrial production.

All three methods yield surprisingly similar results, namely a projection of annual average outlays in 1950-54 of between \$6.3 and \$6.8 billion. This range is 5-10 percent below actual expenditures in 1949 and 20-25 percent below peak annual postwar expenditures in 1948 expressed in 1949 prices.

The low projection of plant and equipment expenditures used in this paper is \$6.8, and the high, \$7.3 billion. The additional half billion dollars has been added to the computed range on the assumption that conditions more favorable to business investment will prevail during the next five years than in the past, and that such conditions will tend to speed up replacement and modernization. In addition, it was felt that over the next five years a somewhat higher volume of plant and equipment expenditures by manufacturing corporations than was indicated by the computed range would be necessary as one of the private investment outlets for private saving, in order for the assumption of reasonably full employment to be at all tenable. The estimated average used in this paper in the case of plant and equipment expenditures, as well as other types of business spending and sources of financing, is the mean of the high and low estimates.

#### SELECTED ITEMS OF WORKING CAPITAL

The projected annual additions to inventories, accounts receivable (customer financing), cash holdings, and accounts payable (financing by trade suppliers) over 1950-54 were computed on the assumption that

Table 1

DERIVATION OF PROJECTED INCREASES IN SELECTED WORKING CAPITAL ITEMS OF MANUFACTURING CORPORATIONS, ANNUAL AVERAGE 1950-54<sup>a</sup>

(in billions of dollars and 1949 prices)

	<i>Annual Average 1950-54</i>
<i>Cash</i>	
Low projection (change in sales/16)	\$ .6
High projection (change in sales/13)	.8
<i>Receivables</i>	
Low projection (change in sales/12)	.8
High projection (change in sales/8)	1.3
<i>Inventories</i>	
Low projection (change in sales/7)	1.4
High projection (change in sales/5)	2.0
<i>Trade Payables</i>	
Low projection (change in sales/21)	.5
High projection (change in sales/12)	.8

<sup>a</sup> Based on Appendix Tables 2 and 3. Low projection divisors are ratios of sales volume in 1949 to year-end holdings of cash, notes and accounts receivable, inventories, and accounts payable, respectively, as given in Appendix Table 3; high projection divisors are averages of the 1938-39 ratios for each of these accounts. Average annual change in sales is calculated from the 1949 sales figure shown in Appendix Table 2 and the projected 1954 sales figure of \$247 billion.

each of the items would increase with the dollar volume of sales, that is, with operating or transactions requirements. Past relationships of each of the items with sales were computed in the main from Treasury Department compilations of balance sheets of all manufacturing corporations as published in *Statistics of Income*, Part 2, brought up to date by data obtained from the Department of Commerce.

For the low projections of the annual increases in these variables it was assumed that they would rise with sales in approximately the same proportion as had been maintained between the volume of each of the items on hand at the end of 1949, and 1949 sales. These projections are shown in Table 1. The 1949 relationship of each of these variables to sales was below that prevailing in the immediate prewar years.

For the high projections of the annual increases in inventories, receivables, cash and payables, it was assumed that these items would increase relative to sales in the same proportion as their volume on hand rose in the immediate prewar years relative to sales in those years. No provision was made for building the volume of each of the items on hand at the end of 1949 back up to its relationship with sales before the war. The decision not to make such a provision was based on the assumption that at

the higher projected level of sales, a smaller dollar volume of these selected working capital elements would be required per dollar of sales.

Corporate income taxes payable at the end of each year were projected by applying an effective tax rate of 40 percent to the volume of profits before taxes as projected in the next subsection. In the projections of annual additions to U. S. government security holdings it was assumed that manufacturing corporations as a group would "fund" their accrued taxes in the form of government securities. That is to say, that they would, on balance, purchase additional government securities each year to offset the increase in their tax liabilities. This practice became quite common among business corporations, particularly large ones, during the recent war when tax liabilities were so large and grew so rapidly. Most corporations have continued to follow the practice in the postwar period. Thus it was assumed for the purpose of this study that an increase in tax liabilities was offset by an equal dollar increase in government security holdings.

#### PROFITS, TAXES AND DIVIDENDS

Profits before income taxes were also projected on the assumption that they would vary with sales as they have in the past. The past relationship was computed from data published by the National Income Division of the Department of Commerce.<sup>2</sup> Since it was assumed that prices would vary in the future only slightly from the 1949 level, the profits figures used in computing this relationship were adjusted to exclude inventory gains and losses as measured by the inventory valuation adjustment of the Department. So adjusted, profits before taxes were about 9 percent of sales in 1949, 7 percent in 1937, and 8½ percent in 1929.

For the low projection of profits before taxes, an adjusted profits-to-sales ratio of 6 percent was assumed, and for the high projection, a ratio of 9 percent. Application of the lower of these ratios to the assumed average annual dollar volume of sales over the next five years, however, yielded a low estimate of average annual dollar profits before taxes about 25 percent below profits in 1949 adjusted for inventory losses. It was thought that such a low profits figure would be inconsistent with the other projections, for example those on plant and equipment outlays, so a low projection of profits 10 percent below those actually experienced in 1949 was chosen. The high projection of average annual profits before taxes is about 15 percent above those in 1949.

