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WARTIME ASSET EXPANSION

The period from the turn of the century to the outbreak of the first World War was one of pronounced and relatively steady expansion of industry and trade, interrupted temporarily by the contractions of 1903-04, 1907-08, 1910 and 1914. The economic importance of manufacturing and trade increased in relation to other productive activities, particularly agriculture. In both manufacturing and trade there was a growth in the business assets of active and successful enterprises, and the financial structure of these companies was strengthened by a slowly advancing price level for manufactured and other goods.

By and large, the prewar decade was noteworthy for its stability of business financial structure.²² Changes took place, of course, with the ebb and flow of business activity, but none of them as radical as those that characterized the financial expansions of 1915-16 and the contraction that followed. In general, there was no long-term tendency for current assets to grow in relation to fixed assets; business debt tended to maintain a stable relationship with ownership or equity; and throughout the period about one-fourth of all manufacturing assets and about one-third of all assets of trade enterprises were supplied by short- and long-term creditors.

The outbreak of World War I in July 1914 found American enterprise contracting operations, and the uncertainties and confusion precipitated by the European conflict, together with the accompanying crisis in world commodity and exchange markets, added force to the contraction tendencies for another half year. Industrial activity, which had declined at the rate of 0.6 percent per month over the year and a half preceding war, fell at an average rate of 1.3 percent during the five months that followed the outbreak of hostilities.²³ In January 1915 business failures were more numerous than any time since the turn of the century,²⁴ and the U. S. Steel Corporation reported that shipments in November and December 1914 were the lowest in the history of the corporation. Among other industries experiencing acute depression were railroad equipment,

The observations of this paragraph are based on Alexander, *op. cit.*

Computed by the compound interest rule, using three-month averages centered on January 1913, July 1914 and December 1914, from Babson's index of the physical volume of business activity.

According to the Insolvency Index issued by Dun & Bradstreet, Inc.

machinery manufacture and railroad transportation — industries that in another year or two were to find themselves producing, an effort to fill the war orders of belligerents, at rates that taxed their productive capacity.

Disrupted production and accelerated consumption caused European belligerent nations, early in 1915, to reach out into world markets for supplies. The influx of war orders into the United States acted first to prevent further recession, then as a stimulus to expansion. Led by a revival of activity in heavy industries and in those producing clothing, food and supplies adaptable to military purposes, recovery spread rapidly. By the end of that year manufacturing output had exceeded its prewar peak; industrial employment and payrolls had attained new highs; trade was flourishing; and farmers were again making profits.

World War I thus came at a time when American business enterprise in general was accumulating unused capacity as a result of economic recession, and the more rapid contraction that followed the outbreak of war widened this margin still further. Fixed productive assets — land, plant and equipment — were relatively abundant, while current or working assets — inventories, receivables and cash or equivalent — were relatively scarce. This condition, typical after a period of extended liquidation, was intensified by the sharpness of the wartime revival, which further depleted current assets — in manufacturing, for financing the conversion from peace to war production; in trade, for financing the enlargement of sales facilities to meet the increase in consumer demand.

In these circumstances the immediate financing problem of business enterprise was to build up working assets to facilitate high level wartime operations, and the problem was soon rendered more acute by the rise in prices, which set in late in 1915 and quickly inflated the value of assets subject to rapid turnover. Whereas during the last three major expansions preceding World War I the structure of assets in manufacturing and trade had been comparatively stable, showing only a moderate increase of current assets in relation to fixed assets, the World War I expansion quickly altered conventional standards regarding the balance between the asset groups.²⁵

The pressure to expand current assets was soon reinforced

²⁵ See Alexander, *op. cit.*

pressure to expand fixed assets, while the problem of financing this expansion was made more acute by the wartime advance in prices. The result was an exaggerated increase of all business assets, which continued through the war years 1915-18 and the two postwar years 1919-20. The percentage increases per year in current assets, fixed property and total assets, and in wholesale prices, for the periods

TABLE 1—PERCENTAGE INCREASE PER YEAR IN CURRENT ASSETS, FIXED PROPERTY AND TOTAL ASSETS, AND IN WHOLESALE PRICES ^a

Industry-Size Group	World War I Expansions		Peacetime Expansions	
	War 1915-18	Postwar 1919-20	1922-29	1933-37
MANUFACTURING SAMPLES				
Large companies				
Current assets	30%	2%	5%	4%
Fixed property	5	10	6	-1
Total assets	15	7	6	1
Medium and small cos. (Wisc.)				
Current assets	21	21	5	3
Fixed property	8 } ^b	16	2	-4
Total assets	13 } ^b	21	4	c
TRADE SAMPLES				
Large companies				
Current assets	25	27	11	11
Fixed property	8	26	21	2
Total assets	14	15	11	4
Medium and small cos. (Wisc.)				
Current assets	14	6	1	2
Fixed property	9 } ^b	9	2	-1
Total assets	13 } ^b	7	1	1
WHOLESALE PRICES				
All commodities	18	8	c	6
Commodities other than farm products and food	17	14	-2	4

^a Annual percentage increases computed by the compound interest rule from balance sheet figures, net of valuation reserves, for the terminal dates of each period. Wholesale prices computed by the compound interest rule from average prices of the preceding and terminal year of each period. "Fixed property" refers to land, plant and equipment. The large corporation samples for the peacetime expansions differ in composition from those for the wartime expansions; for description of the samples see Appendix A.

^b Average for the period 1917-18 only.

^c Decrease of less than 0.5 percent.

1915-18 and 1919-20, are compared in Table 1 with those of the peacetime expansions of 1922-29 and 1933-37.

Over the entire wartime period 1915-20, the relative pace of asset growth was swifter than in either of the later peacetime expansions, and it was much more rapid for current assets than for fixed property. Price inflation was obviously a major determinant of this more rapid rate of wartime asset expansion, especially in the case of current assets, which have the higher rate of turnover.

The wartime expansion in assets had to be financed by an equal sum of dollars. The next section deals with this financing problem in detail; for the moment, two preliminary observations may be offered. First, all possible sources of funds were tapped by manufacturing and trade enterprise to finance such expansion — trade creditors, commercial banks, the securities market (by means of bond and stock issues), and undistributed earnings. Second, many of the critical financial problems encountered by business enterprise in the first postwar recession can be traced to the expedients used to finance asset expansion over the 1915-20 period.

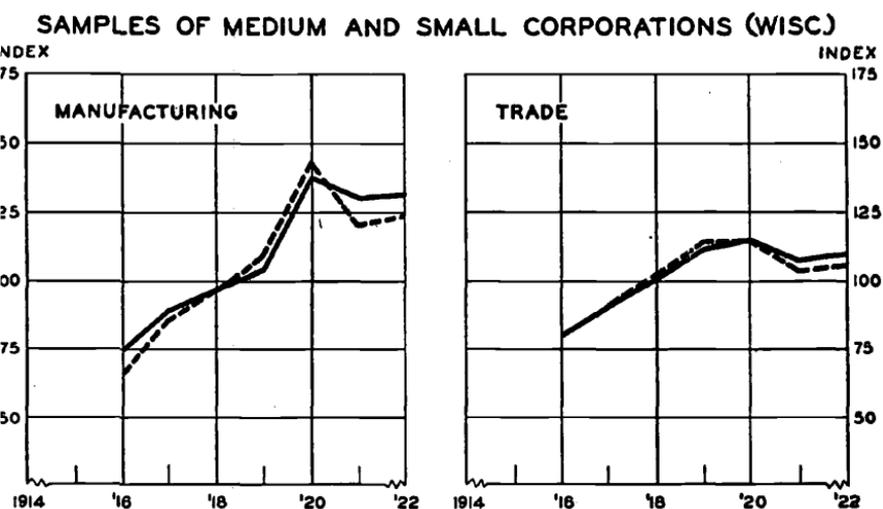
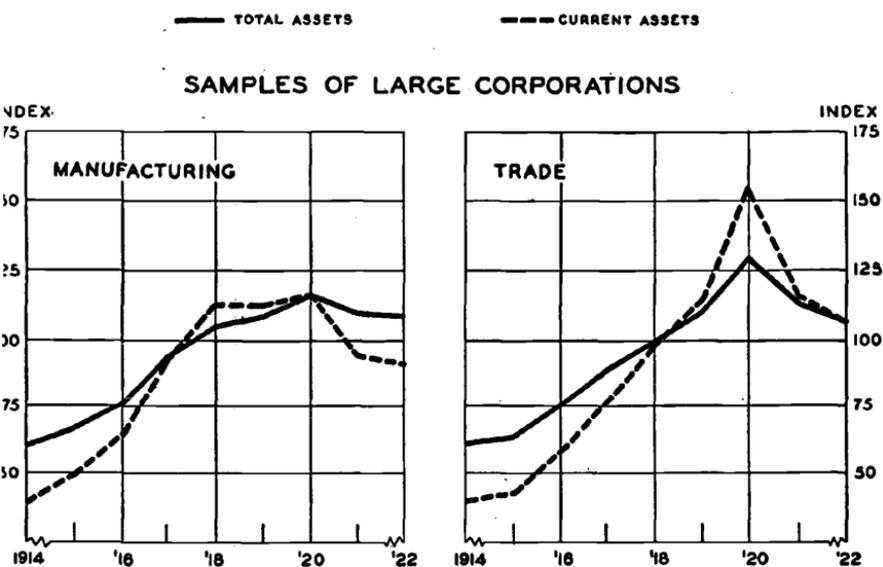
Current Assets

Indexes of wartime changes in current and total assets are shown in Chart 1. The increase in current assets of manufacturing and trade corporations up to the end of hostilities was substantial in both of our size samples, but was greater for the samples of large companies than for those of medium and small concerns.²⁶ The greater rate of current asset expansion of the large corporations than of the medium and small enterprises (as shown by Chart 1 and Table 1) reflects the more rapid expansion of large companies' sales under wartime influences.

