

This PDF is a selection from an out-of-print volume from the
National Bureau of Economic Research

Volume Title: The Pattern of Corporate Financial Structure: A Cross-Section
View of Manufacturing, Mining, Trade, and Construction, 1937

Volume Author/Editor: Walter A. Chudson

Volume Publisher: NBER

Volume ISBN: 0-870-14135-X

Volume URL: <http://www.nber.org/books/chud45-1>

Publication Date: 1945

Chapter Title: The Current Ratio and Interrelationships of Working Capital Items

Chapter Author: Walter A. Chudson

Chapter URL: <http://www.nber.org/chapters/c9213>

Chapter pages in book: (p. 67 - 80)

THE CURRENT RATIO AND INTERRELATIONSHIPS OF WORKING CAPITAL ITEMS

ALTHOUGH THE VARIATIONS in individual working capital components, which we have traced thus far, are of independent interest, one important question concerning them naturally arises: Are these variations interrelated to some degree? For example, do industrial differences in notes payable parallel industrial differences in inventory holdings? Similar questions may be asked with reference to the classifications by corporate size and profitability. The most general basis for a consideration of such questions is the relationship between current assets and current liabilities as a whole—that is, the current ratio.¹

THE CURRENT RATIO

The current ratio occupies a time-honored position in the literature of financial structure, primarily because of its use as a guide in the analysis and prognosis of corporate solvency or financial strength. For the present study a brief treatment of the ratio will suffice to summarize the net effect of the individual variations of current assets and liabilities previously discussed. In certain cases the variations of the current ratio are the product of a constant numerator combined with a changing denominator; and in others the reverse is true. We shall therefore include in our discussion an examination of *total* current assets and *total* current liabilities, separately.

Industrial Variations

The exceptionally high—or exceptionally low—current ratio for a particular industry may frequently be traced to some individual component of the ratio. For example, tobacco products has the

¹ The current ratio is defined as the ratio of cash, marketable securities, receivables, and inventory to accounts payable, notes payable, and "other liabilities." In the reports of the Bureau of Internal Revenue for 1937, "other liabilities" consist primarily of accrued items which properly belong with current liabilities.

highest ratio of all the minor industrial divisions (Chart 8 and Data Book, Table C-28), reflecting primarily the extremely large inventory holdings of curing tobacco. The high ratios for a number of branches of the metals industry also result from relatively large inventory arising from a lengthy production process. On the other hand, the uniformly low current ratio among branches of mining and quarrying is due to the extremely small volume of inventory and receivables in those industries. To single out the numerator rather than the denominator as the determinant of a ratio may be misleading, but it is legitimate in the cases cited since they differ much more sharply in their current assets than in their current liabilities.