Both low and high projections of undivided profits, as is shown in

<sup>2</sup> The profits data published by the Department of Commerce are before the deduction of charges for depletion in order to make them comparable to other components of the national income and gross national product series.

Table 2

DERIVATION OF PROJECTED UNDISTRIBUTED PROFITS OF MANUFACTURING CORPORATIONS, ANNUAL AVERAGE 1950-54<sup>a</sup>

(dollar figures in billions and 1949 prices)

	<i>Annual Average 1950-54</i>
<i>Low Projection</i>	
Profits before taxes <sup>b</sup>	\$16.2
Corporate income taxes (40%)	6.5
Profits after taxes	<u>9.7</u>
Dividends ( $\frac{2}{3}$ profits after taxes)	6.5
Undistributed profits	<u>\$ 3.2</u>
<i>High Projection</i>	
Profits before taxes <sup>c</sup>	\$20.4
Corporate income taxes (40%)	8.2
Profits after taxes	<u>12.2</u>
Dividends ( $\frac{2}{3}$ profits after taxes)	8.1
Undistributed profits	<u>\$ 4.1</u>

<sup>a</sup> Based on data in Appendix Table 2.<sup>b</sup> Estimated as 10 percent below profits before taxes in 1949 (i.e., the sum of adjusted profits before taxes and inventory valuation adjustment shown in Appendix Table 2).<sup>c</sup> Estimated as 15 percent above the adjusted figure on profits before taxes in 1949 or \$18.9 billion plus inventory valuation adjustment in 1949.

Table 2, were based on the same assumptions concerning the proportion of profits paid out in federal and state corporate income taxes and cash dividends to stockholders. The projections assumed that 40 percent of profits before taxes would be paid out as taxes and that two-thirds of profits after taxes would be paid out as dividends. Over the past three years the effective corporate income tax rate of all manufacturing corporations has averaged 38 percent of profits before taxes, and dividends have averaged about 40 percent of profits after taxes. However, dividends were over 80 percent of profits after taxes in 1937 and 65 percent in 1929. The low rate of recent years has been due mainly to a large volume of expenditures in this period.

## DEPRECIATION

Projected average annual depreciation charges were derived by applying an assumed rate of depreciation to a projected volume of gross plant and equipment on hand. The rate was assumed equal to the estimated actual rate of 3½ percent in 1949, computed from data published jointly by the Federal Trade Commission and the Securities and Exchange Commission in their *Quarterly Industrial Financial Report Series*, adjusted on the basis

of selected information from the Treasury Department's publication, *Statistics of Income*.<sup>3</sup>

The projected volume of gross plant and equipment on hand was computed by adding to estimated gross plant and equipment on hand at the end of 1949 new expenditures during each subsequent year, and subtracting depreciation charges computed by multiplying gross plant and equipment on hand at the beginning of a given year by 3½ percent. The low and high estimates of depreciation charges were obtained by the use of the low and high plant and equipment expenditures projected as described above. Rounded off, they both come out to the same figure, \$3.4 billion per year.

#### OUTSIDE FINANCING OTHER THAN BY TRADE SUPPLIERS

The volume of outside financing other than trade debt was the residual difference between total expenditures and the sum of the funds obtained from trade suppliers and internal financing. This additional outside financing was divided into debt and stock financing in such a way that the present debt-to-equity ratio of manufacturing corporations considered as a group was maintained. No attempt was made to allocate the new debt financing among bank loans, insurance company loans, mortgages, and public bond sales.

The debt-to-equity ratio of manufacturing corporations at the end of

<sup>3</sup> The *Quarterly Industrial Financial Report Series* contains data on 1) the volume of plant and equipment plus land on hand, net of depreciation, and 2) depreciation plus depletion charges. *Statistics of Income* data were used to estimate 1) gross plant and equipment less land on hand and 2) depreciation charges separately. It was necessary to exclude depletion charges, for they are included in profits as defined by the National Income Division of the Department of Commerce.

According to the *Financial Report Series*, depreciation and depletion allowances of all manufacturing corporations probably amounted to a little over \$3.6 billion in 1949. According to *Statistics of Income*, depletion allowances alone were about 20 percent of depletion plus depreciation allowances in 1946, the latest year for which such data are available. Thus, depreciation allowances alone probably totaled about \$3.0 billion in 1948.

From *Financial Report Series* data, it can also be estimated that the value of plant, equipment and land net of depreciation and depletion reserves of all manufacturing corporations at the end of 1949 was about \$41 billion. *Statistics of Income* data indicated that the value of gross plant and equipment excluding land at the end of 1946 was about double the value of plant and equipment plus land net of reserves. Doubling \$41 billion yields a value of gross manufacturing plant and equipment (the depreciation base) at the end of 1949 of about \$82 billion. This amount divided by \$3 billion, estimated depreciation allowances for 1949, yields a current average annual rate of depreciation of about 3½ percent.