Current assets not only grew quickly, but became a greater part of total assets, particularly in the large companies. At the end of 1916 the current assets of large manufacturing and trade corporations amounted to 38 percent of total assets; by year-end 1918 the proportion had risen to about 48 percent. Among medium and small manufacturing corporations the rise was from 47 to 53 per-

²⁶ This observation concerning the aggregate behavior of major size-industry groups is confirmed by the behavior of the majority of individual companies in our samples. Throughout the various size-industry groups the degree of current asset expansion of individual companies was high, in comparison with other asset categories.

CHART 1—INDEXES OF TOTAL ASSETS AND CURRENT ASSETS, 1914-22^a
 (1916-20 average = 100)



The samples of large corporations consist of a varying number of identical manufacturing concerns, averaging about 83, and 8 identical trade concerns engaged in mass distribution. The Wisconsin samples of medium and small corporations consist of 73 identical manufacturing concerns, and 30 identical trade concerns; data on these companies are not available for the years before 1916. Subsequent charts, and also the tables, are based on these samples except where otherwise indicated. For details see Appendix A.

cent; while among medium and small trade companies it was only from 79 to 80 percent.

During the postwar expansion of 1919-20 the current assets of manufacturing and trade continued to increase. For large manufacturing concerns the rise was moderate by comparison with that of the war years and of interbellum expansions; for the other group it was pronounced, particularly in medium and small manufacturing and large trade concerns. During 1919 large manufacturing companies were converting plant and equipment back to peacetime production, a process that checked current asset growth; but trade companies and the smaller manufacturers, with few if any problems of plant conversion, responded at once to consumer demand swollen by increased wartime incomes and deferred during the war emergency. Furthermore, current assets of trade companies, which contained a larger inventory component, were carried upward on the postwar wave of rising prices for finished goods, that reached its crest early in 1920.

The financing requirements arising from the growth of current assets during wartime and peacetime expansions may be gauged roughly for our samples by expressing each year's increase in current assets, adjusted for revaluations, in percent of total assets at the beginning of the year. Such percentages, computed by periods, are presented in Table 2. That table shows that the additions to corporate resources resulting from the flow of funds into current assets were larger during the World War I expansions than during

TABLE 2—EXPANSION OF CURRENT ASSETS IN PERCENT OF BEGINNING-OF-YEAR TOTAL ASSETS, ANNUAL AVERAGE ^a

Industry-Size Group	World War I Expansions		Peacetime Expansions	
	War 1915-18	Postwar 1919-20	1922-29 ^b	1933-37
MANUFACTURING SAMPLES				
Large companies	11%	1%	2%	2%
Medium and small cos. (Wisc.)	10 ^c	12	3	1
TRADE SAMPLES				
Large companies	10	14	7	5
Medium and small cos. (Wisc.)	11 ^c	6	1	1

^a See text footnote 27. For description of the samples see Appendix A.

^b Exclusive of 1924 and 1927.

^c Average for 1917-18 only.

the subsequent peacetime expansions, with the single exception of large manufacturing concerns, 1919-20.²⁷ Available data suggest that the wartime current asset additions to corporate resources were large also, on the average, in comparison with the prewar expansions of 1904-07, 1908-10, and 1912-13.²⁸

Inventory

Inventory is ordinarily the largest component of current assets in manufacturing and trade; consequently, marked changes in total current assets arise chiefly from changes in inventory. Chart 2 shows indexes of inventory at book value for our four primary industry-size samples, and also compares them with indexes for other available samples. For large corporations the supplementary indexes are based on samples collected by the Division of Research of the Board of Governors of the Federal Reserve System²⁹ and by Dun & Bradstreet, Inc.³⁰ For medium and small corporations the supplementary index represents a smaller sample of identical Massachusetts companies. The supplementary samples differ from our primary industry-size samples in industrial coverage and weighting, and therefore they reveal somewhat different year-to-year movements.

Over the entire wartime period 1915-20 the indexes on the whole point to the same fact, a rapid accretion in book value of business inventory. For the shorter period 1915-18 the large companies and the smaller trade companies showed a marked increase in dollar

²⁷In preparing this and following tables in which asset, liability and net worth changes, adjusted for write-ups and write-downs, appear as percentages of total assets, the aggregate amount of such change over the period was divided by the aggregate total assets as of the beginning of each year included in the period. This method yields a weighted average of percentage increase or decrease in relation to previous year total assets, and permits the use of a varying number of companies from year to year. Such variation in coverage is caused by omissions, in certain years, of essential data from the published financial statements of individual companies. Moreover, the coverage of the large corporation samples differs somewhat as between the wartime and peacetime expansions. For manufacturing, 47 of the 81 large companies in the 1915-22 sample are included in the 1920-39 sample of 84 companies; for trade, 6 of the 8 companies in the first sample are also among the 10 of the second sample.

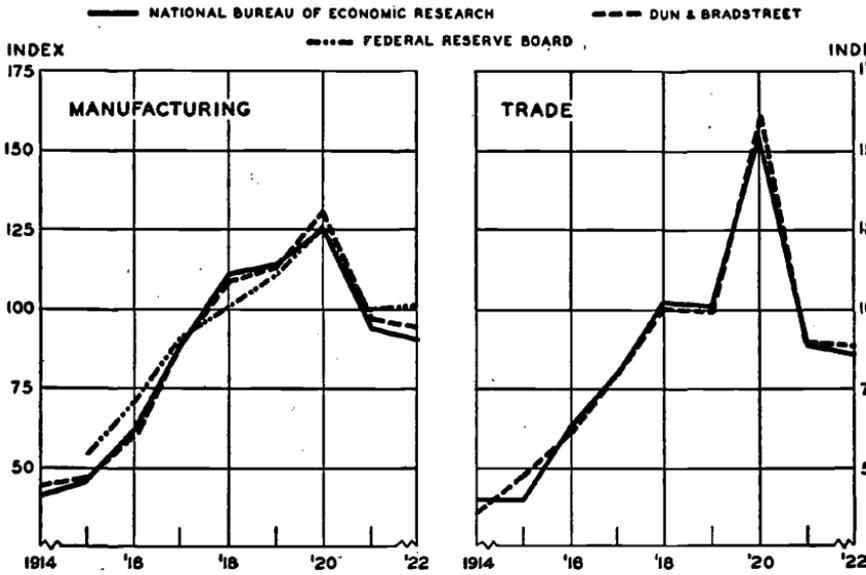
²⁸Several samples of prewar corporate financial data assembled for the Financial Research Program's Studies in Business Financing are collected in a source volume, *Data for Studies in Business Financing, 1900-42* (ms. 1943).

²⁹George Terborgh, "Manufacturing Inventories During and After the World War," *Federal Reserve Bulletin* (July 1941) pp. 613-17.

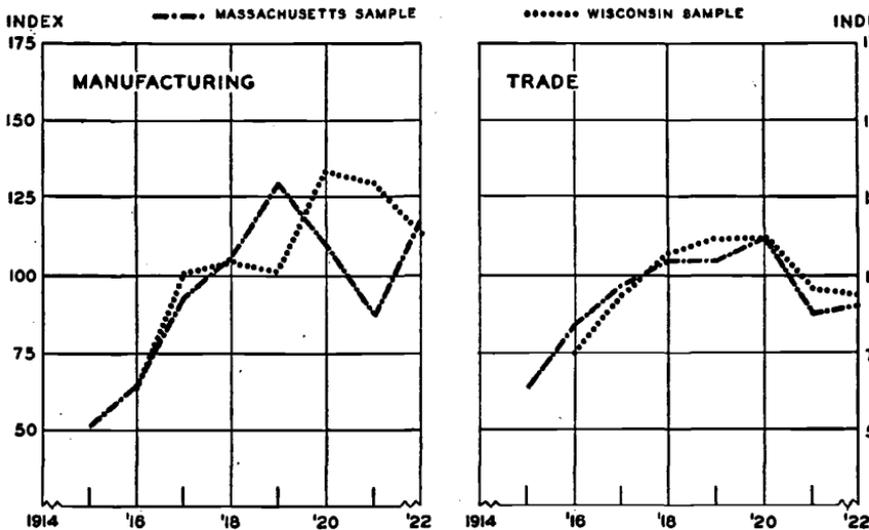
³⁰Helen Brown Russell and Willard L. Thorp, "Inventories During the World War," *Dun's Review* (February 1940) pp. 17-22.

CHART 2—INDEXES OF YEAR-END BOOK VALUE OF INVENTORY, 1914-22
(1916-20 average = 100)

SAMPLES OF LARGE CORPORATIONS



SAMPLES OF MEDIUM AND SMALL CORPORATIONS



^a The Massachusetts samples consist of 39 identical manufacturing concerns and identical trade concerns; for description of the samples see Appendix A.

ventory, but among the smaller manufacturing companies, especially those in the Wisconsin sample, this was true only through 1917, their inventory expansion having slowed down considerably in 1918. This leveling out was found also for 1919 in two of the samples of large companies, but the Federal Reserve sample continued to show a rise in that year. The 1920 rise in large corporation inventory is confirmed by each of the samples. The inventory indexes of the two medium and small company samples, although they moved in the same direction during the war, diverged considerably in the postwar years, especially among manufacturing corporations. This postwar divergence reflects differences in the volume and character of business activity in the two states from which the samples were drawn, and also differences in the industrial composition of the samples.

