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INVENTORY FLUCTUATIONS AND ECONOMIC STABILIZATION

MATERIALS PREPARED FOR THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

PART III

INVENTORY FLUCTUATIONS AND ECONOMIC INSTABILITY

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LETTERS OF TRANSMITTAL

DECEMBER 26, 1961.

To the Members of the Joint Economic Committee:

Transmitted herewith for use by the Joint Economic Committee and other Members of the Congress is part III of a three-part series of papers prepared by experts from government, the colleges, and research organizations. These materials have been assembled under the general title of "Inventory Fluctuations and Economic Stabilization."

The papers contained in this and the other two volumes will be discussed by their authors and other experts in a series of public hearings to be held early next year.

The papers have been prepared and the hearings are being arranged in accordance with the program of work set forth in the committee's annual report filed with the Congress May 2, 1961 (H. Rept. 328, 87th Cong., 1st sess., p. 47). This program provides for a "study of inventory movements, accumulation, and liquidation" in the following language:

> Inventory fluctuation and behavior will be studied to try to determine the extent to which changes in inventories are causes of instability and to what extent they are in themselves affected by other forces inherent in the business cycle. The committee will be concerned with such areas as merchandising and production planning to see what influences and what can be done to regularize purchasing so that characteristically wide swings in the direction of inventory adjustments can be minimized.

The three sets of reports being transmitted are limited to the fact-finding phase of the study outlined in the program.

The papers are presented in advance of the committee's hearings in accordance with a Joint Economic Committee practice of providing members of the committee and participating panelists an opportunity, whenever possible, to examine thoroughly the analyses and findings in preparation for the discussions at the hearings.

Sincerely yours,

WRIGHT PATMAN, *Chairman.*

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DECEMBER 22, 1961.

Hon. WRIGHT PATMAN,
Chairman, Joint Economic Committee,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Transmitted herewith is part III of a three-part series of papers on the general subject of "Inventory Fluctuations and Economic Stabilization." The two papers in part I are devoted principally to a descriptive analysis of postwar inventory fluctuations. The papers in part II deal with the causative factors in movements in business inventories and the papers in part III with the relationship between inventory movements and economic instability. There are also included in part III a bibliography and a paper concerned with the availability and reliability of statistical data on inventories.

Professor Paul G. Darling, on loan to the committee from Bowdoin College, has had major staff responsibility for formulating and directing this study.

Sincerely yours,

WM. SUMMERS JOHNSON, *Executive Director.*

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INVENTORY FLUCTUATIONS AND ECONOMIC INSTABILITY:

An Analysis Based on the Postwar Economy

By

PAUL G. DARLING
Bowdoin College

INVENTORY FLUCTUATIONS AND ECONOMIC INSTABILITY

An Analysis Based on the Postwar Economy

By Paul G. Darling

Introduction

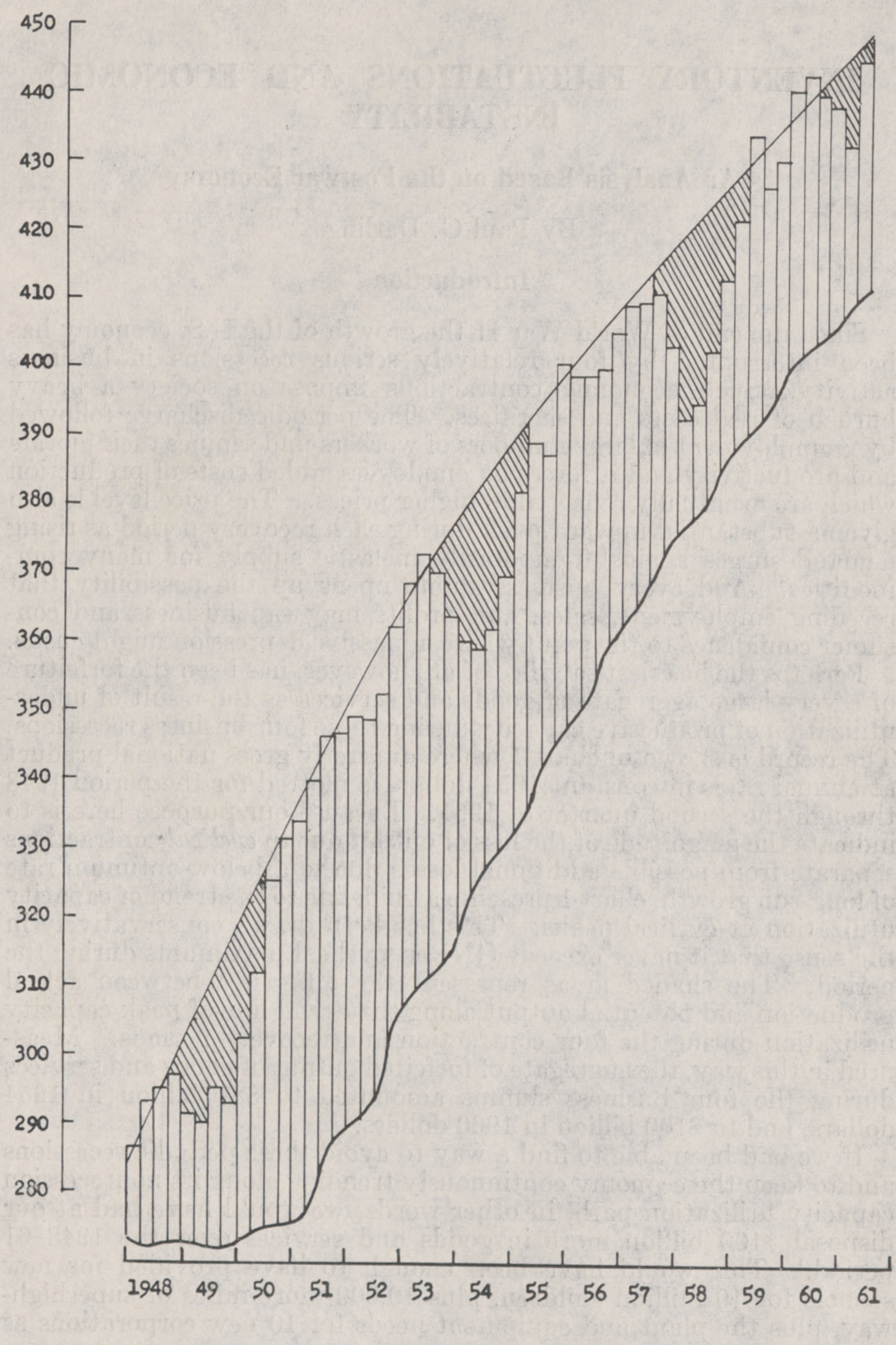
Since the end of World War II the growth of the U.S. economy has been interrupted by four relatively serious recessions in business activity. Such economic contractions impose on society a heavy burden of real costs and sacrifices. The periodic discharge followed by reemployment of large numbers of workers undermines their morale and productivity and it forces on employers added costs of production which are eventually reflected in higher prices. The price level is also given a substantial upward push during each recovery period as rising demand surges against temporarily inelastic supply for many commodities. And every business slump opens up the possibility that receding employment, sales, and profits may sap business and consumer confidence to the point where a massive depression might ensue.

Perhaps the heaviest sacrifice of all, however, has been the forfeiture of a very large aggregate of goods and services as the result of underutilization of productive capacity during these four business recessions. The record is shown in chart 1 where quarterly gross national product at annual rates in constant 1954 dollars is plotted for the period 1948 through the second quarter of 1961. Because our purpose here is to indicate the magnitude of the loss of output due to *cyclical* contractions separate from possible additional losses due to a below-optimum rate of long-run growth, chart 1 presents a guideline to the trend of capacity utilization at cyclical peaks. This has been drawn conservatively in the sense that it never exceeds GNP at cyclical maximums during the period. The shaded areas represent the difference between actual production and potential output along this trend line of peak capacity utilization during the four contraction and recovery periods. Measured in this way, the aggregate of forfeited output of goods and services during the four business slumps amounted to $87 billion in 1954 dollars, and to $100 billion in 1960 dollars.