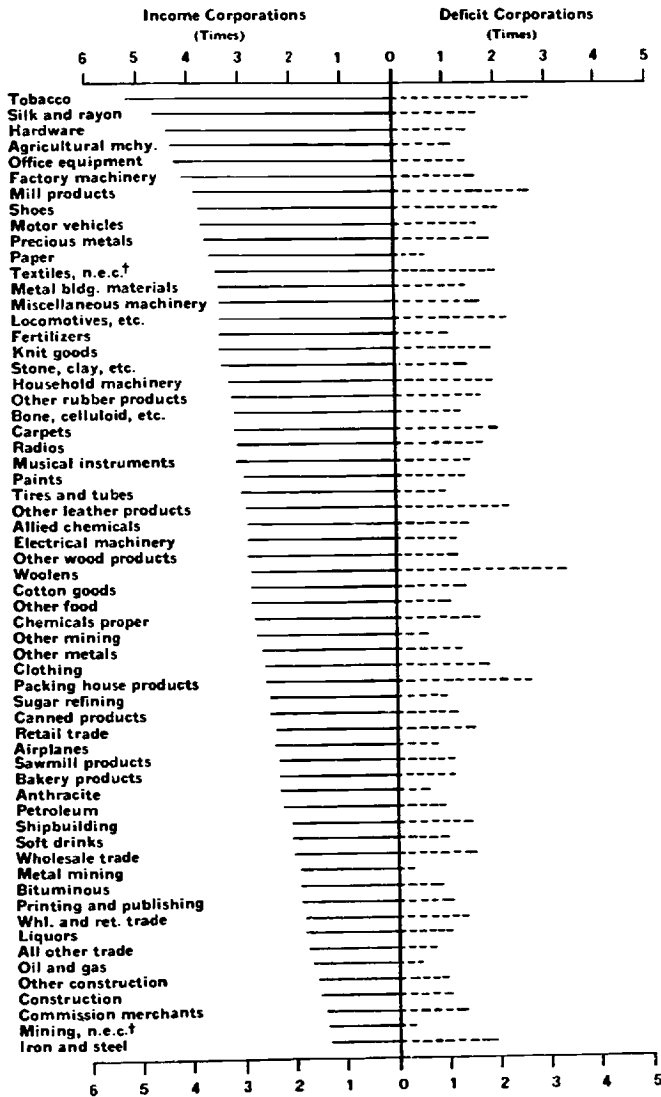
For the most part, however, variations in the current ratio are not related to easily identified industrial characteristics. Significant industrial differences revealed by individual working capital items tend to become obscured when the items are combined with other components, to form the current ratio; but since we have not found any single general explanation of industrial variations in the individual components of working capital, the absence of "systematic" behavior in the current ratio cannot be considered surprising.

Despite the fact that a satisfactory general explanation of industrial variations in the current ratio cannot be provided, several tests indicate that these variations are not of a random character. On the basis of the frequency distributions of the SEC data, significant differences appear in the average current ratios of various branches of manufacturing. A comparison of the rankings of income and deficit corporations among the minor industrial groups also reveals a moderate degree of stability in industrial differences, although in this respect the current ratio is less stable than most of its component items.

Certain interesting results are obtained, however, when total current assets and total current liabilities are considered separately. First, the ratio of current assets to total assets reveals no significant difference between producers' goods and consumers' goods industries.² On the other hand, current assets are a much

²When the minor industrial groups are classified according to producers' goods and consumers' goods industries, the average current ratios for the two groups are 2.8 and 2.5, respectively; the slight difference between the average ratios is of no statistical significance.

Chart 8—RATIO OF TOTAL CURRENT ASSETS TO TOTAL CURRENT LIABILITIES FOR INCOME AND DEFICIT GROUPS OF MINOR INDUSTRIAL DIVISIONS, 1937*



*Based on data from *Source Book of Statistics of Income for 1937*. For composite of income and deficit corporations, see Data Book (National Bureau of Economic Research) Table C-28.

†Not elsewhere classified.

higher proportion of sales in producers' goods industries (51 percent) than in consumers' goods industries (38 percent). This reflects the fact that the producers' goods industries are, on the average, larger and more vertically integrated, which tends to increase the inventory/sales ratio.

Second, no appreciable difference between the two classes of industries is evidenced by the current liabilities/total assets ratio. However, the relatively higher proportion of current assets to sales in the producers' goods branches, compared with the consumers' goods industries, appears paralleled by a higher proportion of current liabilities to sales. Current liabilities amount to 19 percent of sales in producers' goods industries, and to 13 percent in the consumers' goods concerns.

The industrial rankings of the ratio of current assets both to total assets and to sales are quite similar to the rankings of the ratio of current liabilities to assets and to sales.³ An industry that requires relatively large current assets tends to rely to a greater extent on short-term financing than an industry requiring small current assets. If this were not the case, the range of variation of the current ratio would be considerably greater than it is.

Industrial differences in the current ratio are only slightly associated with differences in the average asset size of the minor industrial groups; the ratio shows a mild tendency to rise as size of industry increases. When current assets and current liabilities are studied separately with respect to average asset size no consistent relationship appears. Current assets show an inverse relation in terms of total assets and a direct relation in terms of sales, whereas current liabilities show a fairly strong inverse relation in terms of assets and a nonsignificant relation in terms of sales.