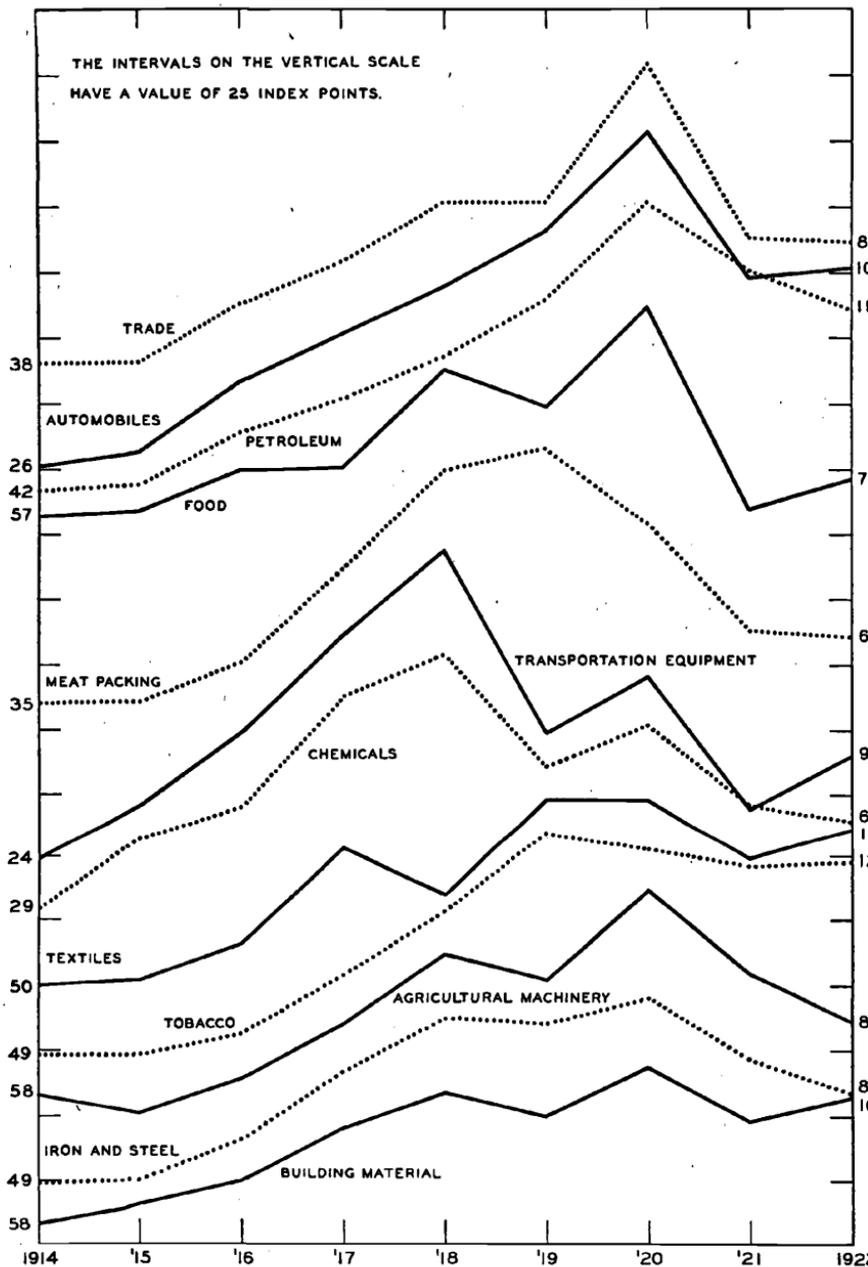
The industries represented in our samples showed a consistent pattern of inventory expansion through 1918, with more uniformity among the large corporations than among the medium and small ones (Charts 3 and 4).³¹ Considerable variation was evident in 1919, but in 1920 there was again a high degree of consistency. In the large corporation sample, durable and non-durable goods industries expanded inventory at about the same rate up to 1918; inventory expansion of durable goods producers was checked in 1919 but rose sharply the following year, while inventory of non-durable goods producers continued to rise in 1919, and again, though at a slower rate, in 1920.³²

There was also a substantial degree of uniformity in the behavior of individual concerns, 1915-20. In the large manufacturing sample, 52 out of 75 companies expanded their inventory in 1915; 74 out of 82 in 1916; 81 out of 85 in 1917; 69 out of 82 in 1918; 46 out of 86 in 1919; and 61 out of 82 in 1920. In the large trade sample, 6 out of 7 companies expanded their inventory in 1915; 7 out of 8 in 1916, 1917 and 1918; 4 out of 8 in 1919; and 6 out of 8 in 1920.

Among the medium and small companies the year-to-year uniformity of behavior with regard to inventory was not so great as among the large concerns. In manufacturing the number of medium and small companies that expanded their inventory holdings was as follows: 48 out of 68 in 1917; 47 out of 73 in 1918; 46 out of 75 in 1919; 58 out of 77 in 1920. For trade the figures are: 18 out of 22 in 1917; 22 out of 29 in 1918; 15 out of 29 in 1919; 20 out of 30 in 1920.

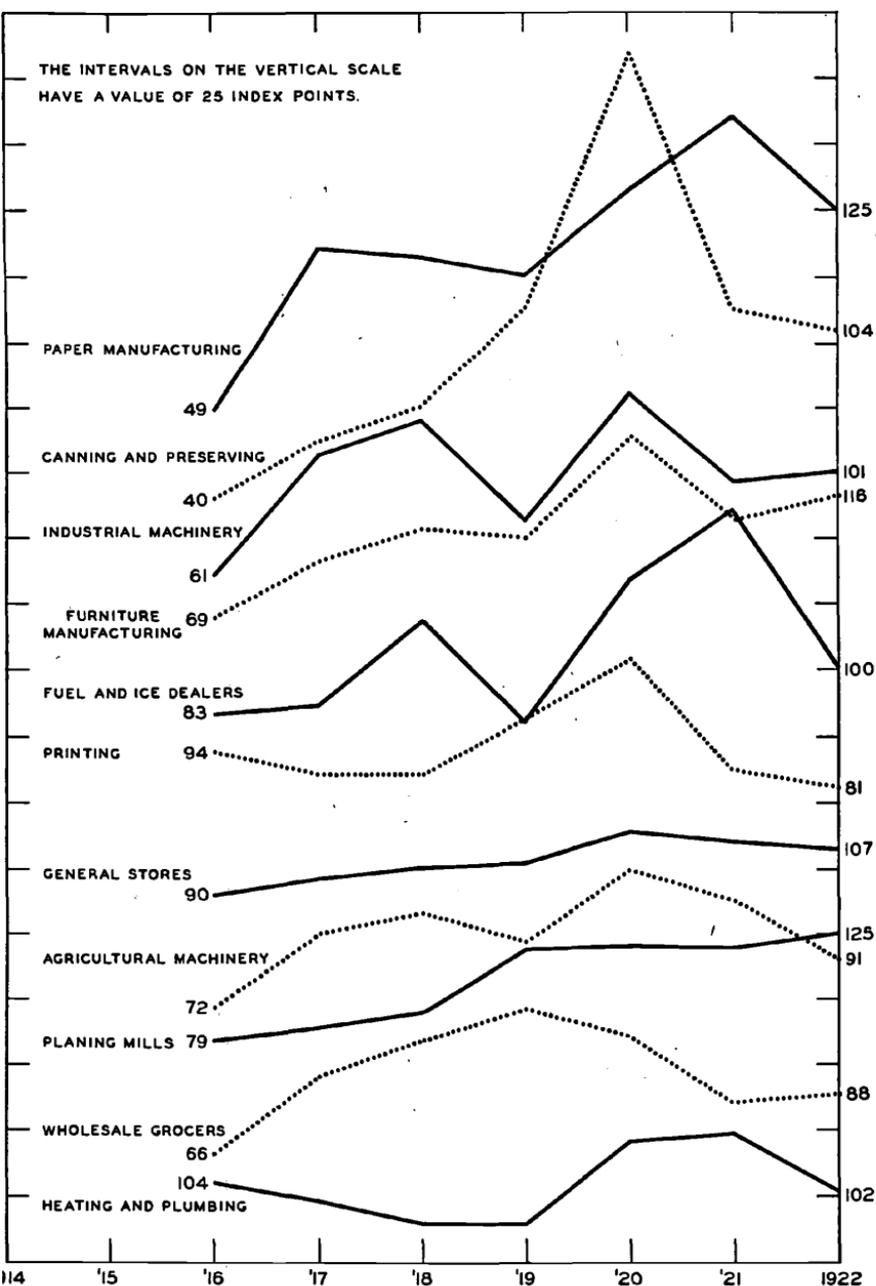
For the four years 1915, 1918, 1919 and 1920 the indexes of inventory book value (1916-20 = 100) were as follows: in durable goods industries, 46, 111, 107, 128; in non-durable goods industries, 45, 109, 120, 124. Terborgh's indexes of durable and non-durable goods inventory for a large sample of corporations indicate the same general movement; see Terborgh, *op. cit.*

CHART 3—INDEXES OF YEAR-END BOOK VALUE OF INVENTORY,
 Samples of Large Corporations in Eleven Manufacturing Industries
 and in Trade, 1914-22^a
 (1916-20 average = 100)



^a For description of the samples see Appendix A.

CHART 4—INDEXES OF YEAR-END BOOK VALUE OF INVENTORY,
 Samples of Medium and Small Corporations in Eight Manufacturing
 Industries and in Three Lines of Trade, 1916-22^a
 (1916-20 average = 100)



^a For description of the samples see Appendix A.

Some of the war period increase in the book value of manufacturing and trade inventory took place because a greater physical stock of inventory was maintained in anticipation of threatened material shortages and transportation bottlenecks, and in support of a larger volume of operations; some was the result of shifts in the character of goods produced. At least half of it, however, was the result of price inflation. Wholesale prices rose rapidly from the end of 1915 to May 1920, when the all-commodity index of the U. S. Bureau of Labor Statistics attained a peak 141 percent higher than the average for 1915. Although the upward movement of prices was general, prices of individual commodities rose in varying degree, and thus affected differently the book value of inventory of individual manufacturers, wholesalers and retailers. Prices of semi-manufactured goods experienced the greatest rise, with raw material prices second and finished goods not far behind.

