Volume Title: Inventories and Business Cycles, with Special Reference to Manufacturer's Inventories

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Volume Publisher: NBER

Volume ISBN: 0-870-14087-6

Volume URL: http://www.nber.org/books/abra50-1

Publication Date: 1950

Chapter Title: Finished Goods Made from Nonagricultural Materials

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Chapter URL: http://www.nber.org/chapters/c9134

Chapter pages in book: (p. 238 - 268)

Chapter 11

Finished Goods Made from Nonagricultural Materials

Manufacturers' stocks ready for delivery to customers, which I call 'finished goods', are the third of the three main classes of inventories. Between World Wars I and II, they probably constituted about 40 percent of manufacturers' total stocks. Goods in process, it will be recalled, made up about 20 percent and raw materials the remaining 40 percent.

From the viewpoint of their characteristic behavior during business cycles, the finished goods category is composed of several distinct classes of stocks. One obvious distinction is between goods made to order and 'to stock' or 'for the market' that is, goods not produced against specific orders. Goods made to order, it will be seen, are likely to rise and fall in close company with production and shipments. The behavior of goods made to stock is less simply described. Our data are largely for staples that can be stored for long periods without serious physical deterioration or loss of value because of style changes. Even among staples, there are at least two subclasses. The distinction turns upon the character of the forces that govern production cycles. The production of most goods moves largely in response to cycles in demand. Production, though following demand closely, is allowed to run behind shipments during most of the upswing and to outrun shipments during most of the downswing. Stocks, consequently, tend to move inversely to the rate of manufacturing activity and to business cycles.

For a less important group of commodities the rate of fabrication is more largely influenced, at least in the short-run, by impulses from the side of raw material supply which originate independently of demand. This may happen in the processing of farm products that cannot be stored in unfabricated form. The timing of cycles in the stocks of such processed goods tends to be governed by that of cycles in the output of the raw material. But since crop

cycles are usually independent of business cycles, either no regular relation can be discerned between stocks and business cycles or stocks show some tendency toward inverse conformity overlaid by many irregular movements. The outcome depends partly upon whether the fabricated product is perishable and partly upon other factors.

While these distinctions can be shown to be consistent with the evidence, they do not comprise all the main classes that need to be recognized. As said above, production cycles in most manufacturing industries are dominated by influences from the side of demand. Stocks of finished goods held by such industries are likely to vary inversely to business cycles, provided the goods are staples and provided they are made to stock. It seems unlikely, however, that manufacturers will allow perishable goods, even if made to stock, to pile up for long when demand is slumping. Manufacturers of items the demand for which depends upon style and fashion probably take drastic steps to liquidate stocks when demand begins to fall. Without excluding the possibility of a moderate lag, stocks of such goods are likely to move up and down with business, being expanded when demand is brisk and quickly cut to avoid loss when demand falls.

We have distinguished the following classes among stocks of finished goods:

1 Goods made to order
2 Goods made to stock
  a Production cycles governed by demand
    i Perishables
    ii Durable staples
  b Production cycles governed by the supply of raw materials
    i Perishables
    ii Durable staples

Of these classes evidence of a sort is available about all except 2, a, i: perishable goods made to stock whose production cycles are governed by demand. Goods made to order and other goods whose production cycles are governed by demand are discussed in this chapter. Commodities in which the supply of raw materials is an important determinant of production cycles are treated in Chapter 12.

1 *Goods Made to Order*

Goods are made to order in at least three kinds of situation. One arises when the varying specifications of different customers have to be met precisely. Machine tools (except for certain standard varieties) are an obvious example. Metal products whose dimensions and chemical composition must be exact are another. Goods are made to order also when the raw materials are durable but the fabricated product is perishable. Thus textiles may be stored economically for long periods in the form of fiber, yarn, or even cloth. Made up into women's dresses, however, the product must be sold before the rapid changes of fashion strip it of most of its value. A manufacturer of women's clothing will therefore make samples and perhaps a small stock to meet early orders. He will also venture to produce a certain stock against expected sales for items that are selling especially well. For the most part, however, he operates by producing rapidly against customers' orders. Finally, even quite standardized types of goods are made to order if they are very expensive and sold infrequently. Locomotives, for example, are produced only upon order.

Unfortunately, there is no evidence whereby the importance of the stocks of goods made to order can be accurately estimated. Very rough estimates suggest that only a small part of manufacturers' stocks is in this category. A large part of all manufacturing output, perhaps as much as half, is made to order. The inventory of finished goods held against this business, however, must be smaller. Generally speaking, once such goods are produced they are shipped promptly. Such stock as one finds may be attributed to early orders produced in a slack season for shipment later, to the time required to accumulate economical shipment units (say, freight car loads), to short delays in the availability of cars or other transportation facilities, and to the time required for transit when title passes at the purchaser's plant or locality. In terms of the number of weeks' supply on hand, stocks of goods made to order must be very small. These considerations, in conjunction with those determining the kinds of goods made to order, persuade me that stocks in this category constitute 15 to 25 percent of all finished goods inventories, or roughly 5 to 10 percent of manufac-

turers' total stocks. I guess the figure is nearer 5 than 10 percent.[1]

Stocks of finished goods made to order are likely to rise and fall with production and shipments; for, seasonal variations aside, production will not be undertaken long before the goods are due to be shipped.[2] Consequently, the higher the rate of production the larger will be the quantity of goods completed and awaiting shipment. In some cases, moreover, title to the goods will pass only upon delivery to the purchaser's establishment or city, not upon shipment from the maker's plant. In such circumstances, finished goods include goods in transit, and the higher the rate of manufacturing activity the larger the quantity of goods in transit.

Our records contain only one example of a stock of a commodity made to order, steel sheets. But it is instructive, for we can compare stocks of steel sheets made to order with those produced in anticipation of sale. Steel sheets, like many other finished rolled steel products, are made principally to customers' specifications. Purchasers prescribe the chemical composition of the steel and the physical dimensions of the goods they want. Production is, therefore, largely to order. The part that is made to stock consists presumably of sheets of standard sizes and grades.

We compare stocks of steel sheets made to order and for the market with each other and with the rates of shipment and production. The production and shipments series are composites combining goods made to order with those made to stock. As stated above, goods made to order predominate, but since sales of standard sheets probably parallel those of sheets made to order closely, it seems valid to compare stocks of sheets made for the market, as well as those made to order, with the production and shipments of steel sheets in general.

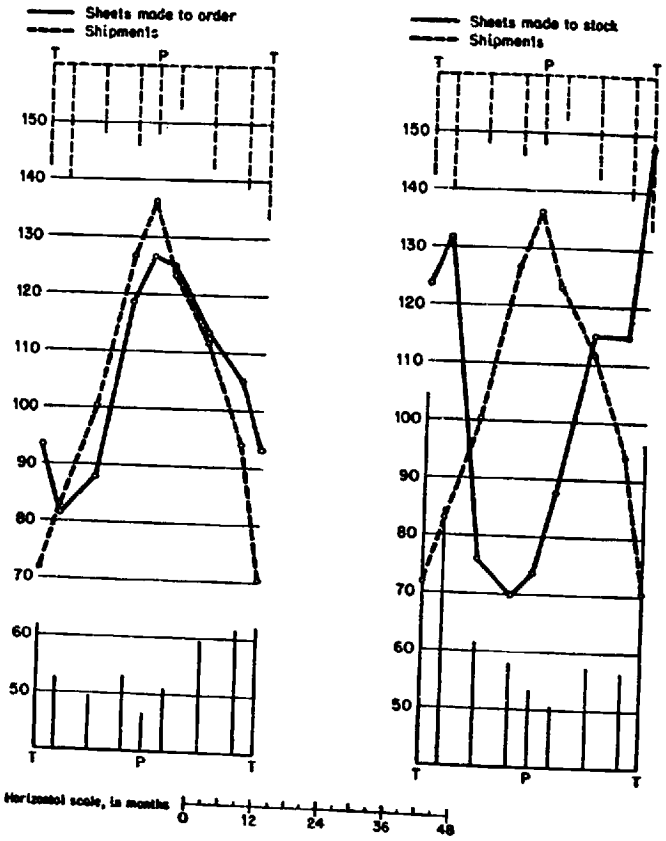
The conformity indexes for sheets made to order during 4 cycles

[1] The calculation on which this estimate is based is too rough to be worth presenting in detail. It involved a guess about the proportion of the value of product in each census industry that is made to order and an assumption that, on the average, goods made to order remain in stock two weeks between completion and delivery. It suggested that some 16 percent of all stocks of finished goods represented products made to order—equivalent to about 6 percent of manufacturers' total stocks.