Industrial variations in the current ratio, when related to the profitability of minor industrial divisions, reveal a behavior opposite to that of the components of the ratio. The more profitable industries tend to have relatively high current ratios; but no tendency of this kind is evident when current assets are considered separately. The more profitable industries display a slight tendency toward having a low ratio of current liabilities to total

³ See Appendix D for the rank correlation coefficients on which this conclusion is based.

assets, but they show no such tendency when the basis of comparison is sales.

Variations with Corporate Size

The current ratio rises fairly consistently as size of corporation increases in most of the major manufacturing groups; but in some groups—notably printing, chemicals, petroleum—and also in construction and wholesale and retail trade the upward tendency is interrupted several times or is entirely absent. (Chart 9. See also Table C-24 in Data Book.) In the light of the variations of the several working capital components as a percentage of sales, discussed in earlier chapters, the behavior of the current ratio may be traced to an increase in the relative importance of current assets as size of corporation increases, accompanied by a relatively steady level of current liabilities. Viewed in terms of ratios based upon total assets, the movements of the ratio may be ascribed to the fact that current liabilities decline more sharply than current assets as corporate size increases.⁴

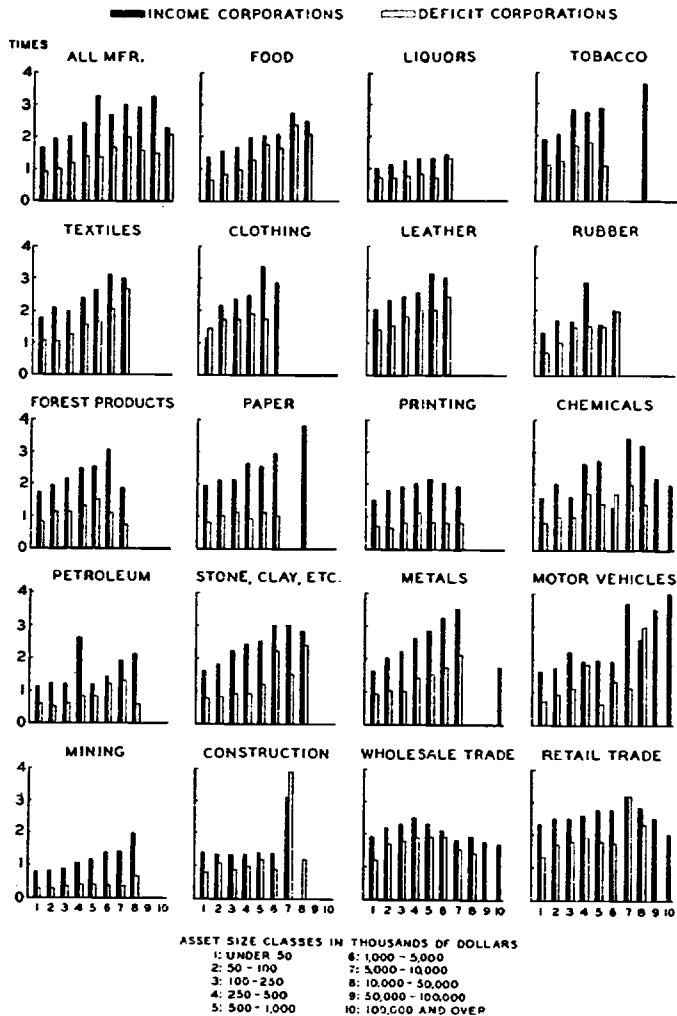
According to the SEC frequency distributions for listed manufacturing corporations the differences between the average values of the current ratio of various size classes are statistically significant. The SEC data also reveal the tendency for the current ratio to increase with corporate size, confirming the general movement shown by the Internal Revenue data. As noted in the previous section, the influence of size on the current ratio is not strong enough to affect the industrial differences in this ratio, the rank correlation with the average asset size of the minor industrial groups being barely above the level of statistical significance.