Chart 5 shows the movement of the inventory indexes for large corporations, adjusted and unadjusted for price changes, and the comparable indexes of wholesale prices.³³ Between 1915 and 1920 large manufacturing companies showed steady increases in their physical inventory (as represented by the deflated book value of inventory); for large trade companies there were sizable increases in 1916 and 1918 and a sharp rise in 1920.

The postwar expansion of physical inventory is of special interest. The speculative conditions that came to prevail, accentuated by delivery and transportation delays, gave rise to the practice of placing duplicate orders with two or more independent suppliers, and in some lines this practice became widespread. Furthermore, these same conditions led to an extension of forward commitments, i. e. an acceleration of forward ordering, from both domestic and foreign buyers. The accumulation of physical inventory by manufacturing and trade in this situation must have been a strong factor in

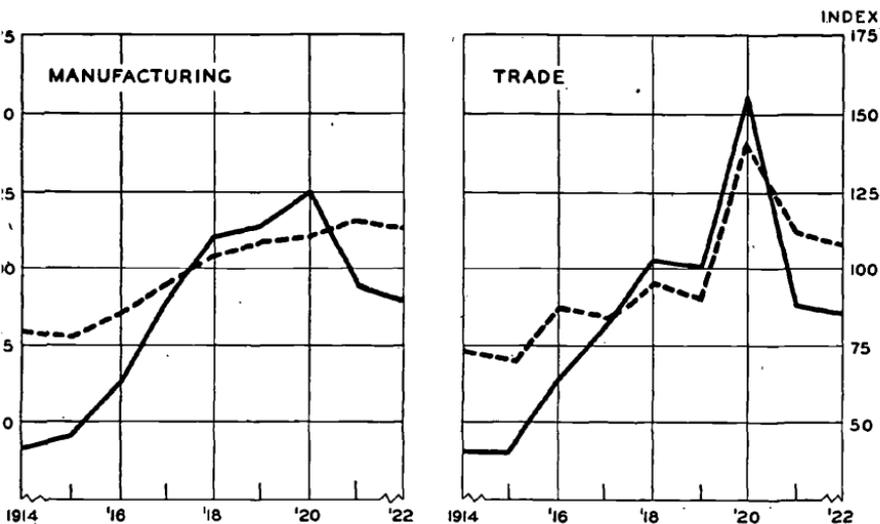
³³ In deflating manufacturing inventory, price indexes developed by the Bureau of Labor Statistics for individual industry groups were employed; the deflation was carried out separately for each industry, using a price average based on the number of months that inventory is ordinarily held, and the index was calculated from the aggregate of the deflated inventory values. In deflating trade inventory, the price index for finished commodities was employed, using the price average indicated by the inventory turnover ratio. No deflation of the inventory book value of the medium and small corporation samples was attempted, because of the absence of suitable price indexes for the specific industries represented.

CHART 5—INDEXES OF CURRENT AND DEFLATED BOOK VALUE OF INVENTORY, Samples of Large Manufacturing and Trade Corporations, and Indexes of Wholesale Prices, 1914-22^a
 (1916-20 average = 100)

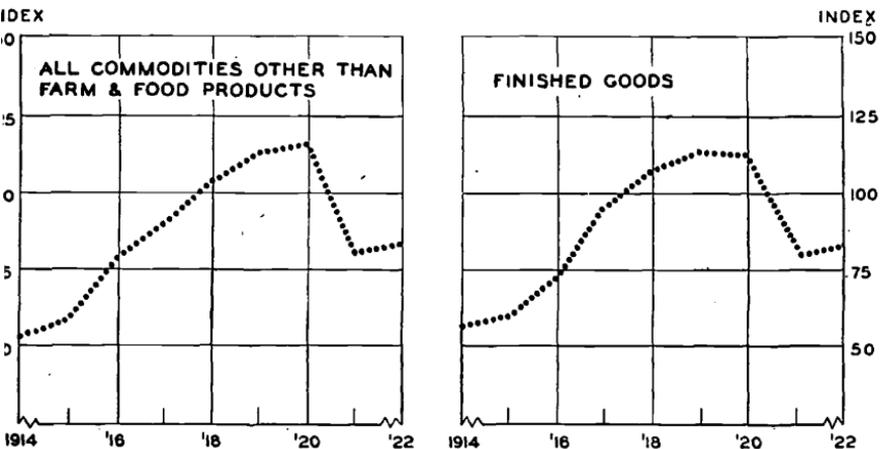
INDEXES OF INVENTORY

— CURRENT BOOK VALUE

- - - DEFLATED BOOK VALUE



INDEXES OF WHOLESALE PRICES



For the methods used in deflating inventory, see text footnote 33. Indexes of wholesale prices are from U. S. Bureau of Labor Statistics. For description of the samples see Appendix A.

the postwar inflation of wholesale prices, for manufacturing output in 1919-20 was below that of 1917-18. At the same time, however, the sharp advance in prices that took place in 1919-20, as well as the growth in physical inventory, operated to sustain the rise in the book value of inventory.

By the nature of business processes the dollar volume of inventory holdings is closely related to the dollar volume of sales. In the absence of any marked change in the operating conditions of a given industry, the ratio between these two accounts will show little or no upward or downward trend; it is characterized, however, by a short-run instability that stems in part from the financial policy of the enterprise and in part from the difficulty of gearing inventory purchases exactly to sales as business conditions change. During the wartime expansions the movement of the inventory turnover rate (sales divided by average year-end inventory), influenced by short-run factors, differed considerably among our industry-size samples (Chart 6). But the principal contrast in behavior was between the size groups. For the large corporation samples a falling tendency characterized inventory turnover from 1916 through 1920, although in trade the fall was interrupted in 1919 by a moderate rise; in 1916 turnover was more rapid for manufacturing, less rapid for trade, than it had been in 1915. For the medium and small company groups, on the other hand, inventory turnover fell from 1916 to 1918,⁸⁴ and then rose to a peak in 1920.

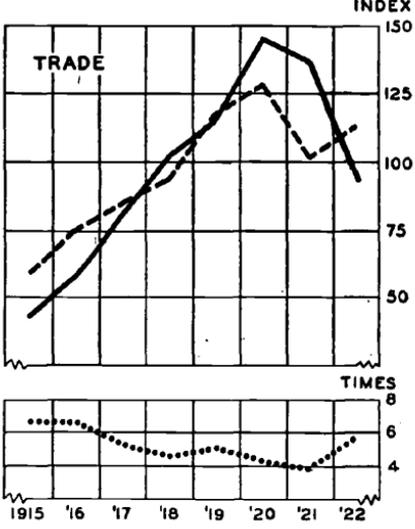
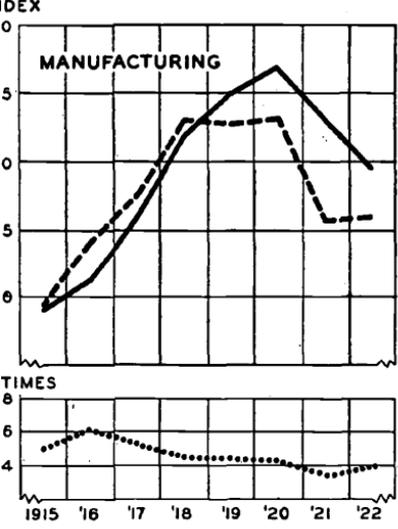
The striking difference, during the postwar expansion, between the movements of inventory turnover for the large and the medium and small company samples seems to indicate a less conservative inventory policy on the part of larger concerns. This was possibly the case in 1919, when large manufacturers and distributors were probably stimulated to make abnormal purchases as a matter of protection against threatened shortages and also as a speculation on future price rises. The same motives doubtless continued to operate in the first part of 1920, but in the spring of that year consumer resistance

⁸⁴ For the medium and small company samples an inventory-sales ratio for 1916 based on average year-end inventory could not be computed, as data on the years before 1916 are not available. It may be assumed, however, that this ratio decreased between 1916 and 1917, as the ratio based on single year-end inventory decreased between those years, and ratios calculated in these two ways indicate the same general pattern of movement.

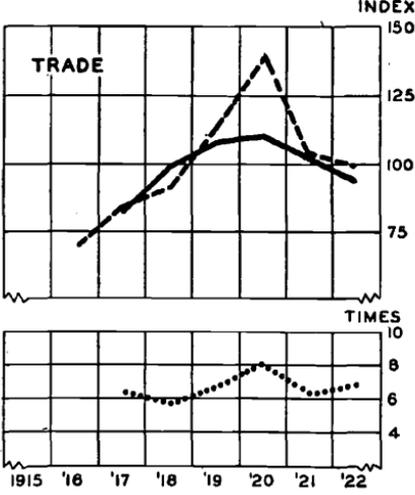
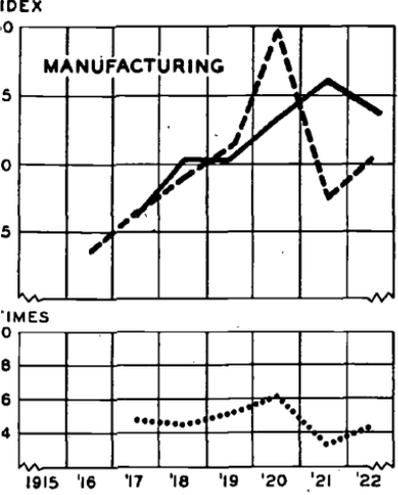
CHART 6—INDEXES OF AVERAGE TURNOVER AT BOOK VALUE AND OF SALES, 1915-22, AND INVENTORY TURNOVER RATES^a
 (1916-20 average = 100)

— INVENTORY - - - SALES TURNOVER

SAMPLES OF LARGE CORPORATIONS



SAMPLES OF MEDIUM AND SMALL CORPORATIONS (WISC)



^aInventory indexes are based on averages of year-end data for two consecutive years. Inventory turnover rates represent sales divided by average year-end inventory. For description of the samples see Appendix A.

to higher retail prices began to make itself felt.³⁵ In trade, consumer buying below expectations meant rising inventory holdings in relation to sales, and this condition was soon, by cancellation of orders transmitted back to manufacturing concerns.³⁶

In the last half of 1920 the curtailment of consumer buying and widespread cancellation of orders by both foreign and domestic buyers were undoubtedly major factors in physical and book value inventory accumulation. Late that year the Chamber of Commerce of the State of New York made an investigation of cancellations and found them greater in volume than ever before, especially in lumber and in various highly competitive consumer goods lines. Reputable concerns in these circumstances were confronted with a dilemma. In many cases, the enforcement of contracts to sell entailed converting inventory into receivables that might become bad debts. Commitments to buy, on the other hand, involved a concern's credit standing in the trade, future as well as current, and could not be lightly repudiated by responsible domestic corporations. One large rubber concern — the Goodyear Tire & Rubber Company — in its reorganization plan of 1920 set up a reserve of \$24 million to cover losses on its commitments for future delivery. Manufacturing companies, whose postwar prosperity depended heavily on foreign orders, were especially vulnerable to cancellation of orders, since foreign buyers did not feel the same degree of responsibility in fulfilling commitments.