If we had been able to find a way to avoid these periodic recessions and to keep the economy continuously trending along its nonrecession capacity utilization path, in other words, we would have had at our disposal $100 billion more in goods and services over the 1948–61 period.[1] This would have been enough to have provided for new schools for 10 million children, plus 10,000 more miles of superhighway, plus the plant and equipment needs for 10 new corporations as

[1] Abstracting from all other determinants of the longrun rate of economic growth, the avoidance of periodic shortrun business recessions might in itself induce a higher rate of growth. If this is so, the recession-induced losses would work out to a larger sum than $100 billion.

CHART 1.—Quarterly gross national product seasonally adjusted at annual rates in constant 1954 dollars, 1948 through 1961–II. Source: Department of Commerce.



large as General Motors, as well as the payment of medical bills of $300 a year for 10 million retired citizens during every year of the last decade.

It is, then, a matter of real concern to determine why these periodic recessions occur and what might be done to reduce their severity. Our main concern in this paper will be the former problem, why they occur.

The postwar record of experience exhibits several characteristics which suggest that these recurring recessions are not caused by purely random or exogenous factors but, on the contrary, are self-generating economic cycles. This experience, furthermore, indicates that fluctuations in business inventories have played an important role. Omitting the 1960–61 recession, the recovery from which appears not to be fully completed at this writing, the patterns of the postwar recessions and recoveries, in the first place, are remarkably alike. As chart 1 shows, the shaded areas representing three completed contraction-recovery periods, which we may identify as the 1948–49, the 1953–54, and the 1957–58 recessions, are each seven quarters in duration. The amplitudes of the contractions, measured by the maximum divergence of actual from trend output as indicated in chart 1, are remarkably similar: minus $24 billion, minus $22.7 billion, and minus $27 billion, respectively, for the three recessions. These regularities suggest that a similar causal mechanism has been operating in each recession.

TABLE 1.—*Quarterly investment in nonfarm inventories, during 3 postwar recessions*

[Annual rates in billions of 1954 dollars]

Successive quarters of recession period	Recession of—		
	1948–49	1953–54	1957–58
Prerecession quarter [1]	[2] $4.1	[3] $4.1	[4] $1.7
1	3.0	1.5	1.3
2	.4	−4.3	−2.0
3	−4.6	−2.6	−5.5
4	−.8	−3.4	−4.3
5	−5.4	−2.7	−2.1
6	2.4	.1	2.4
7	4.8	3.9	6.1

[1] "Prerecession quarter" refers to the quarter in chart I immediately preceding the commencement of "shaded" recession period.
[2] 1948, 3d quarter.
[3] 1953, 2d quarter.
[4] 1957, 2d quarter.

Source: Department of Commerce seasonally adjusted data from GNP accounts (reflecting "inventory valuation adjustment").

To go one step further, the postwar record also suggests that a major aspect of this causal mechanism has been the behavior of business stocks of purchased materials, goods in process, and finished goods. These inventory holdings have exhibited contractive movements during each recession of substantial size, as shown in table 1. Thus during the 1948–49 contraction inventory investment shifted from an annual rate of *accumulation* of $4.1 billion in the final prerecession quarter (1948, third quarter) to *liquidation* of inventories of $4.6 billion

by the third recession quarter.[2] Since accumulation of inventory is a draft on production while liquidation is equivalent to "living off" inventories without concomitant production, the total decline in production attributable to this turnaround in inventory investment was $8.7 billion measured at an annual rate (i.e., from plus 4.1 to minus 4.6). The same general pattern holds for the 1953–54 and 1957–58 recessions. And the reader should observe the rather startling similarity in the magnitudes of the inventory turnarounds for the three contractions: *minus* $8.7 billion for the 1948–49 recession, as we have just seen; *minus* $8.4 billion for the 1953–54 recession (from plus 4.1 to minus 4.3); and *minus* $7.2 billion for the 1957–58 contraction (from plus 1.7 to minus 5.5). The fact that the amounts of these three declines in production for inventory were so much alike again suggests some sort of systematic mechanism in operation for all three recessions in business activity.