Table 3  
ESTIMATED PAST AND PROJECTED SOURCES AND USES OF FUNDS OF MANUFACTURING CORPORATIONS<sup>a</sup>  
(in billions)

	ANNUAL AVERAGE, 1950-54, ASSUMING 1949 PRICES AND:							
	1946	1947	1948	1949	Average Uses & Internal Sources (A)	High Uses & Internal Sources (B)	Low Uses & Internal Sources (C)	High Uses & Low Internal Sources (D)
<i>Sources</i>								
Internal	\$ 6.6	\$10.1	\$10.8	\$8.0	\$ 7.1	\$ 7.5	\$6.6	\$6.6
Undistributed profits <sup>b</sup>	4.3	7.6	8.1	5.0	3.7	4.1	3.2	3.2
Depreciation allowances	2.3	2.5	2.7	3.0	3.4	3.4	3.4	3.4
External	3.0	5.6	2.6	-1.9	3.4	3.9	3.0	4.8
Trade payables	1.7	.6	.3	-.7	.7	.8	.5	.8
Income taxes payable	-1.2	2.4	.3	-1.2	.e	.e	.e	.e
Bank loans	.9	1.1	.4	-.7	2.0	2.2	1.9	2.2
Bonds and mortgages	.7	.8	1.2	.5	.7	.9	.6	1.8
Stocks	.9	.7	.4	.2	.0	.0	.0	.0
Other net sources & stat. discrepancy	.6	-.8	.6	1.5	.0	.0	.0	.0
TOTAL SOURCES	\$10.2	\$14.9	\$14.0	\$7.6	\$10.5	\$11.4	\$9.6	\$11.4
<i>Uses</i>								
Plant and equipment expenditures	\$ 6.6	\$ 7.6	\$ 8.3	\$7.1	\$7.0	\$ 7.3	\$6.8	\$ 7.3
Inventory accumulation	6.3	4.5	4.9	-3.2	1.7	2.0	1.4	2.0
Customer financing	1.2	2.0	.8	.9	1.1	1.3	.8	1.3
Increase in cash holdings	-.6	1.0	-.2	.7	.7	.8	.6	.8
Increase in govt. security holdings	-3.3	-.2	.2	2.1	.e	.e	.e	.e
TOTAL USES	\$10.2	\$14.9	\$14.0	\$7.6	\$10.5	\$11.4	\$9.6	\$11.4

<sup>a</sup> Data for 1946-49 are based on U. S. Department of Commerce

figures; projections for the annual average, 1950-54, were estimated (using method described in the text) and are based primarily on historical data in Appendix Tables 1-3.

<sup>b</sup> Includes depletion.

<sup>c</sup> A change in accrued income taxes is assumed to be offset by a corresponding change in government security holdings.

1949 was about 38 percent.<sup>4</sup> It has declined somewhat since the end of the war and is now considerably below its level during World War II. It is still, however, somewhat higher than it was during the late twenties and thirties. The past debt-to-equity ratios of manufacturing corporations were computed from *Statistics of Income* data through 1946 and carried through 1949 on the basis of information obtained from the Department of Commerce.

The fact that the present debt-to-equity ratio is somewhat higher than it was before the war may be explained in part, at least, by the sharp post-war price rise. As a result of this rise, a significant portion of the assets, and hence the net worth, of manufacturing corporations is now recorded on their books, and in their published financial statements, at a value considerably below those prevailing in the current market. If all assets were valued at market prices, the present debt-to-equity ratio would be much lower. The assumption of the maintenance of prices at 1949 levels would in and of itself probably tend to produce a lower debt-to-equity ratio as lower-valued assets are replaced by higher-valued ones.

In terms of a criterion that measures financial strength more accurately than the debt-to-equity ratio, namely the ratio of interest paid to income available for the payment of interest, manufacturing corporations have recently been in a much better position than they were in either the late twenties or thirties. In 1948 this ratio was 3 percent as compared with 9 percent in 1939 and 13 percent in 1929.<sup>5</sup> In view of the present low level of this ratio, it has been assumed that the present debt-to-equity ratio of manufacturing corporations is not excessive, and that projected increases in new outside financing could safely be in debt form to the extent that the current debt-to-equity ratio is maintained.

### III THE FINDINGS

The projections of annual expenditures and financial requirements of all manufacturing corporations, on the average, over the next five years under the assumptions stated in this paper are summarized in Table 3. Several sets of figures are presented in Columns A through D involving different combinations of average, high, and low projections of expenditures, profits, internal funds and financing by trade suppliers to see what volume of additional external financing would thereby be required.

It should be stressed again that these figures are projections on the

<sup>4</sup> See Appendix Table 3.

<sup>5</sup> Monetary interest paid as defined by the National Income Division of the Department of Commerce divided by profits before taxes plus monetary interest paid.

basis of specific assumptions; they should in no sense be considered forecasts. To repeat, the main assumptions made were 1) that relatively full employment conditions will be maintained in the economy, and 2) that historical relationships will continue between (a) manufacturing spending and general economic conditions, and (b) manufacturing spending, profitability, and methods of financing.

Under these assumptions, a central finding on the projected expenditures of manufacturing corporations is that, barring a specific price rise, total expenditures on new plant, equipment and inventory accumulation will be somewhat smaller over the next half decade than they have been in the postwar period prior to 1949. This is the case whether we assume average, high, or low expenditures of each type, as described previously and as shown in Columns A, B, and C of Table 3. Assuming average expenditures, the annual total would be only approximately two-thirds of actual expenditures per year in 1946-48.