The advance in inventory book value during the war era was bound to have far-reaching effects on the operating results of business enterprise as well as on its financial structure. In manufacturing, for example, substantial short-run profits resulted from the pr

³⁵ For a discussion of consumer buying resistance in this period see the Report of the Joint Commission of Agricultural Inquiry, 67th Congress, House Report No. 40, *Credit*, Part II, pp. 45-46; also Alexander P. Noyes, *The War Period of American Finance, 1908-1925* (New York 1936) pp. 333-34; Wilson F. Payne, *Business Behavior, 1919-1922*, School of Business, University of Chicago (1942) pp. 62-63 and 109-11; and William Hoyt Moore, *Post-Armistice Industrial Developments, 1918-1920*, U. S. Bureau of Labor Statistics, Historical Study No. 58 (January 1943) pp. 38-42.

³⁶ See Noyes, *op. cit.*, pp. 395-96; also Payne, *op. cit.*, Chapters III-VIII, pp. 55 ff.

³⁷ Chamber of Commerce of the State of New York, "Cancellations," *Monthly Bulletin* (November 1920) pp. 1-8 and 34-35.

³⁸ See the court testimony of George O. May on the Goodyear reorganization of 1920, reprinted in his *Twenty-five Years of Accounting Responsibility, 1911-36* (American Institute Publishing Co., New York, 1936) I, pp. 291-316.

ling practice of charging raw materials into process on some average-cost basis, which, though including provision for valuation reserves in many cases, more nearly approximated the first-in, first-out ("fiffo") method of pricing inventory than any other.³⁹ Such short-run profits arose out of the time lag occurring between the purchase of the raw material and the sale of the finished product. So long as the trend of prices continued upward, and manufacturers generally followed procedures similar to the first-in, first-out method of valuation, the upward price spiral was bound to generate book profits; but when the upswing of prices was replaced by a downswing, beginning at the middle of 1920 and extending through 1921, it was equally inevitable that the write-down of inventory holdings could be a source of exceptional book losses. Similar book profits and losses arose for trade concerns; although trade procedure in accounting for inventory, known as the retail method, differed somewhat from the procedure current in manufacturing, as a mat-

The different results that may be obtained in a period of rising prices from alternative methods of valuing manufacturing inventory may be seen from the following comparison of the first-in, first-out ("fiffo") method and the last-in, first-out ("liffo") method. In principle, average cost methods are more nearly related to the first-in, first-out basis of inventory valuation and over time yield a roughly similar pattern of results.

The first-in, first-out method assumes that materials are withdrawn from stock in the same order as they are purchased and at the original purchase price. Thus, in a period of rising prices, materials moving from stock into production are priced at lower figures than are newly purchased materials moving into stock. Therefore the cost in the cost of goods manufactured lags behind the rise in the price of finished goods, and profits as well as inventory values are inflated by advancing prices. The amount of the lag (and of the resulting profit differential) obviously depends upon the size of inventory, its rate of turnover, and the amount of price change.

The use of the last-in, first-out method of valuation, according to which materials withdrawn from stock are priced at the most recent acquisition cost, yields in a period of rising prices a higher cost of goods sold and a lower value for inventory on hand, that is, a smaller short-run book profit, than the first-in, first-out method. For an interesting discussion of the comparative results obtained by the use of the first-in, first-out, last-in, first-out, and average-cost methods of inventory valuation, see Charles W. Laa, *Effect of Inventory Methods on Calculation of Profits and Income Taxes*, University of Illinois, Bureau of Economic and Business Research, Bulletin No. 63 (February 1943).

During the period of war and postwar price inflation, a few large companies set up valuation reserves for the difference between the current cost of inventory on hand and some average prewar cost, charging a like amount either to a loss account or to the cost of goods sold, and thereby reducing both the book value of their inventory and the amount of their operating profits.

ter of operating practice the trade method appears to have had much the same results.⁴⁰

A substantial number of large concerns, in anticipation of a subsequent decline in prices, established or increased inventory reserves, charging the amount of such reserve provision against the war and postwar profits. A few of the more conservatively financed companies, such as the United States Steel and International Harvester Corporations, valued inventories in reports to stockholders at prewar prices and carried the difference between these values and cost as inventory reserves; other large companies included provisions for inventory revaluation as part of their contingency reserves. Most inventory reserves, however, were inadequate, and many of the medium and small companies — perhaps the majority of them — did little about the matter. In consequence, a large number of manufacturing and trade companies found themselves suddenly faced with substantial operating losses when prices declined in 1920-21.

A total of 31 large manufacturing companies for which inventory revaluation data are available (21 of which are included in our sample) reported inventory write-downs of \$115 million for 1920, or 1.5 percent of the value of their inventory holdings at the beginning of the year. In regard to large trade companies it is not possible to obtain from published data an adequate impression of the extent of 1920 inventory write-downs; we do know, however, that 2 of the companies in our sample had write-downs totaling \$8 million, or 0.8 percent of inventory at the beginning of the year. It is noteworthy that only one of the companies in our samples of medium and small manufacturing and trade corporations indicated inventory write-downs in 1920. Companies that did not take inventory losses or write-downs of course absorbed them in the cost of goods sold.

Quick Assets

The sharp expansion of business inventory was an outstanding feature of corporate financial development during the war and postwar years. But the increase in quick assets — cash, marketable securities and receivables — was also abnormally large between 1919 and 1920 if that period is compared with the subsequent peacetime

⁴⁰ See report prepared by the American Institute of Accountants Committee in Cooperation with Controller's Congress of the National Retail Dry Goods Association, "The Last-in, First-out Inventory Basis," *Journal of Accountancy* (February 1921), pp. 146-54, especially p. 148.

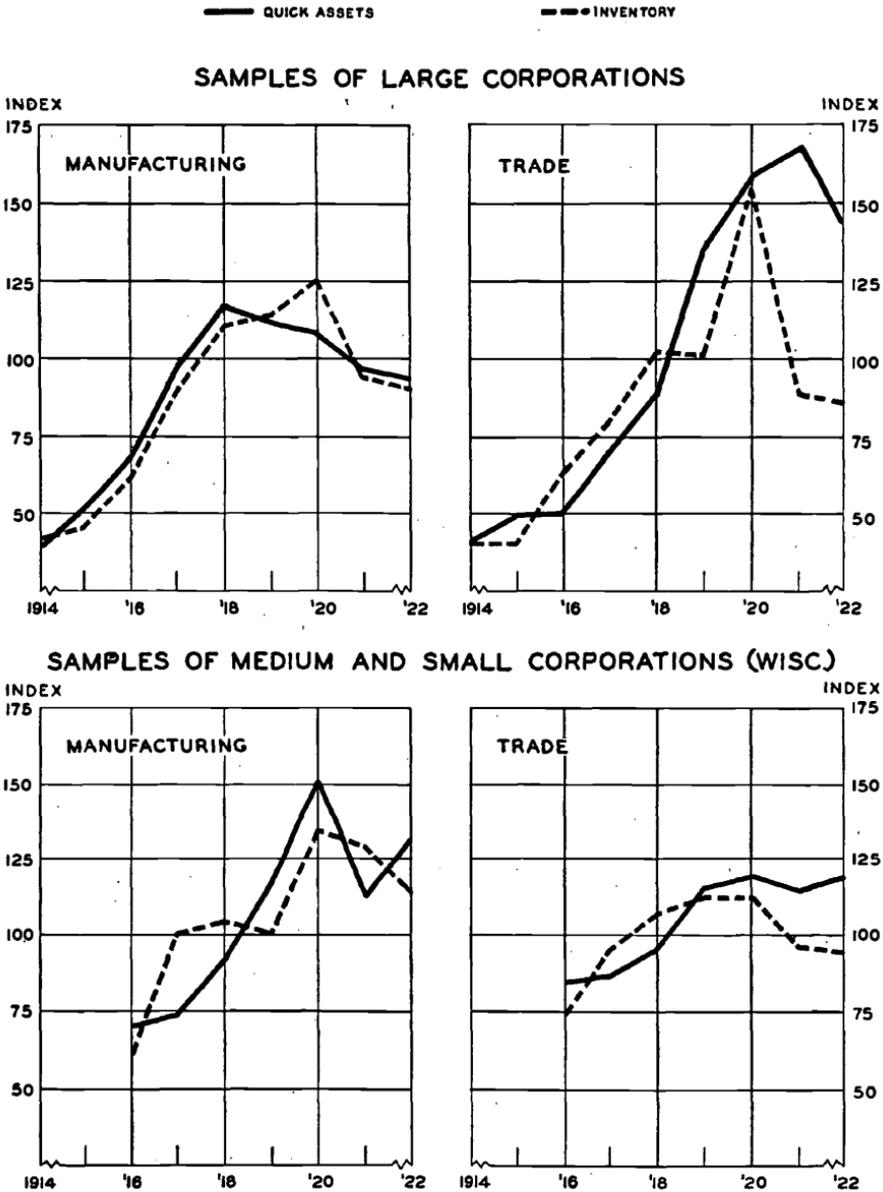
expansions of 1922-29 and 1933-37, or with expansions between 1904 and 1913 (according to such fragmentary evidence as is available). In some industries — such as steel, meat packing, transportation equipment, and building materials — quick asset expansion was relatively greater than the increase in inventory.