Variations with Profitability

The differences in the current ratio between income and deficit groups support the traditional view that the level of this ratio is a symptom of financial strength (Charts 8 and 9). Income corporations have a substantially higher volume of current assets relative to current liabilities. Examination of the separate figures

⁴ Among the current assets the chief decreases with corporate size are registered by receivables and cash. Inventory varies only moderately and not in a consistently direct or inverse manner. Marketable securities of income corporations in most industries rise as size of corporation increases, while for deficit concerns the movement is irregular.

Chart 9—RATIO OF TOTAL CURRENT ASSETS TO TOTAL CURRENT LIABILITIES FOR INCOME AND DEFICIT GROUPS OF MAJOR INDUSTRIAL DIVISIONS, 1937, BY ASSET SIZE*



*Based on Table C-24 in Data Book (National Bureau of Economic Research). Wholesale and retail trade figures are for the year 1938.

for total current assets and total current liabilities (each as a percentage of total assets) reveals that this feature of the current ratio is the joint result of the behavior of its numerator and denominator. The percentage figures for current assets are substantially larger among income corporations than among corresponding deficit corporations, while the percentages of current liabilities for income corporations are systematically smaller. The association of a high current ratio with a high level of profitability is confirmed by the SEC data.

In view of the marked relationship between the current ratio and profitability it is of interest to inquire whether the variations of the ratio with corporate size noted above can be attributed to variations in profitability among the size classes of the major industrial groups. Inspection reveals that this is not the case. The current ratio characteristically increases with size among both income and deficit concerns, while the ratio of net income to net worth is typically different in the two groups, rising sharply among the deficit group and remaining practically stable for income corporations.

INTERRELATIONSHIPS OF WORKING CAPITAL ITEMS

To what extent do the various working capital assets and liabilities follow a common or related pattern with respect to the three-fold classification by industry, size, and profitability? Thus far we have emphasized that the presence or absence of relationships in the static, cross-section picture that we are studying does not necessarily indicate the presence or absence of dynamic relationships between changes in one working capital item and changes in another. In the light of the data already presented we may expect that the nature of the interrelationships among the working capital items will depend to a large extent upon whether sales or total assets are used as the basis of comparison.⁵

Accounts Receivable and Accounts Payable

The extension of credit by corporations is measured by the volume of notes and accounts receivable; and the receipt of credit from

⁵ The analysis of interrelationships of working capital ratios with respect to industry is based on the computation of rank correlation coefficients between the selected ratios. These are given in Appendix D. Interrelationships with respect to size and profitability are judged by a comparison of the data given in preceding chapters.

other (nonfinancial) corporations is measured by the volume of accounts payable. A comparison of the two balance-sheet items will indicate the positions of certain classes of corporations, either as net creditors or as net debtors. A corporation whose accounts receivable exceed accounts payable (ignoring, for the moment, notes payable and other current liabilities) would, in effect, be acting as a "bank" for the rest of the business community. The volume of receivables in the balance sheets of nonfinancial corporations totaled \$15,700,000,000 on or about December 31, 1937, while accounts payable totaled \$12,100,000,000. The difference of \$3,600,000,000 measures the net extension of credit by incorporated concerns both to other businesses and, in the case of retailers and of manufacturers' sales branches, to consumers.⁶

Among the minor industrial divisions there is a definite tendency for a high turnover of accounts payable to be associated with a high turnover of receivables and vice versa. In our earlier discussion of the turnover of these two balance-sheet items (Chapters 3 and 4), we observed that both the ratio of receivables to sales and the ratio of accounts payable to sales are significantly higher in the producers' goods than in the consumers' goods industries. The former group of industries, with a longer average period of processing than the consumers' goods industries, apparently utilizes a larger relative volume of trade credit for working capital needs. On the other hand, they extend relatively more trade credit, which may reflect the fact that the purchase of durable producers' goods requires relatively large sums for each individual transaction. Manufacturers selling consumers' goods directly to distributive outlets apparently shift the burden of