[2] Production here and later is taken to be measured by output. Commodities do not form part of the stock of finished goods until they are in a form ready for shipment.

of shipments 1919-32 were +100, +100, +100; for sheets made to stock, −50, −100, −100. Since output virtually parallels shipments, stocks clearly have the same relation to production as to shipments. Cycles of stocks made to order conform positively to the rate of manufacturing activity. Inventories of sheets made to stock, however, like other examples of fabricated staples made for the market, move inversely to the rate of activity (Chart 38).

Chart 38
Steel Sheet Stocks and Shipments
Average Patterns during 4 Shipments Cycles, 1919-1932



2 *Staples Produced for the Market*

As stated above, stocks of staple goods made for the market tend to move inversely to manufacturing activity when production cycles are themselves largely governed by cycles in the demand for

goods. Moreover, since cycles in demand generally conform closely to business cycles, such stocks tend to move inversely to business cycles. These conditions probably hold good for a large majority of all manufactured staples. For commodities whose production cycles are controlled largely by supply conditions, however, stocks of finished goods tend to vary with cycles in production, which in turn may or may not bear some relation to cycles in demand. The relation of stocks to business cycles in the second case, therefore, depends partly upon the relation between business cycles and the underlying conditions of supply and partly upon the relative amplitudes of the supply-stimulated cycles in production and those in demand.

The distinction between goods with output cycles largely induced by demand conditions, on the one hand, and supply conditions, on the other, is doubtless the true general ground for differentiating between them. But as a practical matter, the distinction I draw initially is between goods made from farm and from nonfarm materials. Broadly speaking, short-run fluctuations in the fabrication of nonfarm products turn on the demand for them. The derived demand for the raw materials brings out the requisite supply. Raw materials grown on the farm, however, do not respond quickly to demand. On the contrary, supplies of materials tend to fluctuate independently of demand and, when they are perishable, greatly influence the rate at which they are processed.

That this is not a completely adequate approximation to the distinction required will become clear when the evidence on fabricated farm products is reviewed. Cycles in the supply of the underlying farm product do not always dominate the rate of fabrication. The distinction between farm and nonfarm products, however, serves fairly well to bring out the more important elements of the situation. In this chapter and the next I describe and analyze the behavior of stocks of these two kinds of goods.

SIZE OF THE CATEGORY

Since this is the largest category of finished products held by manufacturers, a notion of its size is essential. When industries whose products are made from agricultural materials and a few whose products are perishable though made from nonagricultural ma-

terials are excluded, the remainder comprises finished inventories, durable and staple and made from nonagricultural materials. At the end of 1939 these stocks were worth some $2.5 billion or about 63 percent of the value of stocks of finished goods.[3]

This percentage is on one count too small and on another too large to represent the broad class in which we are really interested—finished staples whose production cycles are dominated by changes in demand. It is too small because it excludes the products derived from agricultural materials whose production cycles nevertheless respond primarily to changes in demand.[4] The figure excludes products made from cotton, wool, silk, leather, and rubber. The value of finished inventories of staples fabricated from these materials was over $500 million in 1939.[5] Adding this to the previous figure raises the class to $3.0 billion or over 75 percent of finished goods—about 30 percent of manufacturers' total stocks.

The percentage is too high in that it includes finished goods made to order which, as indicated above, constitute 5 to 10 percent of total stocks. Thus I take it that the figure we are after lies between 20 and 25 percent of manufacturers' total stocks.

CONFORMITY TO CYCLES IN MANUFACTURING ACTIVITY AND BUSINESS

Table 49 shows the conformity indexes of stocks of 18 commodities to cycles in manufacturing activity. In most cases, activity is measured by shipments, in a few cases by production, in one case by manufacturers' receipts of the raw material. Fifteen commodities appear to conform inversely, as judged by the sign of the full cycle index. Rubber tires and tubes, however, are not completely qualified members of the class, for they include stocks on consignment to dealers in addition to finished goods in the hands of manufacturers. Of the remaining 16 series, 14 have negative full cycle in-

[3] See App. E. Most goods subject to the risk of changes in style are made from agricultural materials—cotton, wool, silk, leather, etc.

[4] They respond to demand because the raw materials from which they are made can be stored economically when demand slumps or crops are very large. Similarly, large stocks of raw materials make it possible for production to expand when demand increases.

[5] An estimate of perishable, that is, style items, has been excluded.

TABLE 49

Finished Nonagricultural Products Stocks, Conformity to Manufacturing Activity Cycles

STOCKS	INDICATOR OF ACTIVITY	NO. OF PHASES	INDEX OF CONFORMITY TO ACTIVITY[a] Exp.	Contr.	Cycle
Paper, all grades	Paper prod., all grades, 1919-33	9	−20	−75	−25
Newsprint at mills, U.S. & Canada	Newsprint ship., U.S. & Canada, 1919-37	7	0	−100	−100
Southern pine lumber	South. pine lumber ship., 1919-38	12	−67	−33	−45
Oak flooring	Oak flooring shipments, 1913-41	14	−14	−71	−69
Portland cement	Portland cement shipments, 1912-38	12	−67	−67	−82
Bath tubs	Bath tub shipments, 1918-25	5	−33	−100	−100
Lavatories	Lavatory shipments, 1919-25	5	+33	0	0
Kitchen sinks	Kitchen sink shipments, 1919-25	5	+33	0	−50
Misc. enameled sanitary ware	Misc. enameled sanitary ware ship., 1919-24	2	+100	+100	+100
Gasoline at refineries	Gasoline output, 1918-38	13	+67	−43	−67
Lubricants at refineries	Lubricants output, 1918-40	15	−43	−75	−71
Pig iron at merchant furnaces	Pig iron ship. from merchant furnaces, 1919-24	4	−100	−100	−100
Steel sheets made to stock	Steel sheet ship., total, 1919-32	8	−50	−100	−100
Refined copper, N. & S. Am.	Refined copper ship., N. & S. Am., 1919-38	6	−33	−100	−60
Lead at smelteries & refineries	Lead ore receipts, 1923-38	6	+33	−100	−20
Slab zinc at refineries	Slab zinc shipments, 1921-38	10	−100	−60	−100
Auto. tires	Auto. tire shipments, 1921-38	8	0	0	−14
Auto. inner tubes	Auto. inner tube shipments, 1921-38	6	+100	+33	+20

Except as noted, all stocks series are finished goods in the hands of United States manufacturers. Stocks of automobile tires and inner tubes include stocks on consignment to dealers.

[a] Stages I-V matched with expansions in all cases.

dexes, and of these, 11 stand 50 or higher, indicating inverse conformity in three cycles out of four, or better.

These results suggest a strong tendency for this class of stocks to conform inversely to cycles in manufacturing activity. One possible area of obscurity may seem to lie in the fact that the indicator of activity was in most instances shipments and only in some instances production. There may be some question whether stocks bear the same relation to production as to shipments. The answer, however, is not really difficult. In most manufacturing industries we are accustomed to assume that the rate of production increases when the rate of shipments rises. For goods made from nonagricultural materials, the assumption is well in accord with the facts. There is evidence, it is true, that turns in production lag behind turns in shipments (Table 54), but the lag is usually very short and not significant for the present purpose.

