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## CHAPTER 7

### Relative Importance of Raw Materials, Goods in Process, and Finished Goods

Earlier chapters have given the most adequate picture we can draw of how aggregate inventories of manufacturers behave during business cycles. The materials, however, did not permit us to gain a significant understanding of this behavior. No classifications of stocks by type were available within each industry, and it seemed unwise to trust the accuracy of the data to the point of treating as significant the industrial differences that appeared.

To analyze the cyclical behavior of stocks we turn to evidence on manufacturers' holdings of various commodities. In the chapters that follow we attempt to describe and explain the behavior of three classes of inventories: finished goods, raw materials, and goods in process. This chapter is devoted to their relative size. 'Finished goods' are commodities ready for sale by the manufacturer who produces them, whether or not in the form required by their ultimate users. 'Raw materials' include all goods held by manufacturers but not yet processed by their current holders, no matter how highly fabricated by previous holders. 'Goods in process' are being fabricated by their current holders but not yet ready for sale to other manufacturers, distributors, or final consumers.

#### *1 Census and Department of Commerce Data*

The Census of Manufactures contains comprehensive annual estimates of manufacturers' stocks as of December 31 for each year 1936-39. Showing inventories classified as 'finished goods' and 'all other' stocks, these reports are the most reliable indicators of the relative importance of finished goods stocks. Since December 31, 1938 the Department of Commerce has published an addi-

tional classification into raw materials, goods in process, and finished goods (Chart 15). The original data, which are in dollar values for the ends of months, are based on a sample of manufacturing concerns (App. A). Figures for finished goods stocks are reconciled with adjusted census data for the ends of 1938 and 1939. Percentage allocations based on these two sets of reports are shown in Table 38.

Chart 15  
Raw Materials, Goods in Process, and Finished Goods  
Relative Shares in Total Manufacturers' Stocks



Source: Department of Commerce.

Inference from these statistics about the relative size of the three classes of stocks on the average is complicated by the fact that all do not act in the same fashion during business cycles. As we shall see, raw materials and goods in process typically vary positively with manufacturing activity, and at least a large portion of finished goods varies inversely.<sup>1</sup> The period covered by Table 38 includes 1941-45 when manufacturing output, under the stimulus of the defense and war programs, rose to unprecedented levels. It is not surprising that in these years the proportion of stocks repre-

<sup>1</sup> This is a rough statement, true for short cyclical phases; see Ch. 11.

TABLE 38  
Manufacturers' Inventories, Percentage Distribution  
by Stage of Fabrication

Dec. 31	RAW MATERIALS	GOODS IN PROCESS	FINISHED GOODS
1) 1936	...	...	41.6
2) 1937	...	...	43.7
3) 1938	40.8	15.7	43.5
4) 1939	42.4	17.7	40.0
ANNUAL AVERAGE OF MONTHLY STANDINGS <sup>a</sup>			
5) 1939	39.8	16.9	43.3
6) 1940	40.5	18.8	40.6
7) 1941	42.6	23.9	33.4
8) 1942	45.8	25.6	28.5
9) 1943	46.3	28.5	25.2
10) 1944	44.6	28.3	27.1
11) 1945	46.0	25.8	28.2
AVERAGE STANDINGS			
12) Ends of years, 1936-39	...	...	42.2
13) Ends of years, 1936-45	...	...	34.5
14) All months, Dec. 1938- Dec. 1940	40.2	17.9	41.9
15) All months, Dec. 1938- Dec. 1945	43.6	23.9	32.5

<sup>a</sup> Computed from original data for ends of months.

Dec. 31, 1936 and 1937: Census of Manufactures, 1937. Based on census reports for establishments representing 94.6 percent of the total value of product.  
Dec. 31, 1938 and 1939: Census of Manufactures, 1939. Adjusted by Department of Commerce for underreporting (satisfactory reports were received from establishments representing 96.4 percent of total value of product) and for inadequate coverage in petroleum refining, tobacco, and printing and publishing. Census reports are classified into finished goods and all other. Relatives for raw materials and goods in process based on sample data are described below.  
Monthly data, Dec. 31, 1938-May 1946: Department of Commerce data based on reports of a sample of manufacturing firms. Firms reporting finished goods separately held 28 percent of manufacturers' total stocks in June 1942; those reporting all three classes separately held 24 percent. Relatives for finished goods are adjusted to corrected census figures for Dec. 31, 1938 and 1939. See Appendix A for further description.

represented by finished goods should have sunk greatly and that the proportions of raw materials and goods in process should be correspondingly high. Consequently, lines 13 and 15, which present averages including the defense and war boom years, tend to understate the usual size of finished goods and to exaggerate that of the other two classes. For the typical importance of the three classes of stock we depend upon the averages in lines 12 and 14 which exclude the years since 1940.

Line 12 shows the average importance of finished goods at the

ends of years 1936-39, which include a peak of business, a trough, and two year ends when business was recovering. This fairly balanced distribution of dates yields an average standing for finished goods of just over 42 percent of total inventories. It is, of course, necessary to remember that year end figures may not represent accurately the situation at other times in the year. Chart 15, indeed, suggests a seasonal cycle in 1939 and 1940 although there is no clear indication of a seasonal in other years. Moreover, the average of 25 months beginning with December 1938 (line 14) is almost exactly the same as that for the four year ends 1936-39.