The decline in total spending would be due mainly to a reduced demand for additional inventories. Large increases in outlays for inventory accumulation have generally occurred in the past only when prices have risen sharply or when a large real deficiency in the stock of goods on hand has developed, for example as a result of a war. Assuming an average increase relative to sales (as was assumed in Column A of the table), annual outlays on inventories in 1950-54 would only amount to about a third of average annual outlays during the years 1946-48.

Under the assumed conditions, annual plant and equipment expenditures during the coming five-year period, on the other hand, would come closer to the level of recent years. The \$7.0 billion average shown in Column A is only slightly below actual expenditures in 1949 and perhaps 15 percent below those of 1948 expressed in 1949 prices. (It was in 1948 that plant and equipment expenditures of manufacturing corporations reached their annual postwar peak.) This is true whether expenditures are considered in current year or constant prices. The high estimate of plant and equipment expenditures in 1950-54, \$7.3 billion, would be 3 percent above 1949 outlays.

How would these expenditures be financed by manufacturing corporations under the assumptions made in this paper? One of the most important findings regarding financing is that equity financing through stock sales would have to be fairly significant relative to the actual volume that has occurred in recent years in order to maintain the present debt-to-equity relationship. Assuming average expenditures and internal financing (Column A), an average annual volume of \$700 million would have to come from new stock sales. This is equal to the volume actually obtained

by manufacturing corporations in 1947 and somewhat below the peak annual volume of the postwar period obtained in 1946 when stock prices reached their postwar high. The stock price index compiled by Standard and Poor's Corporation and based on 416 common stocks averaged 140 in 1946 and 123 in 1947 (1935-39 = 100). In May 1950 the index averaged 147.

Under assumptions of high expenditures and internal sources of funds (Column B), the volume of new stock sales would have to be somewhat higher than \$700 million, and with low expenditures and internal sources (Column C), it would have to be somewhat lower. These volumes of new stock financing seem to be reasonable possibilities of achievement in view of the assumed course of profits and in view of the fact that the average annual dollar volume of dividend payments in 1950-54 is projected at more than twice the volume actually paid out in 1946.

Under the assumed conditions, the volume of internal financing, undistributed profits and depreciation allowances would be somewhat smaller relative to total financing requirements in 1950-54 than it has been in recent years. Whether average, high, or low expenditures and internal financing are assumed, the ratio of internal to total financing would vary from about 65 to 70 percent in 1950-54 as compared with 75 to 80 percent in 1948 and, on the average, during the four-year period 1946-49.

Finally, Column D of Table 3 includes what might be considered the maximum total requirements of manufacturing corporations for outside financing during the next five years under the conditions assumed in this paper. It is based on a high projection of expenditures and low projections of both profitability and available volume of internal funds and trade credit. Under these conditions, manufacturing corporations would require an annual volume of approximately \$4 billion of outside financing in 1950-54, excluding that provided by trade suppliers. Slightly under half of this sum would have to come from the proceeds of stock sales in order to maintain the present debt-to-equity ratio of these companies over the period.

## APPENDIX

### NOTE ON THE DATA

A careful reading of the statistical material in this paper will disclose several inconsistencies from one table to another. It will also disclose differences in data here presented from data published in other sources. Since none of these inconsistencies and differences is serious enough to alter the general conclusions of the paper, no attempt has been made to

Appendix Table 1  
 COMPOSITE BALANCE SHEET OF MANUFACTURING CORPORATIONS, DECEMBER 31, 1926-49<sup>a</sup>  
 (in billions)

	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
<i>Assets</i>													
Cash	\$ 3.5	\$ 3.5	\$ 3.9	\$ 3.8	\$ 4.0	\$ 3.5	\$ 3.3	\$ 3.1	\$ 3.0	\$ 3.4	\$ 3.5	\$ 3.3	\$ 4.0
Notes & accts. rec. (net)	8.6	8.9	9.5	9.6	8.7	7.8	6.5	6.8	7.5	7.4	7.4	7.0	6.8
Inventories	12.3	11.9	12.0	12.6	11.2	9.0	7.3	8.1	8.3	8.7	10.0	11.5	10.2
Investments, gov't oblig.	1.8	2.0	2.2	2.0	1.8	1.7	1.9	2.0	1.6	1.4	1.3	1.1	1.1
Land & capital assets (net)	26.6	26.0	27.0	28.2	29.0	28.3	25.6	24.4	20.5	20.2	20.7	21.5	21.5
Other invest. & assets	11.9	13.2	12.4	14.0	14.6	13.5	14.3	13.5	11.7	11.6	11.3	11.3	11.2
<b>TOTAL ASSETS</b>	<b>\$64.7</b>	<b>\$65.6</b>	<b>\$67.1</b>	<b>\$70.3</b>	<b>\$69.2</b>	<b>\$63.8</b>	<b>\$59.0</b>	<b>\$57.8</b>	<b>\$52.5</b>	<b>\$52.7</b>	<b>\$54.3</b>	<b>\$55.7</b>	<b>\$54.8</b>
<i>Liabilities and Net Worth</i>													
Accounts payable	\$ 3.2	\$ 3.6	\$ 7.4	\$ 7.4	\$ 6.9	\$ 6.0	\$ 5.5	\$ 5.7	\$ 6.8	\$ 6.7	\$ 7.1	\$ 4.7	\$ 4.2
Bonds, notes & mortgages payable	4.0	3.8	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	2.3
In less than 1 year	4.3	4.8	5.4	5.4	5.9	5.6	5.2	5.0	4.0	4.4	4.3	4.9	5.3
In 1 year or more	6.9	5.4	4.1	4.7	4.4	4.6	4.3	3.7	3.6	3.9	4.4	2.3	1.8
Other liabilities	7.4	7.4	7.6	7.0	6.8	6.9	6.6	6.7	5.9	5.6	5.5	5.7	5.7
Capital stock, preferred	24.0	24.2	24.9	26.2	27.0	25.4	24.6	23.7	21.0	20.3	20.1	20.3	20.1
Capital stock, common	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>
Surplus reserves	14.9	16.5	17.5	19.5	18.3	15.3	12.8	12.9	11.2	11.7	12.8	15.3	13.5
Surplus & undiv. prof. less def.													
<b>TOTAL LIABILITIES &amp; NET WORTH</b>	<b>\$64.7</b>	<b>\$65.6</b>	<b>\$67.1</b>	<b>\$70.3</b>	<b>\$69.2</b>	<b>\$63.8</b>	<b>\$59.0</b>	<b>\$57.8</b>	<b>\$52.5</b>	<b>\$52.7</b>	<b>\$54.3</b>	<b>\$55.7</b>	<b>\$54.8</b>