Chart 39 depicts the average reference cycle patterns of the production and shipments of commodities for which we have comparable indicators of these two processes. The very close connection between the rates of production and shipment of manufactured staples is obvious.

The relation between stocks and manufacturing activity is reflected in a similar relation between stocks and business cycles (Table 50). One series, stocks of hardwoods, which could not be included in Table 49 for lack of a measure of activity in the industry, is added. Of the 19 series, 13 appear to conform inversely. Again, however, the exclusion of rubber tires and tubes raises the ratio of negative indexes to the total, this time to 13 out of 17. It should be noticed, moreover, that in computing the indexes for oak flooring stocks, stages III-VII were matched with reference expansions. The positive indexes for this series suggest inverted conformity with a long lead as validly as they do positive conformity with a long lag. When stages I-V are matched with expansions, the indexes run $+43, -43, -23$. On the whole, the conformity of stocks to business cycles is somewhat lower than to manufacturing activity, because production and shipments of individual commodities did not conform perfectly to cycles of business at large. Nevertheless, the general tendency of the class to vary inversely to general business is clear.

TABLE 50

Finished Nonagricultural Products Stocks
Conformity to Business Cycles

STOCKS[a]	NO. OF PHASES	INDEX OF CONFORMITY TO BUSINESS[a]		
		Exp.	Contr.	Cycle
Paper, all grades, 1918-33	9	−100	−100	−100
Newsprint, U.S. & Canada, 1918-37	10	−60	−100	−100
Southern pine lumber, 1918-38	11	−100	−33	−60
Hardwoods, 1926-38	4	−100	−33	0
Oak flooring, 1912-37	13	+100	+33	+67
Portland cement, 1912-38	14	−14	−14	−23
Bath tubs, 1919-29	7	0	−33	0
Lavatories, 1919-29	7	0	−33	−33
Kitchen sinks, 1919-29	7	0	−33	−33
Misc. enameled sanitary ware, 1919-29	7	0	−33	−33
Gasoline at refineries, 1918-38	11	+100	−33	0
Lubricants at refineries, 1918-38	11	−20	−100	−20
Pig iron at merchant furnaces, 1919-26	5	−100	−100	−100
Steel sheets made to stock, 1919-37	9	+20	−50	−50
Refined copper, N. & S. Am., 1919-38	10	−60	−60	−78
Lead at smelteries & refineries, 1924-38	6	−33	−100	−100
Slab zinc at refineries, 1920-38	9	−100	−100	−100
Auto. tires, 1921-38	8	+100	+100	+100
Auto. inner tubes, 1921-38	8	+100	+100	+100

See Table 49, note.

[a] Stages I-V matched with expansion in all cases except oak flooring, III-VII; lead at smelteries and refineries, II-VI; automobile tires, I-VI.

TIMING OF TURNS IN STOCKS

While cycles in stocks of finished nonfarm products generally conform inversely to cycles in manufacturing activity, this is not the whole story. When we compare the timing of their respective turns the cyclical behavior of stocks seems to depend upon the length of the cycle. The first step in establishing this characteristic was to measure the timing of the troughs and peaks of stocks at the matching turns of the corresponding indicators of manufacturing activity.[6] Since stocks conform inversely, peaks in stocks were compared with troughs in activity, and vice versa. Next, the leads and lags thus calculated were classified according to the length of the preceding expansion or contraction of the activity series, that is, according to the length of the phase ending with the turn of the activity involved in the particular comparison. Shipments of south-

[6] The indicator of activity used for each inventory series is that shown in Table 49.

Chart 39

Fabricated Nonfarm Staples, Production and Shipments
Average Reference Cycle Patterns

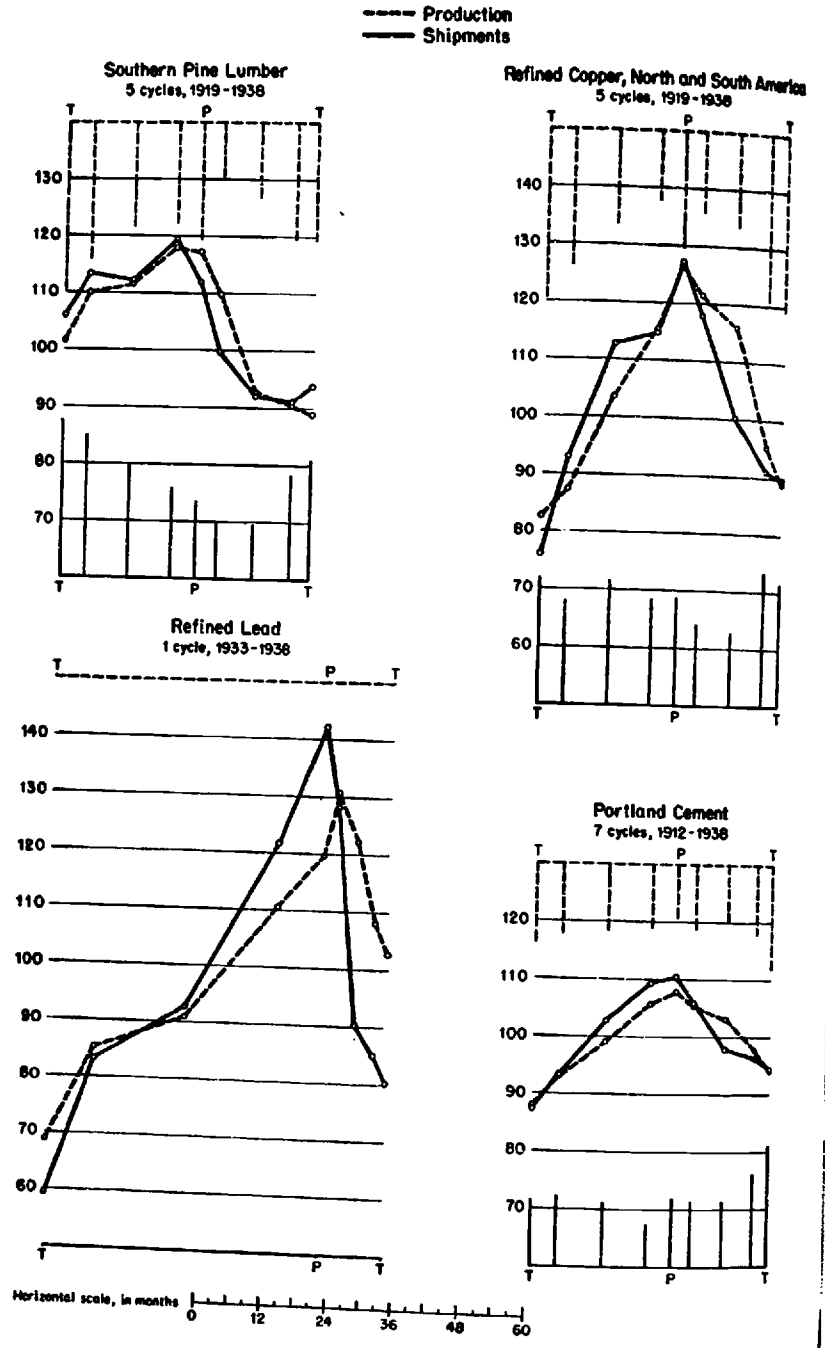
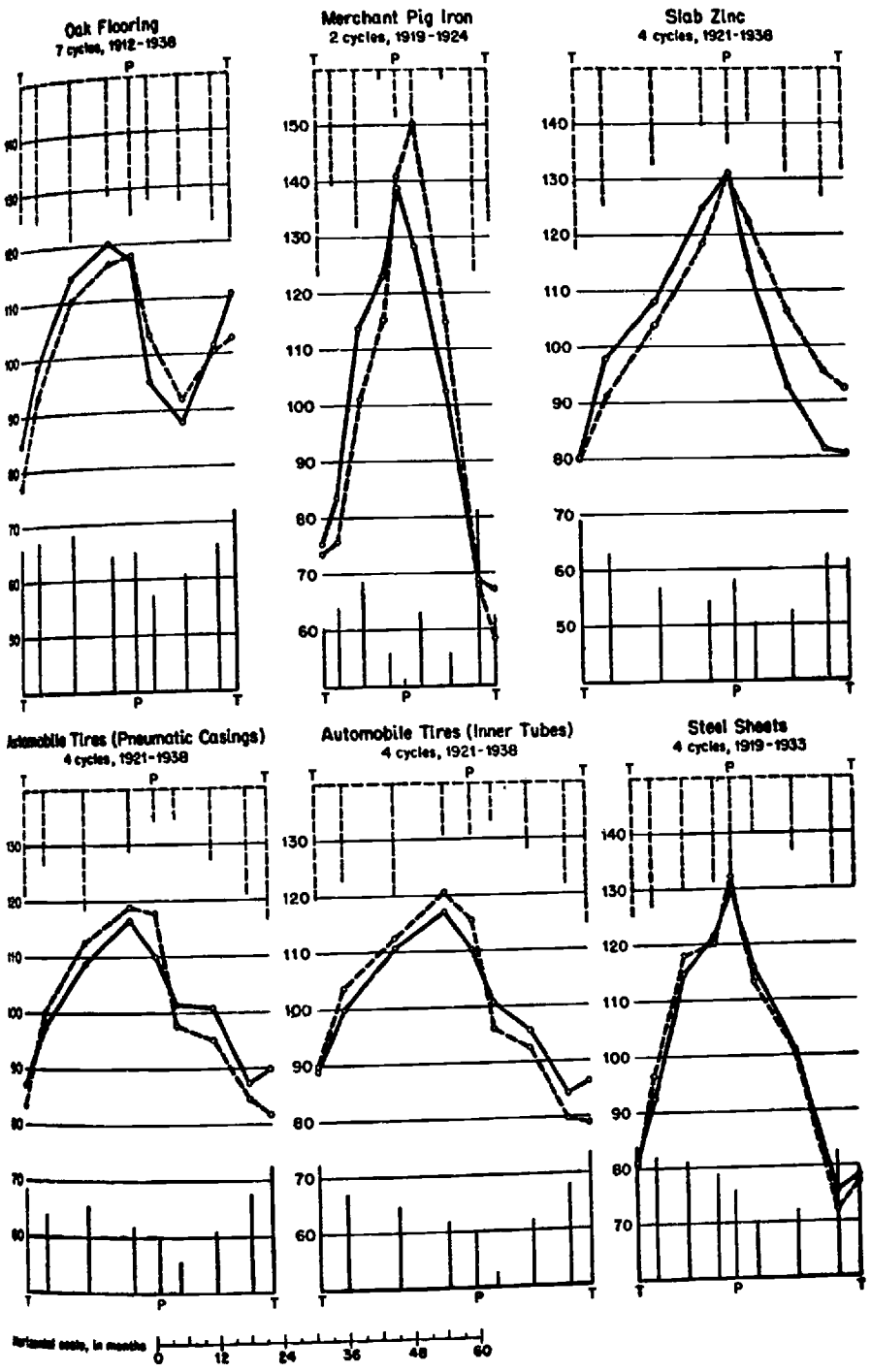