The growth in quick assets of our samples during the World War I expansions is compared in Chart 7 with the growth of inventory. (While inventory may be considered as part of quick assets in trade, we exclude it here for purposes of comparison with manufacturing industry.) Over the war years 1915-18 all four industry-size groups added substantially to both items, but the smaller corporations showed a greater increase in inventory than in quick assets.⁴¹ This difference reflects the larger companies' more rapid wartime increase in sales and profits, a spurt that, among manufacturing concerns, was due largely to war orders for munitions and supplies, and, among trade concerns, resulted from a prompt response to rising prices and volume of consumer demand. During the postwar expansion the quick assets of large manufacturers declined while their inventory increased. For the other groups, however, both quick assets and inventory — particularly quick assets — underwent further expansion, benefiting from the consumer buying wave of 1919-20; while the dollar sales of large manufacturers leveled off in 1918 and failed to rise in 1919 or 1920, the other groups enjoyed a substantial growth in their sales in the latter years.

The wartime increases in corporate resources resulting from the investment of funds in quick assets and in inventory exceeded those of the interbellum expansions. This is clear from Table 3, which compares the increase in these accounts, in percent of total assets at the beginning of the year, on a weighted annual average basis. In all four industry-size groups both accounts made a larger average percentage addition to total assets in 1915-18 than in either of the postwar peace expansions. The 1919-20 period showed some irregularity among the samples, but over the 1915-20 period as a whole

⁴¹ Among an average of 83 large manufacturing companies included in our sample, 42 in 1915-18 and 48 in 1919-20 expanded their inventory in relation to their quick assets; for the large trade concerns the proportions were 5 out of 8 in 1915-18 and 4 out of 8 in 1919-20. Among the 73 medium and small manufacturing companies, the number expanding inventory in relation to quick assets amounted to 35 in 1917-18 and 32 in 1919-20; for an average of 30 medium and small trade concerns the proportions were 23 in 1917-18 and 14 in 1919-20.

CHART 7—INDEXES OF QUICK ASSETS AND OF YEAR-END BOOK VALUE OF INVENTORY, 1914-22^a
(1916-20 average = 100)



^a For description of the samples see Appendix A.

one or both items produced sizable increases in total assets for all groups.

TABLE 3—EXPANSION OF QUICK ASSETS AND OF INVENTORY, IN PERCENT OF BEGINNING-OF-YEAR TOTAL ASSETS, ANNUAL AVERAGE ^a

Industry-Size Group	World War I Expansions		Peacetime Expansions	
	War 1915-18	Postwar 1919-20	1922-29 ^b	1933-37
MANUFACTURING SAMPLES				
Large companies				
Quick assets	6%	-1%	1%	^c
Inventory	5	2	1	2%
Medium and small cos. (Wisc.)				
Quick assets	4	9	3	^c
Inventory	6 } ^d	4	^c	1
TRADE SAMPLES				
Large companies				
Quick assets	3	6	2	2
Inventory	7	8	5	3
Medium and small cos. (Wisc.)				
Quick assets	2	4	^c	-1
Inventory	9 } ^d	1	1	2

^a See text footnote 27. For description of the samples see Appendix A.

^b Exclusive of 1924 and 1927.

^c Less than 0.5 percent.

^d Average for 1917-18 only.

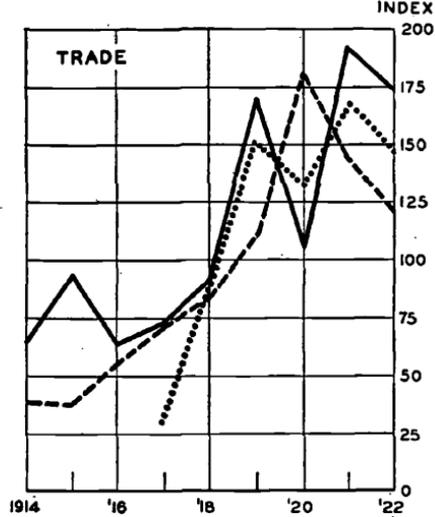
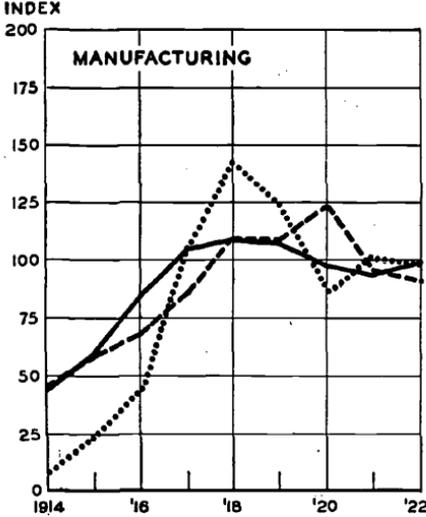
An analysis of changes in the various components of quick assets (Chart 8) reveals, for each of our samples, a notable growth of receivables, cash and marketable securities over the wartime period as a whole, though during the war itself the increases were more consistent for large corporations, and less consistent for smaller concerns, than during the postwar expansion. Receivables constituted the largest part of quick assets at the outset of the war expansion—roughly three-fifths among the large manufacturing and trade corporations, three-quarters among the medium and small manufacturing companies, and four-fifths among medium and small trade companies. For the trade groups, however, the relative importance of receivables declined through 1919, and for manufacturing through 1920.

The increase in cash balances shown by our samples between 1915 and 1919 or 1920 suggests that a significant change in the own-

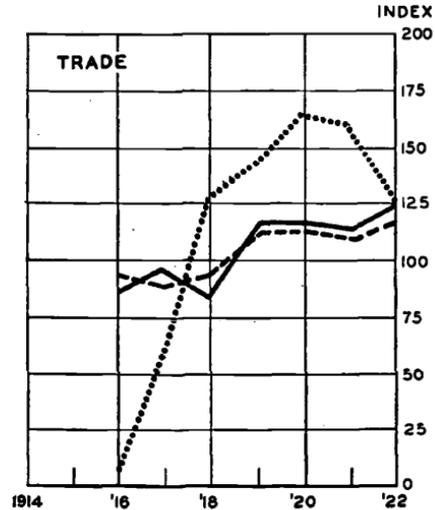
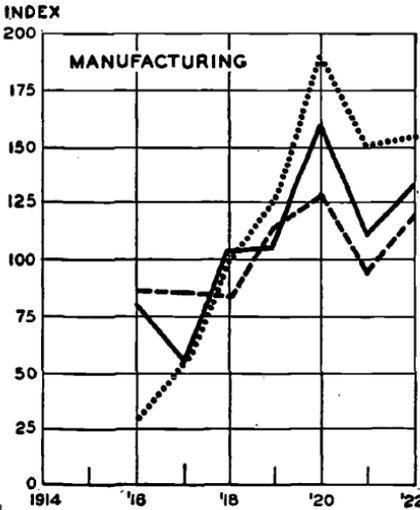
CHART 8—INDEXES OF CASH, RECEIVABLES, AND MARKETABLE
SECURITIES, 1914-22^a
(1916-20 average = 100)

— CASH - - - RECEIVABLES MARKETABLE SECURITIES

SAMPLES OF LARGE CORPORATIONS



SAMPLES OF MEDIUM AND SMALL CORPORATIONS (WISC.)



^a For description of the samples see Appendix A.

ship of bank deposits may have been associated with the wartime inflation process. During 1915-18 the total deposits of all banks rose at a per annum rate of 13 percent, and demand deposits at a rate of 11 percent; in 1919-20 both categories showed an average increase of 8 percent.⁴² Up to 1918 the cash balances of our large corporation samples (manufacturing and trade combined) increased faster than demand deposits of all banks (Chart 9), but then they leveled off and declined as these companies drew down their cash in order to finance fixed property expansion, war profits taxes and postwar inventory accumulation; but total demand deposits continued to rise into 1920. In contrast, the smaller corporations' increase in cash balances appears to have maintained a fairly steady relationship to the growth of demand deposits.

These sample data suggest that cash balances of large manufacturing and trade corporations may have grown more rapidly than consumer and other business balances through 1918, and that from 1918 to 1920 a change in the opposite direction occurred. Since such a change may have been an important factor in the development of the postwar boom, it needs to be confirmed by data relating to all large manufacturing and trade corporations (defined here as those with total assets in excess of \$5 million). Estimates indicate that cash balances of this entire group represented about 7 percent of the \$12 billion of demand deposits of all banks at the end of 1916, 8 percent of the \$15 billion of deposits in 1918, and 8 percent of the \$18 billion outstanding at the end of 1920.⁴³ In other words, cash balances of all large manufacturing and trade companies grew more rapidly than demand deposits from 1916 to 1918, and at about

Computed by the compound interest rule, from interpolated year-end adjusted demand deposits.