	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
<b>Assets</b>											
Cash	\$ 4.6	\$ 5.7	\$ 6.1	\$ 9.1	\$ 11.8	\$ 11.9	\$ 11.3	\$ 11.0	\$ 12.0	\$ 11.8	\$ 12.5
Notes & accts. rec. (net)	7.4	8.4	10.9	13.8	15.0	14.6	13.6	13.5	15.5	16.3	17.2
Inventories	11.0	12.3	16.2	18.4	19.2	18.4	17.3	23.3	27.8	32.7	29.5
Investments, gov't oblig.	1.2	1.1	2.5	5.7	9.2	11.3	11.0	7.2	7.0	7.2	9.3
Land & capital assets (net)	23.1	23.6	24.7	26.6	27.0	25.9	25.1	29.4	34.5	40.1	44.2
Other invest. & assets	9.5	9.3	9.6	11.5	12.7	13.9	12.8	12.0	13.1	12.7	11.0
<b>TOTAL ASSETS</b>	<b>\$56.7</b>	<b>\$60.5</b>	<b>\$70.1</b>	<b>\$85.1</b>	<b>\$94.8</b>	<b>\$96.0</b>	<b>\$91.0</b>	<b>\$96.4</b>	<b>\$109.9</b>	<b>\$120.8</b>	<b>\$123.7</b>
<b>Liabilities and Net Worth</b>											
Accounts payable	\$ 4.8	\$ 5.3	\$ 6.4	\$ 8.5	\$ 9.3	\$ 9.3	\$ 8.3	\$ 9.2	\$ 9.8	\$ 10.1	\$ 9.4
Bonds, notes & mortgages payable											
In less than 1 year	2.2	2.0	2.8	2.7	3.2	3.2	2.7	3.5	13.3	14.9	14.7
In 1 year or more	5.3	5.4	5.7	6.2	6.6	6.3	6.4	7.9			
Other liabilities	2.0	3.7	6.8	12.7	15.0	14.1	9.4	8.2	10.9	11.4	10.0
Capital stock, preferred	5.7	5.6	5.5	5.9	5.8	5.9	6.1	6.3	30.7	31.1	31.3
Capital stock, common	20.0	19.8	19.9	21.2	21.6	22.4	22.4	23.7			
Surplus reserves	2.2	2.6	4.0	5.9	7.5	7.2	6.0	5.7			
Surplus & undiv. prof. less def.	14.6	16.2	18.9	22.1	25.8	27.5	29.7	31.9	45.2	53.3	58.3
<b>TOTAL LIABILITIES &amp; NET WORTH</b>	<b>\$56.7</b>	<b>\$60.5</b>	<b>\$70.1</b>	<b>\$85.1</b>	<b>\$94.8</b>	<b>\$96.0</b>	<b>\$91.0</b>	<b>\$96.4</b>	<b>\$109.9</b>	<b>\$120.8</b>	<b>\$123.7</b>

\*Data for 1926-46 are from *Statistics of Income*; data for 1947-49

are estimates based on U. S. Department of Commerce data. Amounts are rounded and do not always add to totals.

<sup>b</sup> Included in accounts payable.  
<sup>c</sup> Included in surplus and undivided profits in 1937 and in other liabilities from 1934 to 1936 and presumably in earlier years.