Chart 39 (concl.)



ern pine lumber, for example, reached a peak in March 1928. The corresponding trough of stocks was in November 1928. Thus stocks lagged eight months behind shipments at the peak in March 1928. The expansion of shipments that ended with the peak of March 1928 began with the trough in February 1927. This gives us the length of the corresponding phase of activity, in this case 13 months.

The results of the calculation are striking (Table 51).[7] Lines 9-12 give the measures for all comparisons. If shipments of manufactured goods have been rising or declining for a relatively brief period, 12 months or less, a change in the direction of movement of activity seems likely to be followed shortly by an opposite change in the movement of finished inventories. Turns of stocks came later than the opposite turns in activity in some 81 percent of the comparisons; they preceded the turns in activity in only 19 percent. The average lag of stocks behind activity in these short phases was 6.1 months. As we consider longer and longer phases of activity, the tendency to lag becomes weaker and is replaced by a tendency for stocks to lead. Thus for phases of 13-24 months, stocks lag in only 57 percent of the comparisons and lead in 43 percent. Moreover, the average timing shows stocks leading slightly. For phases of 25-36 months, the tendency to lag is replaced by a tendency to lead. A little over half of the comparisons are leads and the average lead has grown to three months. For long phases, over 36 months, the tendency for stocks to lead is as strong as is their tendency to lag after short phases. Seventy-eight percent of the comparisons showed stocks leading and the average lead is very long—16.4 months.

Again, we must take account of the fact that in most of the comparisons the indicator of activity was shipments rather than production. Since, as we shall see presently, shipments tend to lead production by a short interval, it seems likely that if we could have made our comparisons in every case with production, we would have found stocks tending to lead during somewhat shorter phases of activity. The average lag in the shortest phases would probably

[7] Since automobile tires and inner tubes were analyzed on a positive basis the number of series for which timing comparisons are included in Table 51 is 16, two fewer than in Table 49.

have been shorter, and the average leads in the longer phases, longer.

TABLE 51

Finished Nonagricultural Products Stocks
Timing Comparisons at Turns in Manufacturing Activity
Classified by Length of Preceding Phase of Activity

LENGTH OF PREC. PHASE OF ACTIVITY, MONTHS	NUMBER OF Leads	Lags	Coin.	Comparisons	LEADS AS % OF TOTAL	AV. LEAD (−) OR LAG (+) MONTHS
	AT TURNS IN MANUFACTURING ACTIVITY THROUGH DECEMBER 31, 1929					
1) 12 & under	5	23	1	29	17.2	+8.2
2) 13-24	7	10	2	19	36.8	0
3) 25-36	5	4	1	10	50.0	−1.4
4) Over 36	10	0	1	11	90.9	−18.5
	AT TURNS IN MANUFACTURING ACTIVITY AFTER DECEMBER 31, 1929					
5) 12 & under	3	9	1	13	23.1	+1.8
6) 13-24	5	3	1	9	55.6	−2.1
7) 25-36	3	2	0	5	60.0	−6.2
8) Over 36	8	4	0	12	66.7	−14.4
	AT ALL TURNS IN MANUFACTURING ACTIVITY					
9) 12 & under	8	32	2	42	19.0	+6.1
10) 13-24	12	13	3	28	42.9	−0.7
11) 25-36	8	6	1	15	53.3	−3.0
12) Over 36	18	4	1	23	78.3	−16.4

Timing measured invertedly; see Ch. 3, note 5.

Since the business contraction beginning in 1929 and the expansion beginning in 1933 were two of the longest phases so far recorded, and since most of our series reflected these two long business movements, some question arises whether the observed difference in timing between long and short phases is not, in fact, a feature of the 1929-37 cycle alone. This question was tested by making separate calculations for timing comparisons before and after the end of 1929 (Table 51, lines 1-8). We found that the tendency operated fully as strongly in the early as in the later period. Whether we look at figures before or after the end of 1929, the lags of stocks at opposite turns of manufacturing activity grow shorter and less numerous as the length of the preceding phase of activity increases; and leads grow more numerous and longer.