An estimate of the number of manufacturing and trade corporations with total assets of \$5-10 million and \$10-50 million was obtained for the years 1916, 1918 and 1920 by adjusting the number of companies listed in the 1923 *Moody's Manual of Investments* for change in asset size during the period 1915-20. The estimated number of companies for each year was then multiplied by the average amount of cash holdings of companies in the same size groups, as determined from samples of companies listed in *Moody's Manuals* for 1916, 1918 and 1920. To determine cash holdings of manufacturing corporations of a total asset size of \$50 million and over, all such companies listed in *Moody's* in 1916, 1918 and 1920 were included; but for trade concerns of that size it was necessary, because of the small number of large trade concerns whose statements were published in *Moody's*, to follow the same procedure for the manufacturing and trade concerns in the \$5-50 million total asset group.

the same rate from 1918 to 1920. The difference between this finding for the latter period and that for our sample in the same year reflects an increase in the number of concerns in the large corporation class rather than an increase in average cash balance. Taken together, however, these data suggest that over the entire wartime period there was some shift in deposit ownership in general, and also a considerable shift in deposit ownership within the population of large corporate enterprises.

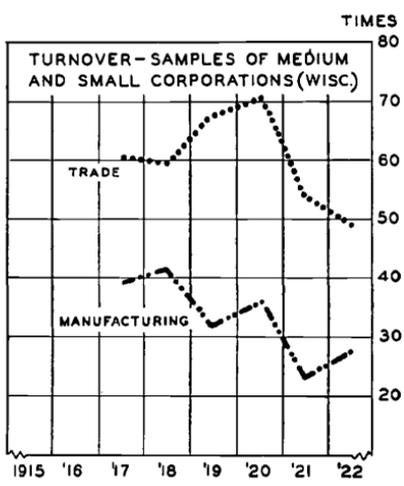
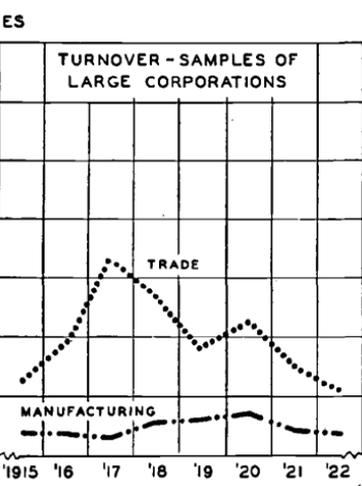
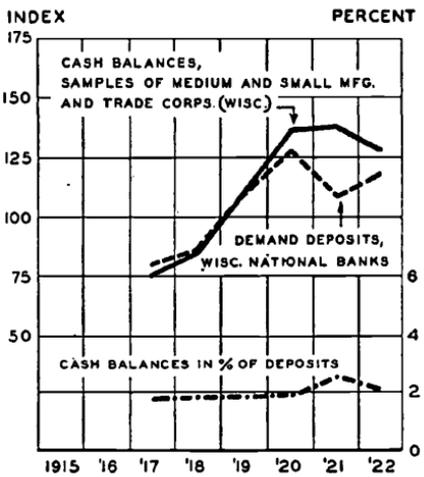
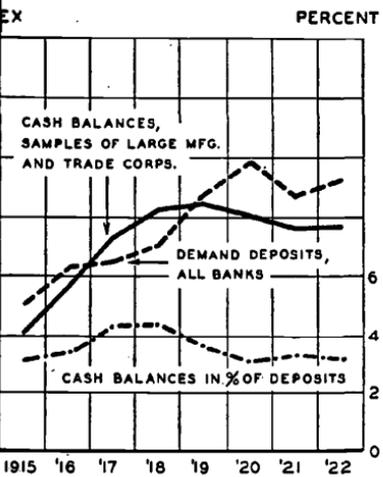
When business operations are relatively stable a sharp increase in corporate cash balances is reflected in a decrease in their rate of turnover, that is, a decline in the number of times a year that the average amount of cash on hand is spent. Under the inflationary conditions prevailing through 1915-17 the turnover of average cash balances of large manufacturing corporations remained relatively constant, with a slight decline in 1917, while that of the large trade concerns increased somewhat from 1915 to 1916, and by 1917 had practically doubled its 1915 level (Chart 9).⁴⁴ Between 1917 and 1920 the cash turnover of the large manufacturing corporations increased slightly, while that of the large trade concerns declined through 1919, then recovered somewhat in 1920. The cash turnover of the medium and small manufacturing corporations moved both up and down during 1917-20 but declined on the whole, while that of the medium and small trade companies rose noticeably in 1919 and 1920 above the 1917-18 level.

The growth in marketable security holdings during the war years was primarily a reflection of Liberty Bond purchases. From a negative

⁴⁴ In order to derive an annual rate of turnover of corporate cash holdings either cash receipts or cash payments may be divided by the average cash balance. For periods of stable cash balances the two methods yield the same result; if cash balances are growing the use of total cash payments yields a lower turnover rate than cash receipts; if cash balances are declining cash payments yields a higher rate than cash receipts.

For Chart 9 the total of cash payments, as compiled from the sources and uses of funds statements for individual companies, has been employed. Sales minus net funds from operations (net income plus non-fund charges to income, such as depreciation, depletion, losses on sales of fixed assets, amortization of deferred charges, and the like) minus increases in current payables, are assumed to equal operating expenses paid in cash; to this are added cash dividends, decreases in current payables, increases in assets other than cash and receivables, decreases in long-term debt, and repurchases of stock. As an estimate of total cash payments the result of the procedure admittedly rough, based as it is on changes in year-end balances of asset and liability accounts.

CHART 9—INDEXES OF CASH BALANCES AND OF DEMAND DEPOSITS, 1915-22, AND TURNOVER RATES OF CASH BALANCES ^a
 (1917-20 average = 100)



Indexes of cash balances are based on averages of year-end data for two consecutive years. Turnover rates of cash balances represent cash payments made during the year, divided by average year-end cash balances; see text footnote 44. For description of the samples see Appendix A.

ligible sum at the end of 1916, the marketable security holdings of all large manufacturing and trade corporations grew rapidly to an estimated peak of some \$1.5 billion in 1919, then declined to around \$0.8 billion at the end of 1920. Much of the wartime purchase of government securities was a patriotic response to war loan drives and did not reflect a deliberate policy of building up corporate liquidity. Some large manufacturing corporations sold government bonds in 1919 in order to finance the reconversion and expansion of plant and equipment and the payment of income taxes while in 1920 both large manufacturing and large trade corporations drew upon this source to finance inventory expansion and tax payments. In liquidating their government bond holdings in 1919 and 1920, these companies not only contributed to the break in prices of Liberty Bonds that occurred between mid-1919 and mid-1920, but also suffered some losses as a result of this price decline. The medium and small corporations, both in manufacturing and in trade, were purchasers of government bonds in 1919 and 1920, a further indication of the extent to which the smaller corporations benefited from the postwar boom in consumer buying.

Fixed Property Expenditures and Investments

The production emergency of 1915-18, like that of the current war, was met not only by conversion and by more intensive use of existing plant and equipment, but also by construction of new facilities. However, many companies followed the practice of charging wartime plant and equipment expenditures, in whole or in part, to current operating expense or to contingency or other reserves, and of burying depreciation reserves in other accounts without fully disclosing such facts in their published statements. Moreover, in some industries war contracts provided for contra-advances to finance the cost of special new facilities. Prior to our entry into the war, European belligerents financed plant expansion by this method, obtaining a large part of the funds advanced from proceeds of security sales in American markets. Some war contracts of our own government, 1917-18, provided for new plant financed in this way. For these reasons, any estimate of fixed property expenditures is necessarily rough. Nevertheless, some judgment may be formed concerning the relative magnitude of such expenditures in 1915-20 and in the peacetime expansions of 1922-29 and 1933-3

Chart 10 shows, for 1915-37, fixed property expenditures (change in net fixed property account plus reported depreciation and depletion accruals) as a percentage of the net fixed property account at the beginning of the year — hereafter called the fixed property expenditure ratio. During 1915-17 (years for which data on the smaller companies are unavailable) the ratio rose for both samples of large corporations, thus reflecting the broad influence of expanding production and trade under wartime stimulus. But in 1918 wartime priorities, shortages of labor materials and bottlenecks in transportation brought about a reduction in the ratio for each group, though the decline was small among the large manufacturing concerns engaged in the output of war materials. For all groups the ratio recovered to some degree in 1919, and in 1920 it attained levels in trade and in smaller-scale manufacturing that were unequalled during either of the interbellum expansions; even for the large manufacturing group it rose almost as high as in the subsequent peak years 1929 and 1937.

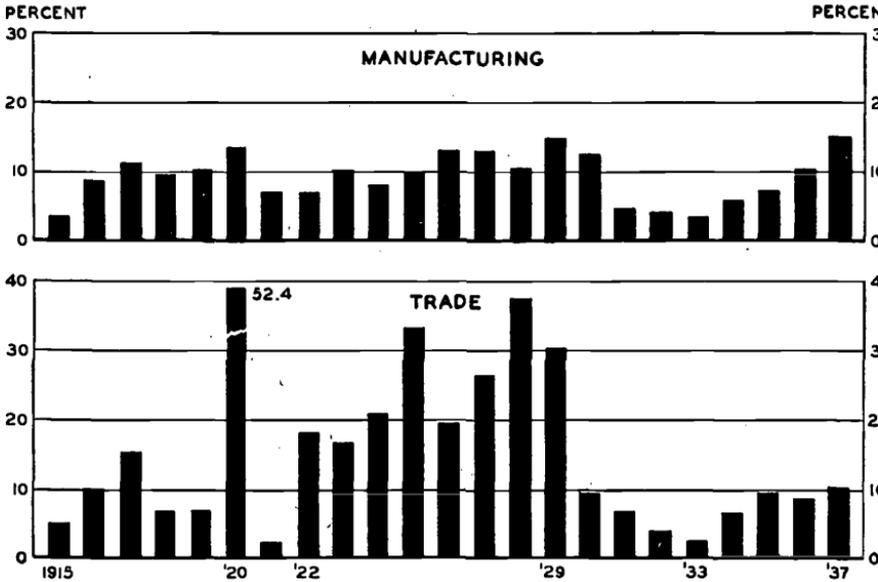
This rise in the fixed property expenditure ratio during the immediate postwar expansion reflected a large increase in dollar outlay for plant and equipment. In current dollars the total fixed property expenditures of all manufacturing companies reached in 1919-20 the high-water mark for the entire 1915-37 period.⁴⁵ It is true that actual additions to physical productive facilities were considerably less than the dollar figures imply, largely because of concurrent price increases; by April 1920 the Bureau of Labor Statistics wholesale price index of building materials had risen 71 percent over its 1918 level, and for the whole year 1920 the index averaged 52 percent higher than 1918. There is no doubt, however, that manufacturing and trade companies made important additions to their fixed property during the 1919-20 period, and particularly in 1920.