Appendix Table 2  
SELECTED INCOME STATEMENT ITEMS AND RATIOS FOR MANUFACTURING CORPORATIONS, 1929-49<sup>a</sup>

(dollar figures in billions)

Year	Sales	Inventory Valuation Adjustment	Adjusted Profits Before Taxes <sup>b</sup>	Income Taxes	Profits After Taxes	Cash Dividends	Undistributed Profits	Profits Before Taxes of Sales	Income Taxes Before Taxes After Taxes	Dividends as % of Profits
1929	\$ 70.3	\$ .3	\$ 5.6	\$ .6	\$ 5.0	\$3.2	\$1.8	8.4%	11%	64%
1930	58.5	2.2	2.3	.4	1.9	3.1	-1.2	7.7	17	163
1931	42.8	1.6	.1	.2	.1	2.3	-2.3	4.0	c	c
1932	31.0	.7	-1.1	.1	-1.2	1.3	-2.5	-1.3	c	c
1933	34.3	-1.3	1.0	.3	.7	1.2	-.4	.9	30	171
1934	40.1	-.5	1.8	.3	1.4	1.6	-.1	3.2	17	114
1935	46.8	-.2	2.8	.5	2.4	2.1	.2	5.6	18	88
1936	56.0	-.5	4.2	.7	3.4	2.9	.6	6.6	17	85
1937	61.5	.4	4.2	.8	3.5	2.9	.6	6.8	19	83
1938	50.0	.6	1.9	.5	1.5	1.5	a	5.0	26	100
1939	57.2	-.5	4.1	.8	3.3	2.1	1.2	6.3	20	64
1940	65.8	-.1	6.0	1.8	4.2	2.3	1.9	9.0	30	55
1941	92.0	-1.7	11.6	5.4	6.2	2.8	3.4	10.8	47	45
1942	116.3	-.7	13.0	7.5	5.5	2.4	3.1	10.6	58	44
1943	141.9	-.6	14.9	8.9	6.1	2.6	3.5	10.1	60	43
1944	151.0	-.2	14.4	8.0	6.4	2.8	3.6	9.4	56	44
1945	138.7	-.4	10.8	6.2	4.6	2.8	1.9	7.5	57	61
1946	136.9	-3.0	12.6	5.0	7.6	3.3	4.2	7.0	40	43
1947	187.0 <sup>c</sup>	-3.8	19.4	7.4	12.0	7.6	7.6	8.3	38	36
1948	209.4 <sup>c</sup>	-1.7	20.9	7.8	13.1	5.0	8.1	9.2	37	38
1949 <sup>c</sup>	197.0	1.5	16.5	6.3	10.3	5.4	5.0	9.1	38	52

<sup>a</sup> Source: U. S. Department of Commerce except for intercorporate dividends included in profits and dividends, which are from *Statistics of Income*.

<sup>b</sup> Profits before taxes less inventory valuation adjustment.

<sup>c</sup> Ratios omitted because of either net deficit or excess taxes over profits.

<sup>d</sup> Less than \$50,000.

<sup>e</sup> Estimated from related series or part-year data.

Appendix Table 3  
 SELECTED FINANCIAL RATIOS OF MANUFACTURING CORPORATIONS, DECEMBER 31, 1926-49<sup>a</sup>

Year	RATIO OF ANNUAL SALES TO:				DEBT AS A PERCENT OF EQUITY		
	Cash	Notes & Accts. Receivable (net)	Inventories	Accounts Payable	Incl. Surplus Res. in Equity	Incl. Surplus Res. in Debt	
1926	b	b	b	b	b	39.7%	
1927	b	b	b	b	b	36.6	
1928	b	b	b	b	b	33.8	
1929	18.5	7.3	5.6	b	b	33.2	
1930	14.6	6.7	5.2	b	b	33.0	
1931	12.2	5.5	4.8	b	b	34.0	
1932	9.4	4.8	4.2	b	b	34.1	
1933	11.1	5.0	4.2	b	b	33.3	
1934	13.4	5.3	4.8	b	b	37.8	
1935	13.8	6.3	5.4	b	b	39.9	
1936	16.0	7.6	5.6	b	b	41.1	
1937	18.6	8.8	5.3	13.1	35.1%	b	
1938	12.5	7.4	4.9	11.9	32.9	39.7	
1939	12.4	7.7	5.2	11.9	33.6	40.9	
1940	11.5	7.8	5.3	12.4	37.1	45.7	
1941	15.1	8.4	5.7	14.4	44.9	58.0	
1942	12.8	8.4	6.3	13.7	54.6	73.2	
1943	12.0	9.5	7.4	15.3	56.2	78.2	
1944	12.7	10.3	8.2	16.2	52.2	71.9	
1945	12.3	10.2	8.0	16.7	41.7	56.4	
1946	12.4	10.1	5.9	14.9	42.6	55.7	
1947	15.6	12.1	6.7	19.1	44.8	b	
1948	17.7	12.8	6.4	20.7	43.1	b	
1949	15.8	11.5	6.7	21.0	38.1	b	

<sup>a</sup> Computed from data in Appendix Tables 1 and 2.

<sup>b</sup> Not available.

eliminate them completely. The main reason for the discrepancies is that there are several basic sources of financial statistics on manufacturing corporations, namely, *Statistics of Income* of the Treasury Department, the *Quarterly Industrial Financial Report Series* of the Federal Trade Commission and the Securities and Exchange Commission, and the national income statistics of the Department of Commerce. Because of necessary differences in methods of collection and procedures of compilation, these data can probably never be completely reconciled. However, a thorough study of the possibility of making the basic data more consistent, or at least an investigation into the reasons why they differ, is certainly in order.