The relation between the timing of turns in stocks and the length of business movements may be shown to be a characteristic also of both expansions and contractions (Table 52). Cyclical turns in stocks tend to lag behind the opposite turns in manufacturing ac-

tivity when the expansion or contraction is 12 months or less. But as longer cyclical movements are considered, the lags gradually give way to leads, and in long expansions or contractions stocks turn before manufacturing activity in a large majority of all the comparisons. The results at peaks are, of course, not identical with those at troughs, but the differences are too small to warrant attention in view of the few observations on which they are based.

TABLE 52

Finished Nonagricultural Products Stocks
Timing Comparisons at Peaks and Troughs of Manufacturing Activity Classified by Length of Preceding Phase of Activity

LENGTH OF PREC. PHASE OF ACTIVITY, MONTHS	NUMBER OF Leads	Lags	Coin.	Comparisons	LEADS AS % OF TOTAL	AV. LEAD (−) OR LAG (+) MONTHS
	AT PEAKS IN MANUFACTURING ACTIVITY					
1) 12 & under	2	8	1	11	18.2	+3.0
2) 13-24	6	8	2	16	37.5	+0.3
3) 25-36	7	5	1	13	53.8	−2.9
4) Over 36	11	3	1	15	73.3	−15.4
	AT TROUGHS IN MANUFACTURING ACTIVITY					
5) 12 & under	6	24	1	31	19.4	+7.2
6) 13-24	6	5	1	12	50.0	−2.0
7) 25-36	1	1	0	2	50.0	−3.5
8) Over 36	7	1	0	8	87.5	−18.2

The meaning of these results may be put in this fashion. When business turns down after a short expansion, shipments tend to turn first and to drop below production after a short interval. Stocks, in consequence, turn up soon after shipments turn down. If the ensuing contraction of activity is short, stocks continue to rise during the entire phase. If the business recession is protracted, however, there is a growing tendency for stocks of finished goods to reverse their direction and to begin to move down with manufacturing activity. By the end of very long contractions, most manufacturers' inventories of finished goods will be moving in the same direction as manufacturing activity rather than in the opposite direction. When shipments finally turn up after a long downswing of business, therefore, stocks of finished goods are likely to be falling. The upturn of shipments then causes stocks to fall even more rapidly. This explanation has run in terms of events during business contractions. Expansions have the same sort of influence on finished goods inventories, but in the opposite direction.

CONFORMITY OF INVENTORIES RECONSIDERED

The significance of these results may be developed by turning our attention once more to the conformity of stocks of finished nonfarm products. If they act in the fashion just described, the measure of full cycle conformity of stocks to cycles in manufacturing activity is more likely to indicate inverted conformity during short than during long cycles. Defections from the general rule of inverted behavior should be found more often during long than during short cycles. The figures bear this out.

In the 18 indicators of manufacturing activity with which the stock series of Table 49 are matched, 126 cycles, measuring both from trough to trough and from peak to peak, have been identified.[8] Stocks conformed inversely in 100 cycles, according to the National Bureau's full cycle measure,[9] and positively in 26. We classified the 126 activity cycles and the cycles in which stocks conformed positively by their length in months (Table 53). The results suggest that the chance of finding stocks moving together with activity increases with the length of activity cycles. True, the percentage that positively conforming stocks cycles are of total cycles does not, in Table 53, grow steadily with the length of the cycle. But this is due to the size of the class intervals chosen. If the class intervals are widened, a steady progression appears. If we divide cycles into those lasting less than 30 months, 30-49 months, 50-69 months, and 70 months and over, the percentages of all cycles in which inventories conformed positively are respectively 10, 13, 33, and 47. The effect of the length of cycles upon the conformity of stocks can be appreciated also by considering cumulative totals. Thus about 43 percent of all cycles were shorter than 40 months, but only some 31 percent of the positively conforming stocks cycles occurred during these short cycles of activity. Moreover, while more than half of the positive cycles of stocks occurred in activity

[8] That is, during the periods covered also by the corresponding stock series.

[9] Any one of three types of movement of stocks during a given cycle of activity constitutes inverse conformity: stocks fall during expansion and rise during contraction; stocks decline throughout the cycle but more rapidly in expansion than in contraction; stocks increase throughout the cycle but less rapidly in expansion than in contraction. Similarly, three types of movement may constitute positive conformity.

TABLE 53

Finished Nonagricultural Products Stocks
Inventory Cycles Conforming Positively to Cycles in
Manufacturing Activity Classified by Length of Activity Cycles

LENGTH OF ACTIVITY CYCLES, MO.	NO. OF ACTIVITY CYCLES OF INDICATED LENGTH, MO.	CYCLES IN WHICH INVENTORIES CONFORMED POSITIVELY	
		No.	%
Under 20	9	1	11.1
20-29	22	2	9.1
30-39	24	5	20.8
40-49	30	2	6.7
50-59	10	3	30.0
60-69	14	5	35.7
70-79	7	5	71.4
80 & over	10	3	30.0
All cycles	126	26	20.6

cycles longer than 50 months, only 33 percent of all cycles were so long. Stocks conformed positively to activity in less than 12 percent of all cycles shorter than 50 months. They conformed positively in 39 percent of all cycles that exceeded 50 months.

It is noteworthy that even in long cycles—those over 60 months, for example—stocks still conform inversely in a majority of the cases observed. Consequently, despite the strong tendency for stocks to move in the same direction as activity toward the close of long cycles, the whole movement of stocks from the beginning to the end of even long cycles usually remains inverse to activity.

FACTORS INFLUENCING THE BEHAVIOR OF FINISHED NONAGRICULTURAL STAPLES

The characteristics of the behavior of stocks of finished nonfarm staples seem fairly clear. It is not easy, however, to settle upon a well founded explanation for their behavior, especially of their tendency to inverted conformity, their major trait.

At least two lines of explanation suggest themselves. Manufacturers may fail to foresee the turning points in demand and fail equally to forecast the rate of rise of demand during expansions and the rate of decline during contractions. As they respond tardily to changes in demand, shipments tend to outrun production during the rise, and production tends to outrun shipments during the decline. Lack of foresight, of course, need not be absolute. Some

time, in some cases considerable time, is required to bring additional capacity into production on the rise and to take it out of production on the decline. This amounts to saying that even if changes in demand are expected, they are not foreseen sufficiently far in advance, or early forecasts are not held with sufficient confidence to induce the required action before the change in demand takes place.

This possibility almost certainly has some force. Even at the trough of a cycle when there is idle equipment ready for operation in most plants and when additional output from employed workers can be attained by increasing hours and the pace of work, some time is required to increase output. As we have already seen (Ch. 8), the average interval between input of materials and output of completely fabricated goods is about three weeks. In some cases additional labor must be hired or facilities repaired before the rate of fabrication can increase; and these obstacles become more serious as expansion proceeds.

Forecasts even a few weeks in advance are, of course, subject to some degree of uncertainty. Indeed, the actual turning points of demand are hard to recognize when they occur. The normal course of sales during a cycle is far from smooth. It alternately advances and retreats, tracing a jagged pattern. Consequently, the advance that signals the beginning of an expansion or the decline that initiates contraction is impossible to identify immedately. It seems natural, therefore, that manufacturers will not begin to reduce their rate of operations until after sales and shipments have been declining for some time, and, as far as operations are curtailed, the reductions may for some time be inadequate. This hesitancy, of course, seems more likely at the beginning of a phase when the future is especially uncertain than later when the trend of business, up or down, is more clearly marked.

Manufacturers have other cogent reasons to allow their operations to follow, rather than to keep step with, sales and shipments. To change the rate of operations is an act of managerial judgment, and decisions once made tend to remain unaltered for some time, especially when a change in output entails a change in the labor force. Quite aside from obvious nonpecuniary reasons, it cannot be good personnel policy to hire workers who may soon have to be

laid off or to lay off workers who may be needed again in a few weeks.