⁶ The volume of accounts receivable reported in balance sheets is overstated in relation to accounts payable by the amount of checks in the mail issued against current payables, since current payables are reduced without a corresponding reduction in current receivables. This also produces an understatement of corporate cash holdings, since the balance sheets of the paying corporations show a reduced volume of cash holdings, while the accounts of the receiving corporations are not yet credited with this amount. The volume of checks reported as in process of collection by member banks of the Federal Reserve System as of December 31, 1937 was \$2,300,000,000. (*Annual Report of the Board of Governors of the Federal Reserve System, 1937*, p. 117.) In *Debts and Recovery* (1938), p. 335, Dr. A. G. Hart offers 75 percent as a "very rough" estimate of the proportion of checks in the mails going to corporations. This would amount to \$1,700,000,000 in 1937 and would reduce the difference between accounts receivable and accounts payable from \$3,600,000,000 to \$1,900,000,000.

financing these sales to the purchaser to a greater extent than do sellers of producers' goods.

Practically all the minor industrial divisions are net creditors with respect to trade credit. In about half of the minor divisions, the volume of receivables is twice or more the volume of accounts payable. Only two groups (iron and steel, and metal mining) are net debtors, while three others (bakery products, canned products, and silk and rayon) show a very slight margin of receivables over accounts payable. These observations refer to income and deficit corporations combined or to income corporations separately; the deficit corporations, as would be expected, include a number of cases in which the minor divisions are net debtors with respect to trade credit.

Table 8 presents further aspects of the short-term creditor-debtor relationships of nonfinancial corporations, with particular reference to variations by size of concern. To simplify the analysis with respect to size, the ten size classes discussed in earlier chapters have been reduced here to four: small, medium-sized, large, and very large corporations. If notes payable, representing indebtedness primarily to banks, are added to accounts payable, nonfinancial corporations as a whole are substantial debtors on short-term account. This is not the case, however, for certain sectors of the corporate population. For example, manufacturing concerns in the income group shown in Table 8 are net creditors; and all nonfinancial corporations in the income group have a ratio of receivables to notes and accounts payable of about 100 percent for the small and very large concerns, and of more than 100 percent for the medium-sized and large corporations.

Contrary to expectations the ratio of receivables to accounts payable does not rise progressively with size throughout the entire range. For all nonfinancial corporations with assets over \$10,000,000 the ratio declines to approximately the same level as that for concerns with assets of less than \$250,000. This behavior may be due at least partly to the fact that the balance sheets upon which these ratios are based are in an unconsolidated form. The large corporations often have very large selling subsidiaries (as in the petroleum industry) which have on their balance sheets a substantial volume of accounts payable to the parent company. This fact also may explain the drop that occurs between the "large"

Table 8—CREDITOR-DEBTOR RELATIONSHIPS AMONG INCOME AND DEFICIT CORPORATIONS, 1937, BY ASSET SIZE^a
(dollar figures in millions)

Size ^b	Notes and Accounts Receivable	Accounts Payable	Notes Payable	Ratio of Receivables to Accounts Payable (percent)	Ratio of Receivables to Notes and Accounts Payable (percent)
INCOME CORPORATIONS					
All Manufacturing					
Small	\$ 473.0	\$ 286.8	\$ 171.5	165	103
Medium-sized	643.6	335.1	253.4	192	109
Large	1,400.4	685.6	511.2	204	117
Very large	3,272.2	2,313.9	845.2	141	104
All Nonfinancial					
Small	1,713.3	1,075.9	634.9	159	100
Medium-sized	1,716.7	926.0	642.0	185	109
Large	3,003.6	1,722.9	1,107.8	174	106
Very large	5,664.9	4,242.8	1,378.8	134	101
DEFICIT CORPORATIONS					
All Manufacturing					
Small	330.9	362.4	241.8	91	55
Medium-sized	221.9	196.4	190.0	113	57
Large	334.3	250.9	242.5	133	68
Very large	327.3	246.7	137.3	133	85
All Nonfinancial					
Small	1,186.3	1,344.2	853.3	88	54
Medium-sized	659.0	631.6	550.1	104	56
Large	827.4	850.9	764.8	97	51
Very large	919.5	1,317.9	727.8	70	45
INCOME PLUS DEFICIT					
All Manufacturing					
Small	803.9	649.2	413.3	124	76
Medium-sized	865.5	531.5	443.4	163	89
Large	1,734.7	936.5	753.7	185	103
Very large	3,599.5	2,560.6	982.5	140	102
All Nonfinancial					
Small	2,899.6	2,420.1	1,488.2	120	74
Medium-sized	2,375.7	1,557.6	1,192.1	153	86
Large	3,831.0	2,573.8	1,872.6	149	86
Very large	6,584.4	5,560.7	2,106.6	118	86