Line 14 shows the average importance of all three classes during the months beginning December 1938 and ending December 1940. This period begins in a month when recovery was well under way and continues to a time when production was again very high. It does not include 1941 and later years when production rose to heights never reached before.<sup>2</sup> The average shares during the period were approximately 40 percent for raw materials, 18 percent for goods in process, and 42 percent for finished goods (line 14). These figures cannot, of course, be relied upon to represent average standings for a long period. They are, however, the best that can be extracted from the short series available.

Before leaving these materials, we note the large variations among industries with respect to the importance of inventories in two categories, finished goods and 'all other' stocks (Table 39). Similar industrial classifications for the three groups are not available.

#### 2 Federal Trade Commission Data

Census reports for four years render our information about the relative importance of finished goods and all other inventories far more secure than our evidence about the division of all other stocks between raw materials and goods in process. *Industrial Corporation Reports, 1938 and 1939*, provide another reading on the

<sup>2</sup> Selected standings of the FRB index of manufacturing production help to indicate the character of the period.

Annual average, 1937	113	December 1938	100
Peak value, May 1937	123	Annual average, 1939	109
Annual average, 1938	87	Annual average, 1940	126
Trough value, June 1938	79	Annual average, 1941	168

TABLE 39  
 Finished Goods and All Other Manufacturers' Stocks  
 Average Values as Percentages of Total Stocks at  
 Year Ends, 1936-1939

	FINISHED GOODS	OTHER STOCKS	TOTAL STOCKS
Total manufacturing	42.6	57.4	100.0
Food, beverages & tobacco	56.1	43.9	100.0
Textiles & textile products	37.9	62.1	100.0
Leather & leather products	39.0	61.0	100.0
Rubber & related products	52.2	47.8	100.0
Lumber & wood products	53.2	46.7	100.0
Paper, printing & publishing	32.1	67.9	100.0
Chemicals & allied products	50.0	50.0	100.0
Stone, clay & glass products	55.9	44.1	100.0
Metals & metal products	35.8	64.2	100.0
Miscellaneous	33.3	66.7	100.0

Census of Manufactures, 1937 and 1939. Figures are not adjusted for the small percentage of establishments not reporting.

significance of the latter two classes. As of the end of 1939, they show balance sheets for 74 manufacturing industries, of which 38 classified inventories into raw materials, goods in process, and finished goods.<sup>3</sup>

The FTC sample was usually obtained by selecting from each industry some "of the most important concerns in the industry from the standpoint of investment and value of goods sold". The sales reported in the 38 groups range from 12.5 to 97.0 percent of the Bureau of Census value of product (excluding a few cases where census sales were exceeded by sales of the FTC sample).<sup>4</sup>

<sup>3</sup> The information was compiled by the Federal Trade Commission from reports submitted directly by selected corporations for their 1939 operations and from annual reports to the Securities and Exchange Commission covering their 1938 operations. The data are compiled by corporation, not by establishment. Most reports cover the calendar year, but some cover the most nearly corresponding corporate fiscal year.

<sup>4</sup> Apparently because the FTC's unit was the corporation, whereas the census unit was the establishment. If the census had classified a sufficiently large number of the plants belonging to the FTC's corporations in other industries, the result noted would be obtained. In addition, the census does not cover establishments in foreign countries whereas the Commission includes the consolidated assets of the companies covered.

In most instances the sample accounted for over half the activity reported to the census. The sales of the FTC sample of firms reporting classified inventories amounted *in toto* to only 15 percent of the census value of product for all inventory reports in 1939. In 1938 the coverage of the sample was even less adequate.

To bolster the coverage and, in particular, to include several important groups absent from the FTC's reports, the National Bureau of Economic Research compiled additional material from SEC records (App. C). The over-all average ratio of goods in process to total stocks, was obtained by first computing this ratio for each group. A weighted average ratio was then calculated using weights proportionate to the value of inventories held in each group as reported by the Census of Manufactures, 1939 (Table 40).

TABLE 40

Ratios of Goods in Process to Manufacturers' Total Inventories  
December 31, 1938 and 1939  
(percentages)

	1938	1939
Federal Trade Commission sample	19.1	20.6
Department of Commerce sample	15.7	17.7

We cannot account for the difference in the results, and it may well be due merely to the sampling error. With such unsatisfactory materials the important thing to note is that results from the two samples do not differ by more than three or four percentage points.

### 3 Conclusions

We can get satisfactory estimates of the importance of finished goods on the particular dates of the census canvass. For goods in process and raw materials less reliable data are available for short periods. Finally, the specific dates and periods covered are not fully representative of conditions during the entire interwar period on which our study is centered. In these circumstances, we have to be satisfied with rough judgments about the relative size of the three categories. With these reservations, we shall assume that, on the average, raw materials account for 40 percent of manufacturers' total stocks, goods in process for 20 percent, and finished goods for 40 percent.