Businessmen will therefore probably hesitate to act upon intimations of future demand unless the volume of sales is foreseen with confidence. And this is hardly likely far in advance of the event. Of course, even if preparations for a change in demand are not made sufficiently far in advance, a gap between production and shipments is not inevitable. Sales can be held in check or encouraged, as the case may be, by changes in prices. For many reasons inherent in the character of competition in industrial markets, however, businessmen are reluctant to initiate cuts in prices to stimulate sales or to risk the loss of business that may accompany a rise in prices. Competition rather encourages manufacturers to avoid precipitating price declines when demand falls off and to try to fill an unexpected increase in orders from stock if necessary rather than to chance the loss of business by requiring purchasers to wait several weeks until additional goods can be produced.

An important question still remains. If production outruns shipments in the early months of a recession, stocks of finished goods begin to accumulate. Once this has occurred, why do manufacturers not curtail production enough to liquidate stocks? If demand falls even more than they expected, they will have moved in the right direction; if less, they will still have stocks from which to meet sales for some weeks. It is just such action that I postulate in explaining the tendency for raw materials inventories to turn in the same direction as production within a few months after the turn of business.

To this question there are two answers. The first stems from the physical character of the goods and the fact that they are finished products, not purchased supplies. The commodities under consideration are staples. They will not deteriorate physically and they are the basic materials of production, useful whatever the particular form demand for completely fabricated goods takes. Consequently, this category of stocks must be distinguished from finished nonstaples. As stated, I do not suppose that manufacturers of goods that are perishable, for whatever reason, can afford to allow stocks to accumulate for a long period. Within a short time after sales fall off, they will curtail output sufficiently to reduce their

stocks. Producers of staples, however, can afford to tolerate at least a modest accumulation of stocks for a considerable period.

Stocks of finished staples must be distinguished also from stocks of purchased materials, whether durable or perishable. Inventories of purchased materials are subject to the risks of adverse changes in market prices to their full value. Consequently, except when there is good reason to think prices are firm or rising, manufacturers have a strong incentive to keep such stocks at the lowest levels consistent with the smooth operation of their plants. During business recessions, therefore, manufacturers will try to reduce their raw material stocks as quickly as possible. And having done so, the requirements of a larger volume of business will compel them to rebuild stocks in the ensuing recovery.

Stocks of finished staples too are, of course, subject to the risk of changes in prices. But the risk is smaller. Only some 60 percent of the total inventory cost of finished goods consists of the cost of raw materials.[10] The remainder comprises labor cost and the various elements of manufacturing overhead. This makes a difference in several ways. First, labor is less subject to rapid and unexpected changes in price than purchased materials. Second, against the risks of adverse changes in prices manufacturers are likely to set the economies they see in steady operation. Some of these economies, as noted below, are real, some may be illusory; but real or fancied, they probably make manufacturers more reluctant to liquidate stocks of finished goods by a radical reduction of output than stocks of raw materials by a drastic cut in purchases.

If the first part of the answer to the puzzle of manufacturers' tolerance for the perverse pattern of finished goods stocks lies in the character of the goods, the second part is that their tolerance is not unlimited. As already shown, the longer a phase lasts, the greater is the tendency for finished stocks to reverse their ordinary direction and begin to move with business activity. Apparently, if

[10] As indicated in Appendix A, raw materials account for about 53 percent of the value of product in manufacturing. Not all the elements of value added in manufacturing, however, enter into the inventory value of finished goods. In particular, profits, interest, selling costs, and general administrative expenses are excluded. If we allow 10 percent for these elements, raw materials do not make up more than 60 percent of the residual elements of value we assume are included in the inventory cost of finished goods.

a phase lasts long enough, stocks do accumulate to such uncomfortably high levels in recessions and run down to such inconveniently low levels in expansions that manufacturers are eventually compelled to alter production radically. I shall have more to say about this below.

The first line of explanation of the inverse pattern turned on uncertainty about the future of business. A second possible line, more likely to supplement than supplant the first, is that manufacturers, although they foresee the trend of sales, allow shipments to outrun production on the rise and allow production to outrun shipments on the decline as a matter of deliberate policy. To keep a certain number of people working for stock when business falls off is to avoid the dispersion of staff and the expense of preparing equipment for a spell of idleness. And having built up a surplus stock in this fashion, there are obvious reasons for liquidating the stock when business improves. Moreover, as a matter of long-run economy, if production can be kept more stable than shipments, the size of plant necessary to meet the peak load of business need not be quite as large as would otherwise be necessary. These are real advantages to using inventories to stabilize output. There are also spurious advantages. When overhead costs must be divided among fewer units of output, average total costs of production tend to rise. To avoid this increase in book costs, manufacturers may sometimes resort to production for stock even though the out-of-pocket cost of the extra output is greater, or no less, than it will be later.

The evidence is consistent with both lines of explanation. If businessmen fail to foresee changes in demand far enough in advance, we would expect production to lag behind shipments. Comparisons of the timing of peaks and troughs in the shipments and production of 7 commodities indicate a strong tendency for shipments to lead (Table 54).[11]

To this extent the evidence supports the hypothesis of imperfect forecasting. It bears also, though in minor degree, on the possi-

[11] Automobile tires and tubes, for which comparisons were made in Chart 39, are excluded because their stocks were among the few exceptions to the rule of inverted behavior. The relation of their production and shipments does not, therefore, seem relevant to an explanation of the behavior of other commodity stocks that conform inversely.

TABLE 54

Seven Fabricated Nonagricultural Staples
Timing of Turns in Shipments at Turns in Production

	NUMBER OF			AV. LEAD (−) OR LAG (+) MONTHS
	Leads	Lags	Coin.	
	AT PEAKS IN PRODUCTION			
Southern pine lumber, 1916-40	2	2	1	+1.2
Oak flooring, 1912-42	1	1	3	−1.2
Portland cement, 1911-41	6			−4.0
Merchant pig iron, 1919-26	1		1	−1.5
Refined copper, 1919-38	3			−3.0
Refined lead, 1929-41	2			−3.5
Slab zinc, 1920-39	3		1	−1.5
Total	18	3	6	
	AT TROUGHS IN PRODUCTION			
Southern pine lumber, 1916-40	3	1	2	−1.3
Oak flooring, 1912-42	4	1		−2.4
Portland cement, 1911-41	3	2	2	−0.4
Merchant pig iron, 1919-26	3			−1.3
Refined copper, 1919-38	3			−6.0
Refined lead, 1929-41	1	1		+0.5
Slab zinc, 1920-39	4	1		−3.6
Total	21	6	4	

bility that the inverse conformity of stocks reflects a deliberate attempt to stabilize production. If manufacturers could foresee peaks in sales, they would achieve a flatter production curve, other things being equal, if they began to cut output simultaneously with the decline in sales, or even before; and the same at troughs. To allow production to rise for some time after the peak of sales and to fall for some time after the trough makes the amplitude of the swings in output wider than it would otherwise be. The possibility that attempts to stabilize production may play some part in explaining our observations, however, is far from excluded by this consideration. Although manufacturers may not foresee the actual cyclical turns of sales, they must be more or less aware of the declining trend during contraction. Their willingness to accumulate stocks of finished goods might then reflect an attempt to cushion the impact of the decline of sales on output. Some such motive may in fact be present even if the future course of expansion and contraction is nebulous. Uncertain whether sales will continue to decline in recession or to increase in expansion, they prefer to keep their output steady until the pressure of events forces a change, accumulating

stock in contraction and liquidating it in expansion as a necessary consequence. Thus the two lines of explanation, poor forecasting and desire to keep output as steady as possible, merge in a way that our present evidence cannot disentangle.[12]

This is as much as I can say about the general tendency toward inverted conformity. To rationalize the tendency of stocks to reverse their direction and begin to move with manufacturing activity when demand expands or contracts long enough is not too difficult. Let us consider long expansions. As an expansion proceeds, the rate of production and shipments increases and stocks fall. The longer this continues, the nearer does the relation between shipments and stocks approach the point at which it becomes inconvenient for a manufacturer to attempt to serve his customers from so small a stock. He runs the risk that he will be unable to fill a sudden accumulation of orders. It seems reasonable also to suppose that when business has been growing fairly steadily for many months, manufacturers tend to count on it, and some at least will adopt a less cautious production policy.