^a Based on data, as of December 31, 1937, from *Statistics of Income for 1937*, Part 2, and *Source Book of Statistics of Income for 1937*.

^b The asset-size classes (inclusive of the lower limit and exclusive of the upper) are as follows:

Small:	Less than \$250,000
Medium-sized:	250,000-1,000,000
Large:	1,000,000-10,000,000
Very large:	10,000,000 and over

and the "very large" corporations, since the effect of increasing equally the numerator (receivables) and the denominator (accounts payable) when a ratio is greater than one is, of course, to decrease the ratio.

The ratio of receivables to total assets and the ratio of accounts payable to total assets both decline as size of corporation increases (see Chapters 3 and 4), with the accounts payable/total assets ratio showing the greater decrease. On the other hand, the ratio of receivables to sales tends to rise slightly as corporate size increases, while the turnover of accounts payable varies irregularly and moderately from size class to size class. Comparison of both types of ratio shows that as corporate size becomes larger the balance of receivables over accounts payable tends to increase somewhat, although this movement is by no means uniform and does not apply to all branches of industry.

The relationships of the two balance-sheet accounts with respect to profitability may be considered in terms of their turnover among the income and deficit groups. The turnover of receivables is slightly lower, and the turnover of payables is considerably higher, among income than among deficit concerns.

Inventory and Notes Payable

Some relationship between inventory—the most important component of current assets—and notes payable—an important source of current financing—might be expected, but the data for the most part do not support this expectation. To be sure, those minor industrial divisions that have a relatively high ratio of inventory to total assets show a moderate tendency to have a high percentage of notes payable. The implications of this relationship are strongly reduced, however, by the fact that no such general relationship exists when the two accounts are compared upon the basis of sales. Individual cases of parallel variation of the inventory/sales ratio and the notes payable/sales ratio occur, but in general the relationship is statistically nonsignificant.⁷

⁷ Illustrations of relationship are found, for example, in canned products industries which have correspondingly high ratios of inventory and notes payable to sales; and in bakery products, in which the ratios are correspondingly low. Such cases are not frequent enough to constitute a general tendency. Since the volume of inventory in both income and deficit groups is much greater than the volume of notes payable, the absence of a systematic relationship is to be expected, particularly since notes payable are an optional form of current financing.

There is little evidence of covariation between inventory and notes payable with respect to differences in corporate size. On the basis of sales, inventory grows relatively larger as size increases, while notes payable generally show no systematic variation.⁸ When compared with total assets, inventory is generally largest among the medium-sized corporations, while notes payable, on the whole, decline as corporate size increases.

For income and deficit corporations, inventory and notes payable as a percentage of sales do not follow a related pattern. The inventory/sales ratios are slightly higher among income than among deficit corporations, while the notes payable/sales ratios are appreciably higher among deficit than among income corporations. Absence of relationship is also found when total assets are the basis of comparison.