#### DISCUSSION AND COMMENT

*Discussion:*

EVSEY D. DOMAR, *The Johns Hopkins University*

Rates of growth, saving, investment and similar concepts are pleasant companions when you work with them theoretically and are free to make any assumptions you wish. But on an empirical plane you find them stubborn, elusive, and disagreeable. Whatever criticism I may express regarding the paper by Messrs. Hoover and Klein could, I am sure, have been easily made by them if the tables had been reversed.

The purpose of the paper is to estimate capital requirements under conditions of "sustainable maximum employment" — in other words, to find the "sustainable levels and patterns of business investment." The expression "sustainable levels of investment" appears in the paper rather frequently; so it does in recent reports of the Council of Economic Advisers. But since the meaning of the term remains hardly explained, it is not clear what capital requirements are being estimated.

It may be implied that if investment, as a percentage of gross or net national product, does not exceed a certain magnitude (or perhaps if the rate of growth of investment stays within certain limits), this magnitude can be sustained year after year. But what is the basis for the belief that it exists in the first place? Suppose it were established, say, at 15 percent. Does it follow that if investment proceeded in this manner for  $n$  years, there would be good reasons to expect a repetition of this performance for the  $(n + 1)$  year? Investment motives in our society are extremely complex,

and I doubt very much that if, say, five years were endowed with the correct amount of investment, the sixth and subsequent years would be assured of the same.

The idea of sustainable investment may mean, instead, that if investment proceeds at the correct rate, the economy remains in some sort of an equilibrium in the sense that certain maladjustments or disparities do not arise. But the nature of these disparities remains to be explored.

The traditional approach to problems of this kind has consisted in treating investment as an offset to savings; an estimate of the latter would then appear as a first step. This method was rejected by the authors for the following reasons: 1) the limited state of knowledge about our saving habits, 2) the difficulty of estimating all other offsets to savings besides investment, and 3) the fact that no basis for further breakdown of investment by industries would be obtained.

The method, in one variation or another, actually used by the authors consisted of the following steps:

- 1 A full-employment level of output or capacity was projected forward at some rate of growth which was regarded as stable and easily obtainable from historical data.
- 2 Investment requirements were then computed as a function of this expected growth in output.

Thus "sustainable" investment, as the dependent variable, was made a function of two independent variables: (a) the rate of growth of output, and (b) the relation between the investment and the increment in capacity resulting from it — what I shall call the capital coefficient.

It is striking that in a long-range problem of this type the rate of growth of capacity was assumed to be independent of the level of investment. Suppose the "correct" annual amount of (gross) investment over the next five years were estimated to average \$40 billion. What will happen, however, if actual investment reaches only \$30 billion? If the assumed rate of growth of output can still be achieved, the remaining \$10 billion of investment was evidently not needed. On the other hand, if the shortage of investment has prevented the realization of the expected growth of output, this growth cannot be treated as a variable independent of the level of investment.

What if actual investment exceeded the "sustainable" level? The authors seem to think that an excessive accumulation of capital and an excessive productive capacity would result. But it is also possible that additional investment would (via the multiplier process) bring about an increase in output sufficiently large to absorb this capacity without creating

any more trouble than would be created by a smaller amount of investment.

Is there no limit, then, to the amount of investment that an economy can usefully absorb? It seems to me that such a limit exists, or more correctly, that there may be several limits.

First of all, unless we welcome an inflation, investment should not exceed the amount the community desires to save (with due allowance for a possible government deficit). Thus the saving aspect enters the problem after all. It would have come in, in any case, even if we had accepted the idea of a sustainable level of investment, because the latter would have to be compared with savings in order to make certain that both deflation and inflation are avoided.

Secondly, there is the possibility that a high level of investment will eventually result in an excessive accumulation of capital relative to the available labor force. This presupposes, of course, that technological conditions impose a rather rigid relation between the quantities of capital and labor that can be utilized, a relation that cannot be quickly changed. This assumption, implied or explicit, underlies a goodly number of recent business cycle theories, particularly of the Keynesian variety, such as Hansen's, Harrod's, Kaldor's, and others. Whether it is well founded or not is hard to tell. It is possible to imagine some unreasonably large volume of investment, a good part of which will remain unused because of shortage of labor; but whether we have ever been — or are likely to be — in such a position, and whether it would handicap further investment, is more doubtful. After all, a good deal of capital is labor-saving by its very nature, and thus acts as a labor substitute. If labor shortage of this type is not important, a considerable part of our recent thinking on the whole subject has to be, I believe, reconsidered.

Finally, it is possible that in a capitalist society, the volume of private investment over a given period of time is a function of technological progress, changes in tastes and habits, and various institutional factors, so that if a good deal is invested this year, not enough will be left for the next. This does not imply that if more were invested next year, the investors would necessarily be disappointed; quite possibly they would not. But if investment is determined by these exogenous factors, it has to be used sparingly, so to speak, even though it may fall short of the limit imposed by the community's desire to save and the availability of labor.

Thus there may be at least three distinct limits to the proper amount of investment (besides limits to some measure of consistency in its internal structure, of which the authors are perfectly aware). None of the three criteria gives a sustainable level of investment in the sense that it can be expected to take place with a certain degree of automatic adjustment.

Before much more empirical work is done in estimating the levels of sustainable investment, a clarification of its nature is certainly desirable.