During contractions much the same set of influences operates in reverse. The expanded stocks weigh ever more heavily as demand contracts; a substantial time will then be required to liquidate the surplus inventory. Hence the risk of holding it increases. As the contraction proceeds, businessmen become even gloomier, and the risk of holding a given stock compounds. An increasing number will then curtail output drastically enough to reduce it below current shipments.

3 *Note on Blodgett's Treatment of Finished Goods*

As indicated in Chapter 1, Ralph H. Blodgett studied some of the materials used in this book. His treatment of finished goods in particular resembles mine and it is interesting to examine the similarities and differences. Since his sample was smaller, and his series were available for shorter periods, I omit differences of detail.

To begin with, Blodgett divides his commodities into two groups: those that conform inversely and positively to business

[12] A considerable degree of stabilization of output relative to shipments is often achieved, whether deliberately or not. The average amplitudes of production for six of the seven commodities included in Table 54 are smaller than those of shipments, by amounts ranging from 3 to 29 percent.

cycles. This grouping, of course, makes the major behavior trait of Blodgett's categories a matter of classification rather than a finding. Chief interest is, therefore, directed to his explanation of the contrasting behavior of the two classes and to certain exceptions he notices.

Blodgett considers the stocks that behave inversely to be, in general, 'disparity' stocks. "Such stocks tend to accumulate in periods of general business contraction because it seems economically unwise to curtail production as fast as, or to the same extent as, shipments of the finished products fall off. In periods of general business expansion, on the other hand, these stocks tend to be reduced because it is impossible or economically unwise to have production expand as fast as, or to the same extent as, shipments increase."[13] To explain the behavior of these stocks Blodgett notes first, that the industries holding them are, in general, industries that have developed large excess capacity. He therefore supposes that the chief reason for the inverted stock cycles is the desire of manufacturers to minimize fluctuations in production.[14] He does not mention the other explanation on which I have laid stress—that the discrepancies between shipments and production during business cycles may be attributed to the failure of manufacturers to foresee changes in demand soon enough to adjust their rate of production.

For its bearing on the ability of manufacturers to accumulate stocks when shipments are falling, Blodgett notes that his inverted series are durable and staple commodities and hence may be stored for considerable periods without fear of loss because of physical deterioration or shifts in the character of demand. Finally, Blodgett takes special note of three series specifically labeled 'unsold' stocks (p. 59).

[13] Op. cit., p. 50.

[14] In strict logic, excess capacity reduces the need to accumulate stocks in depression since equipment to meet the larger demands of expansion is relatively adequate. Blodgett's position, however, appears more plausible if we suppose that manufacturers base their production policy on considerations of average total cost as distinct from average variable costs or marginal costs. The larger overhead costs are, of course, the more rapidly will average total cost rise when production falls off. Manufacturers' desires to stabilize output may then be attributed to the natural, though mistaken, notion that it is in their interest to avoid increases in average total costs during recession.

"The unsold stocks represent the disparity element in stocks, and would be expected to show inverted conformity with respect to the cycles in general business whenever they could be separated out of any stock series, whether the total series was itself inverted or positive.

Indeed, it seems feasible to interpret the positive and inverted stock series in terms of unsold stocks, and to say that the inverted stock series for finished products tend to be those which are largely made up of unsold stocks, so that the behavior of the unsold stocks comes to be that of the entire series. Positive series, on the other hand, tend to be those in which the unsold stocks are small, relative to the total, so that the behavior of the series as a whole can be positive even though the unsold stocks included in them behave in an inverted fashion."

Thus Blodgett drew attention to two of the three features by which I define the category of stocks studied above: their durable and staple character and the fact that they are made to stock rather than to order. As indicated in Chapter 12, the third feature, which Blodgett omits, is that cycles in the production of these commodities are governed by changes in conditions of demand rather than in the supply of raw materials.

Another notable suggestion is Blodgett's allusion to a difference between the behavior of inverted stock series during ordinary cycles and during long and severe contractions. Observing that maintenance of relatively stable production induces large inverted fluctuations in stocks, he writes (pp. 56-7):

"It should be remembered, however, that when a business contraction is of long duration and is very severe, an end may eventually come to the financial, physical, and psychological ability of the industries to hold larger and still larger stocks, in which case a very drastic drop in the rate of operation in these industries may occur and stocks will also decline."

This prescient sentence may be taken to anticipate my finding that in long phases of manufacturing activity the inverted movement of stocks tends to reverse itself, and that the timing of turns in stocks of finished goods at opposite turns of shipments varies with the length of the cyclical phase.

Blodgett calls the positively conforming series 'convenience' stocks—small inventories whose function is to take care of minor

and passing discrepancies between production and shipments. He believes stocks of commodities that are perishable or ready for the final consumer will tend to be managed in such fashion that inventories will be small and vary positively with business activity. This corresponds with my own expectations for goods in this class, as does Blodgett's observation that such stocks tend to lag behind business activity by a moderate interval. Possibly because of the mixed character of the commodities in his sample of positively conforming series, Blodgett does not follow up his distinction between goods made to order and to stock. This is an unfortunate omission since one of his positive series, total stocks of steel sheets, is composed predominantly of goods made to order. As already noted, moreover, while nonstaples made for the market are likely to conform positively, goods made to order virtually must do so, and there is probably a certain amount of overlapping between the two categories.

Blodgett's review of the behavior of stocks of finished goods brings to light many of the influences affecting this class that are mentioned here. But though Blodgett notices the important distinction between goods made to order and to stock, he does not clearly state its significance. According to the sentences quoted above, Blodgett seems to believe that goods made to order conform positively to cycles in demand, and unsold stocks inversely. The first portion of this proposition is true; the second is not. If the production of a commodity made for the market responds largely to changes in demand, it will conform inversely if the commodity is durable, but positively if it is perishable. On the other hand, if the production of the commodity is governed principally by changes in the supply of raw materials, the characteristic conformity of stocks during business cycles may be inverse, positive, or irregular (see Ch. 12). But whatever the behavior, the influences affecting commodities whose output responds chiefly to raw material supply are radically different from those affecting commodities whose output in the short-run is governed chiefly by demand. Blodgett largely ignores these distinctions. He lumps cottonseed oil, leather, and condensed milk with other inverted series, explaining their behavior in the same way as he does other 'disparity' stocks made from nonagricultural materials. On the other hand, he classifies

refined sugar, wheat flour, and cold storage holdings of pork with other positive series.[15]

4 Cycles in Finished Staples Stocks and Keynes' Inventory Theory

Since the findings of this chapter are relevant to Keynes' theory of the cyclical behavior and significance of inventories we revert to it now. As explained in Chapter 1, Keynes divides stocks into two analytical categories: "working" and "liquid" capital. The first he defines as "the aggregate of goods . . . in course of production, manufacture, transport and retailing, including such minimum stocks, whether of raw materials or finished products, as are required to avoid risks of interruption of process or to tide over seasonal irregularities. . . ."[16] Liquid stocks are any surplus over and above these requirements. Again, "normal stocks required for efficient business are part of working capital and therefore in process, whilst surplus stocks are to be regarded as liquid."[17]

Hence working capital must increase and decline together with the volume of manufacturing activity.[18] Keynes expects liquid stocks, on the contrary, to grow larger during the early stages of a recession and to be liquidated in its later stages. In recovery, liquid stocks, he thinks, will first decline, then begin to accumulate.