Diverse reasons for the variation among industrial divisions of the turnover of inventory have been discussed in Chapter 2. The degree of relationship between inventory turnover and the turnover of notes payable will depend upon the reason for the high or low inventory turnover. Short-run changes in the volume of inventory, whether of a seasonal, cyclical, or random character, require short-term financing from such sources as commercial banks. The degree of dependence upon short-term credit as a source of funds may vary according to whether the change in the volume of inventory occurs at an early phase of a revival, when internal sources of funds are limited, or at a later phase of recovery. When inventory is durable or when the seasonal and style factors are unimportant, working capital needs may be met largely from permanent funds derived from non-current liabilities.

The relationships between inventory and accounts payable are, on the whole, similar to those described above, since accounts payable display a variation with industry, size, and profitability that parallels notes payable, with few exceptions. In particular, accounts payable, like notes payable, finance a much smaller proportion of the inventories of large than of small manufacturing corporations.

⁸ However, the two items, when compared with sales, show similar variations from one size class to another in the following groups: liquor, tobacco, textiles, clothing, leather, forest products.

Accounts Payable and Notes Payable

The relationship between the balance-sheet accounts which represent trade credit and bank credit is of particular interest because it bears upon the question whether these two items tend to substitute for one another in particular classes of corporations. The weight of the evidence points to the conclusion that notes and accounts payable are more complementary than competitive, both in their employment by, and in their availability to, corporations. Industries with a high proportion of notes payable do not generally have a low percentage of accounts payable, whether the basis of comparison is assets or sales. A few exceptions to this are found among industries purchasing raw materials in organized markets in which accounts payable are not available. With respect to size, both items when expressed as a percentage of sales show no systematic variation; when compared with total assets, they decline. Finally, both notes and accounts payable are substantially greater among deficit than among income corporations, regardless of the basis of comparison.

Cash and Marketable Securities

As in the case of notes and accounts payable, the most interesting question with respect to cash and marketable securities is whether they show a tendency to act as substitutes for each other. Among the minor industrial divisions those corporations with a relatively small volume of cash (as a percentage of total assets) show no consistent tendency to hold a relatively large volume of marketable securities, or vice versa. On the other hand, as corporate size increases the percentage of total assets in the form of cash declines, while the proportion of marketable securities increases. When income and deficit corporations are compared, no systematic tendency toward substitution is observed.

Cash and Notes Payable

Nonfinancial corporations as a whole are neither net debtors nor creditors of the banks, when the ratio of cash to notes payable is used as a measure. The corporations' cash holdings of \$6,700,000,000 at the end of 1937 just equaled their outstanding short-term obligations in the form of notes payable. Manufacturing

corporations as a group were net creditors to a slight degree, the ratio of cash to notes payable being 127 percent. Trade corporations, on the other hand, were net debtors, with a ratio of 77 percent. Among the sixty-one minor divisions, thirty-six were net creditors. The median value of the ratio among the minor industrial divisions was 117 percent, with the first quartile at 76 percent and the third quartile at 161 percent. (See Table C-28 in Data Book.)

The ratio of cash to notes payable tends to increase with corporate size, although not in a very consistent fashion. Both cash and notes payable (as a percentage of total assets) decline as corporate size increases, and the upward movement in the cash/notes payable ratio may result from the sharper decline in the notes payable item. Small and medium-sized corporations, with assets under \$1,000,000, tend to be net debtors to the banks, while among the larger concerns the volume of cash typically exceeds the notes payable outstanding by substantial margins.

A comparison of the ratios for the income and deficit groups reveals, as might be expected, that the income corporations are net creditors of the banks while the deficit corporations are net debtors. The difference between the levels of the ratios is large. For nonfinancial corporations as a whole the ratio for the income group is 146 percent; and that for the deficit group, 40 percent. For all manufacturing corporations the ratios are 166 and 41 percent for income and deficit corporations, respectively. The ratios for income and deficit corporations of certain industries are in fact the reverse of those for the group as a whole. However, it may be stated that roughly 70 percent of the assets and 72 percent of the sales of all nonfinancial corporations are represented by corporations which are to some extent net creditors of the banks.