The second independent variable in the paper is the capital coefficient already mentioned, that is, the relation between investment and the annual increment in capacity resulting from it. Irrespective of the approach taken to the problem — whether we start from the growth in labor productivity or from the saving end — the magnitude of this coefficient has to be established, and we hope that it will be found reasonably stable. For some economists the use of this coefficient remains a taboo to this very day. If capital is a convenient and frequent substitute for labor and *vice versa*, and if this substitution depends primarily on their relative prices, which happen to be flexible, the capital coefficient will hardly have much stability. Those who try to estimate it betray their belief in its stability and unquestionably commit an act of heresy against the established body of economic theory — an act for which Messrs. Hoover and Klein deserve congratulations. But the problem itself is large and difficult and I wonder if it can be solved on the aggregate level. In manufacturing, for instance, this coefficient may be as low as 2 or 1, while in housing it may rise to 8 or 10. Hence a change in relative weights may seriously affect its magnitude.

If the capital coefficient has to be estimated on an aggregate level, I imagine that in an empirical problem gross investment, rather than net, would be relevant. After all, depreciation charges are usually aimed at recovering the monetary value of the investment over an arbitrary number of years and may not have much to do with physical productivity. If productive capacity for a number of years were known, as well as gross investment in plant, equipment and inventories in the intervening years, an estimate could possibly be made. But I am somewhat puzzled about the method referred to in the paper, which consists, if I understand it correctly, of subtracting from this gross accumulation of capital a certain allowance for a special depreciation so as to make the remainder proportional to increase in capacity. This, it appears to me, may actually be assuming a part of the answer to the problem.

An estimate of capital coefficients cannot, of course, be precise, and it should not be precise. In no society does every piece of capital equipment always work at its normal capacity. This is true even in Russia, in spite of all their planning. In our economy errors are always made and will be made. Competition among firms and industries implies by its very nature sometimes gradual, sometimes sudden, replacements of some productive apparatus by some other. This is what Schumpeter so aptly called “creative

destruction," but the magnitude of this destruction which is healthy and useful is unfortunately unknown.

Mr. Koch's paper is an attempt to apply the Hoover and Klein technique to a particular industry, in this case to manufacturing. His findings are of course based on the assumptions made, and since most of these assumptions are stated the reader is free to accept or to reject them.

I was a bit puzzled about his very first step — the estimate of expenditures on plant and equipment. This estimate was supposed to indicate expenditures needed to satisfy some assumed rate of growth of output. Yet he found it necessary to add to what he calls the "low projection" half a billion dollars "on the assumption that conditions more favorable to business investment will prevail during the next five years than in the past." What does the estimate become then — amount of investment which may be expected to take place under favorable business conditions? Yet he had another reason for that addition — the savings consideration. Is the estimate then the amount of investment in manufacturing needed to absorb a certain portion of total savings? These three concepts are not identical, and the respective amounts may well differ by more than half a billion.

Mr. Koch's estimate of undistributed profit appears to me to be on the low side as compared with recent years. His assumption that two-thirds of net profits after taxes are distributed in dividends may be somewhat excessive, particularly if large investments are undertaken. And I was rather surprised that his high investment estimate in 1950-54 was below the investment of 1947 and 1948 and only slightly above that of 1949. Is this due to the assumed "slight decrease in manufacturing" from 1948 to 1954 mentioned in footnote 1? Is the output of manufacturing expected to decline in the absolute sense?

On the whole one gets an impression from the paper that Mr. Koch regards the last three years as rather abnormal, and that his figures assume a return to normality. Leaving war years aside, it was only during this period out of the last twenty years that mass unemployment did not exist. Perhaps the maintenance of full employment requires a certain degree of abnormality. If so, the political situation appears to be most promising in this respect.

*Comment:*

O. J. FIRESTONE, *Department of Trade and Commerce, Ottawa, Canada*

I should like to comment on the observation made in connection with the papers by Messrs. Hoover, Klein and Koch, that too great confidence cannot be placed in the ability of businessmen to predict the quantities of investment they are likely to make at a future period, particularly if this future period is a year or longer.

We in Canada have had a bit of experience in this field. Over the last five years the Department of Reconstruction and Supply, now the Department of Trade and Commerce, has been undertaking surveys of investment intentions by both private and public agencies covering a period of a year ahead. As far as the business sector is concerned, these surveys are similar to those conducted by the SEC, with one important difference. We in Canada try to cover all business establishments doing more than a minimum amount of business (over \$50,000 gross sales per annum), while the SEC survey uses a sampling approach.

We have had pretty good response to our surveys, something like 75 percent of all business groups covered.<sup>1</sup> In the last few years business investment surveys in Canada have proved to be remarkably close. For example, the results for 1949 show total business investment forecast to come within 4 percent of actual realization.<sup>2</sup>

Our experience has been that in periods of high levels of economic activity the businessman has proved to be a pretty good forecaster. However, I am willing to agree that the real test of how good businessmen as a group are as forecasters has not yet been met. This test will come when a downturn in economic conditions occurs. Whether the businessman will remain as good a forecaster in times of declining economic activity as he has been in times of rising levels of employment remains to be seen, and I suppose only actual experience will give us an answer to that question.

<sup>1</sup> "Private and Public Investment in Canada, Outlook 1950" (Department of Trade and Commerce, Ottawa) p. 43.

<sup>2</sup> *Ibid.*, p. 46.