". . . when the slump begins, the falling off of production does not show itself immediately at the finishing end of the machine of process, whilst it does show itself immediately in the amount which is being fed back into the mouth of the machine: so liquid stocks increase. Later on, however, the diminished production results in diminished available output, whilst current consumption does not fall off so much

[15] Blodgett comes close to observing the distinction when he explains that pork is more or less fortuitously classified as positive, although it is much more influenced by the large and irregular cycles in hog slaughter than by general business conditions.

[16] *Treatise on Money*, p. 116.

[17] Ibid., p. 129.

[18] This is not a precise statement. If activity, measured by employment, expanded and contracted synchronously at every stage of fabrication, working capital in manufacturing would tend to lead output, by an interval not exceeding, say, four weeks (see Ch. 8). If we define output as the production of completely fabricated goods ready for consumers and suppose production is increased by feeding an additional batch of raw materials into the earliest stage of fabrication and passing the batch through successive stages, the lead would be much longer.

as does production—with the result that there can be no increase of liquid stocks, but rather the contrary."[19]

As suggested in Chapter 1, this picture of the behavior of liquid and working capital is a crucial part of Keynes' theory of the course and mechanism of business cycles. To the accumulation of liquid stocks at the beginning of recession he attributes the sudden and rapid development of depression, the effort quickly to unload stock intensifying the deflationary forces of contraction. With the eventual disposal of liquid stocks he connects the timing of recovery, asserting that it cannot begin until they have been absorbed. And to the inadequacy of liquid stocks during recovery he attributes the relatively moderate pace of expansion, since stocks of goods in process can then be rebuilt only by the slow method of extraction and fabrication.

It is clearly of first importance, then, to know whether Keynes' picture of the behavior of liquid stocks is accurate.[20] In this connection, the big—strictly speaking, insuperable—difficulty is that Keynes' distinctions do not correspond to any existing, or even potentially compilable, statistical categories. A distinction between 'normal' and 'surplus' stocks is not the kind that lends itself to measurement. Still, the behavior Keynes attributes to liquid stocks bears enough resemblance to that which characterizes the stocks of finished staples reviewed above to make it tempting to identify the two, at least as far as liquid stocks in the manufacturing sphere are concerned. The temptation is stronger since the United States data Keynes used are for the same or similar staple commodities.[21] In the end, of course, this temptation will have to be put aside. Appraising Keynes' theory in the light of the evidence of this chapter, however, is still useful. Manufacturers' stocks of finished staples, as far as one can judge by their behavior, are a leading example of liquid stocks in the Keynesian sense. There can be little question, in

[19] Ibid., pp. 134-5; see also the passage from his *General Theory*, quoted in Chapter 1.

[20] It is a moot point, of course, whether the rapidity of contraction is significantly greater than that of expansion, as Keynes asserts. This question, however, is too large to be faced here.

[21] Keynes refers to the total stocks of goods rather than to finished goods held by manufacturers, but in many cases the only data available cover manufacturers' stocks alone.

particular, that the major part of these stocks accumulated in recessions are surplus in the sense that they are unnecessary to the efficient conduct of current business. As far as these stocks do not behave as Keynes expected, we may come to one of two conclusions. Either Keynes' hypothesis requires modification or one must look to other categories of inventories to find the liquid stocks that do meet his specifications.

Keynes expects liquid stocks to rise in the first part of recession and to decline in later stages. It is not clear how long after the peak of business the decline of stocks is supposed to start, but by the time recovery begins, we may assume that the stocks have largely been liquidated, for Keynes makes the absorption of the stocks a condition of recovery. In the early stages of recovery, in his view, liquid stocks decline somewhat further and are subsequently built up.

Roughly speaking, this hypothesis corresponds to the recorded behavior of finished staples held by manufacturers, but only during long cycles. It is inconsistent with the evidence for this class of stocks in cycles of short or moderate length. Stocks of finished staples usually move inversely to business activity (Tables 49 and 50). Moreover, in contractions of short or moderate length, they tend to reach their peak levels after the trough of business (Table 51). True, they tend more and more to reverse direction the longer the expansion or contraction. But only in phases longer than three years did a majority of the timing comparisons indicate a reversal before the turn of business. As already indicated, however, contractions that persist for as long as three years are quite exceptional in both the United States and Great Britain.[22] Only in these especially long contractions does Keynes' hypothesis fit the behavior of finished staples.

Even in long phases, however, this category of stocks may not meet the full requirements of Keynes' theory. For it demands that as a condition of business expansion liquid stocks be largely absorbed before recovery begins. But even if a contraction lasts so

[22] See Ch. 4, Sec. 4. The same is true of United States expansions: only 4 expansions out of 21 identified by the National Bureau lasted as long as 36 months. For Great Britain the count is 9 out of 16. Behavior of surplus stocks during expansion, however, is not nearly as important for Keynes' theory as their behavior during contraction since it is the pace and duration of contractions that he connects with the behavior of liquid stocks.

long (say, three years) that finished staples in the aggregate begin to decline, the depression must be still further protracted to bring liquid stocks down to something like normal levels. This may have happened upon occasion, but whether it is a characteristic feature even of long contractions is questionable.

An additional consideration reinforces the apparent discrepancy between Keynes' hypothesis about the behavior of liquid stocks and the observed behavior of finished staples. Not all inventories of finished goods are surplus. Some part of this, and any other, category of stocks constitutes 'working' capital required for the efficient performance of the current volume of business. But if the working capital component rises and falls with the rate of manufacturing activity, as, on Keynes' definition, it must, a decline of finished goods stocks toward the end of contraction will not necessarily reflect a decline of surplus stocks. The decline may be due in full, and must be due in part, to the decline in the working capital component.

We may conclude, then, that observations of manufacturers' stocks of finished staples do not support Keynes' theory of the behavior of liquid stocks. As already noted, however, this is far from conclusive with respect to Keynes' theory in general. Other categories of stocks contain surplus components that may act as Keynes' hypothesis requires. I have suggested, for example, that manufacturers' stocks of raw materials rise for a short time after the peak of business. If they do, surplus stocks, in Keynes' sense, may well be accumulated during the early months of contraction. And since the decline in inventories of raw materials begins early in contraction, surplus stocks may be fully absorbed before the end of contraction, as Keynes supposes. Again, a considerable portion of aggregate surplus stocks may be, and presumably is, carried by dealers, and these inventories may bear out Keynes' expectations. However, such inspection of dealers' stocks of staples as we have made does not suggest that they conform to business cycles in any very regular fashion. And as far as they do, my impression is that they conform inversely with a lag, rather than inversely with a lead, as Keynes suggests. Inverse conformity with a lag means, of course, that stocks are rising, not falling, toward the end of contraction.

One cannot bring Keynes' hypothesis to a conclusive test be-

cause it is not framed in statistical categories. As far as the manufacturing sphere is concerned, however, Keynes' picture of the mechanism of contraction and of the connection between recovery and the absorption of surplus stocks can be valid at best only for very long contractions. In recessions of short or moderate length, the possibility seems strong that recovery starts while surplus stocks are high and that they are absorbed only in the course of the ensuing expansion. This possibility is supported not merely by the evidence of this chapter but also by our observation that the inventory-sales ratio for manufacturers' aggregate stocks is at its peak near business cycle troughs (see Ch. 6).

Keynes' theory, though not supported by our data, does point to a real distinction between surplus stocks (as represented, say, by finished staples) and other inventories. As will become apparent in Part Three, had Keynes stated his theory in terms of the rate of accumulation of surplus stocks rather than in terms of their level, it would have constituted a valid generalization of the evidence. It does seem to be true that surplus stocks accumulate more rapidly during the first part of contraction than during the latter part; and that their rate of liquidation is high in the first part of expansion and declines as business approaches its peak.