One reason for the postwar expansion of fixed property was the lifting of restrictions imposed by wartime priorities and shortages

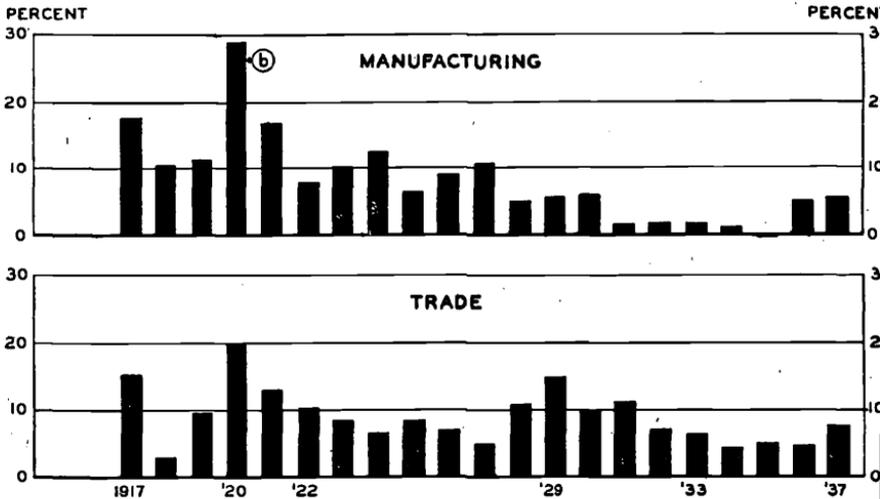
⁴⁵ Estimates of plant and equipment purchases of manufacturing concerns in the United States during the period 1915-39 reveal that the average expenditure during the war years 1915-18 was \$1,468 million, as compared with \$2,695 million in 1919-20, \$2,159 million in 1922-29 (exclusive of 1924 and 1927) and \$1,306 million in 1933-37. See Chawner, *op. cit.*

CHART 10—FIXED PROPERTY EXPENDITURES IN PERCENT OF FIXED PROPERTY ACCOUNT AT BEGINNING OF YEAR, 1915-37^a

SAMPLES OF LARGE CORPORATIONS



SAMPLES OF MEDIUM AND SMALL CORPORATIONS (WISC.)



^a See page 55, footnote a to Table 4.

^b Excluding the paper industry this figure becomes 20 percent; excluding one errata paper corporation the figure becomes 25 percent.

labor and materials. A more fundamental cause, however, was the optimism generated by the fact that prices did not recede seriously and were soon advancing under the impact of consumer spending and foreign demands for American goods. In addition, manufacturing expenditures on fixed property were stimulated by the competitive introduction of new models, products, and technological processes, some of which had been developed during the war years; the process of converting back to peacetime production may have led to higher outlays for plant and equipment, particularly among the large manufacturing companies; and the installation of labor-saving equipment became desirable as an aid in maintaining the high wage scales established during the war years.

In trade especially, the phenomenal 1920 rise in fixed property expenditures was prompted by the postwar spurt in consumer buying, financed partly from current income and partly from the liquidation of war savings by discharged soldiers and the civilian public. A number of large trade corporations launched ambitious expansion programs in that year; mail-order companies and chain stores added many new outlets; and urban department stores substantially enlarged or modernized their merchandising facilities.

An important question in this connection is the extent to which the postwar increase in fixed property expenditures represented replacement deferred from 1917 and 1918. But while it is known that a considerable amount of deferred replacement accumulated in the railroad industry, no precise data are available in regard to manufacturing, where the question has more significance than it has in trade. Possibly a rough measure of such deferment is the amount of decrease in the net fixed property account.⁴⁶ Out of a sample of 50 large manufacturing companies for which depreciation data are available, 35 postponed the full maintenance of their

Decreases in the net fixed property account result not only from deferred replacement but also from the undisclosed sale or retirement of property not fully depreciated; from depreciation charges in excess of the actual decline in the value of productive assets; and from depreciation charges on assets which the company has no intention of replacing, such as those especially acquired for war production; both for taxation and for pricing purposes amortization rates allowed on munitions and armament production facilities were high during and immediately after the World War I period. Therefore the amount of decrease in this account is not a very accurate measure of deferred replacement, but it has some value as a rough indication.

fixed property investment in 1917 and 1918, for one reason or another; in 1919-20, on the other hand, all but 3 of these 35 companies reported net increases in their fixed property accounts. Among the medium and small manufacturing companies the proportion reporting net decreases in 1917-18 was about the same, and here too there was a conspicuous shift in 1919-20. In most cases, however, the amount of decrease in net fixed property accounts was small, and thus this measure would indicate that the volume of deferred replacement at the end of 1918 was not very great. Nevertheless, if the war had continued for several more years the accumulation of deferred replacement would probably have constituted a sizable sum for manufacturing industry as a whole, and the problem of maintaining the productivity of plant facilities would have attained major importance.

Further information on the fixed property accounts of manufacturing and trade enterprise during the World War I expansions is provided by the figures in Table 4. In that table the investment percentages differ from those for expenditures in that they are exclusive of depreciation and depletion accruals, that is, of capital consumption. It should be noted that differences between the expenditures and the investment percentages, as found from one expansion period to another, reflect changes in accounting practice with regard to depreciation and depletion charges, as well as the increase in those charges attendant on the growth in fixed property.

For each of the four industry-size groups the investment ratio, as well as the expenditure ratio reached a level in the immediate postwar years that was higher than in any of the other expansion periods. The groups of medium and small corporations had higher average investment ratios in the 1915-18 expansion than in that of 1922-29, and for the large manufacturing companies the ratio was the same in the two periods; but the investment ratio for the large trade sample, although its extremely high level of 1919-20 was not approached in either interbellum expansion, was markedly higher in the 1922-29 period than it had been during 1915-18. It appears that the postwar period ushered in an era of accelerated growth in large-scale retailing, a corollary of the increasing importance of distribution in the national economy. The average investment ratios for the 1933-37 expansion contrast sharply with those of both wartime expansions and also with those of the 1922-

TABLE 4—FIXED PROPERTY EXPENDITURES AND INVESTMENT,
PERCENT OF BEGINNING-OF-YEAR FIXED PROPERTY ACCOUNT,
ANNUAL AVERAGE ^a

Industry-Size Group	World War I Expansions		Peacetime Expansions	
	War 1915-18	Postwar 1919-20	1922-29 ^b	1933-37
MANUFACTURING SAMPLES				
Large companies				
Expenditures	8%	12%	11%	8%
Investment	4	7	4	1
Medium and small cos. (Wisc.)				
Expenditures	14	20	9	2
Investment	7 } ^c	13 } ^d	1	-3
TRADE SAMPLES				
Large companies				
Expenditures	13	39	28	8
Investment	8	30	22	1
Medium and small cos. (Wisc.)				
Expenditures	10	15	10	5
Investment	5 } ^c	9	3	-1

For each year the figures are exclusive of the companies that did not report depreciation in that year. Fixed property investment represents the change in land, plant and equipment account, net of depreciation reserves. Fixed property expenditures represent investment plus depletion and depreciation accruals. For the World War I period unpublished financial statements were in almost every case insufficiently detailed to permit of adjustments for retirements of fixed property, or for profits or losses resulting therefrom. The large corporation samples for the peacetime expansions differ in composition from those for the wartime expansions; for description of the samples see Appendix A.

^a Exclusive of 1924 and 1927.

^b Average for 1917-18 only.

^c Including the predominant industry (paper), expenditures and investments become 13 and 9 percent respectively; excluding one paper corporation with erratic behavior, ratios become 18 and 10 percent respectively.

^d Period: while the large manufacturing and trade companies failed to contract their fixed property investment in the expansion of the 1920s, even in that group the average expansion was of nominal proportions. For the two wartime expansions and for that of 1922-29 the expenditure ratio could be described in almost exactly the same way as the investment ratio.

On the whole, the available evidence indicates that the military equipment of World War I was produced to a great extent with equipment on hand at the beginning of the war, and that additions to manufacturing facilities, though substantial, were not abnor-

mally large. But the outburst of domestic and foreign spending that followed the termination of hostilities was translated by enterprise into property expansion programs, commitments for which were entered into and carried through at the top of the postwar price inflation. While there were some property writedowns in 1921, most of the war and postwar additions to the value of production facilities were apparently carried forward on the books at original cost, even though the reproduction cost at the level of prices of the '20s was substantially lower. Wartime tax laws permitted accelerated depreciation on war-built plant and facilities, but the amount was to be fixed after the war, when actual economic obsolescence could be determined under normal peacetime conditions. Writedowns on such property therefore occurred over the early '20s when depreciation allowances had been established and approved.⁴⁷

⁴⁷ See Brown and Patterson, *op. cit.*, pp. 630-36, especially pp. 634-35. Accelerated depreciation was allowed on war constructed facilities having a total value amounting to some \$672 million under the Revenue Acts of 1918 and 1921.