In short, it is impossible to make even a casual inspection of the broad economic aggregates of the postwar period without at least suspecting a crucial interplay between inventory fluctuations and periodic contractions in business activity. Clearly the shift from inventory accumulation to liquidation which has characterized the early stages of each of the completed contraction recovery-periods was a depressing influence. Did this shift in inventory position *cause* the decline in business activity? Or was the shift merely a *consequence* of a business contraction which found its roots in some other cause? Or did the line of causation run in *both* directions? If causation does indeed run both ways what does this fact imply for economic stability? These questions pose the problem to be investigated in the present paper.

The analysis will proceed as follows. In part I, a framework to guide the ensuing analysis will be described, consisting of a set of hypotheses which assert both an "inventory feedback" and an "income feedback" on GNP. It will be demonstrated that the existence of an inventory feedback mechanism of the sort postulated will act both to produce greater amplification of any "shocks" imposed on the system than would be the case in its absence, and under certain conditions to cause oscillations in GNP. The question then becomes, does the hypothesized model fit the real world?

Using data for the important manufacturing sector of the economy, the first basic feedback asserted by the hypothesized model is put to an empirical test in part II. Here it is found that the relatively simple hypothesis regarding inventory adjustments described in part I, that desired inventory levels are determined by sales, needs to be amended to take into account the influence on desired inventory levels of the flow of new orders that are not immediately translated into sales, i.e., changes in order backlogs. The empirical record is found to provide strong support for this reformulated feedback relationship.

Income feedbacks are examined empirically in part III. Attention is focused on the major income-expenditure relationships. First, the implications are examined of a shift in production on the flow of corporate income in the form of retained earnings, and in consequence on

---

[2] The dating of the beginning and end of contraction-recovery periods is based on the shaded areas shown in chart 1. Although inventory liquidation during the 1948–49 recession reached its quarterly maximum of minus $5.4 billion in the fifth recession quarter (1949–IV), this figure is probably under the influence of of the major coal strike that occurred in the fall of 1949. It seems more significant, therefore, to measure the inventory "turnaround" during the period ending with the third recession quarter (1949–II).

expenditure for plant and equipment. Second, changes in wage and salary incomes arising from alterations of production levels are studied for their effects on expenditure for goods by households. Supporting statistical evidence is presented for both income-expenditure relationships.

In part IV the overall systematic implications of the model for instability and cyclical behavior of GNP are compared with the pattern of variation of several broad measures of economic activity during the postwar period. This postwar record is found to support the implications of the model as they concern oscillatory behavior of output and inventory investment.

A summary of the paper and its conclusions with respect to inventory-induced economic instability are set out in part V.

PART I

THE HYPOTHESIS

Almost everyone has at one time or another participated in a search during the semidarkness of early evening for a lost object, perhaps an earring inadvertently dropped on a lawn, a driveway, or a beach. It will be recalled how helpful, even necessary, in such circumstances it is to conjure up a mental image of the object's size and shape. To know fairly precisely what one is looking for when a search is conducted in an "obscure" situation immensely enhances the chances of success. Let me carry the analogy one step further. Even where the exact kind of earring one is looking for is not known with certainty, the chances of finding it will be improved by imagining a specific size and shape, or perhaps several alternative sizes and shapes, to guide the search. This process of "hypothesizing" will most assuredly be of no service if the earring isn't there at all; but if it is, its shadowy outline will more likely be recognized by "fitting" it into a mental image.

For the same reason an empirical examination of the relationships connecting inventory fluctuations and economic instability needs to commence with a mental conception of what it is we are looking for; that is to say, a "model."[1] The economic system is an awesomely complicated web of multitudinous interconnections among persons, groups of persons, and the economic "things" in which they deal. This extreme complexity creates for the researcher a situation much more "obscure" than hunting for an earring at twilight. Yet we must probe into this complicated network to study a single mechanism: the process of interaction between inventory investment and aggregate production. Unless we possess an image of what this interaction may look like, the obscurity created by many other shifting variables may thwart our search. There is another justification for starting the investigation with a "model" in hand. By drawing out its logical implications many additional relationships are brought to light, and often these implications are all one can hope to recognize in a very complex "real world." There are occasions when a dog's bark is more easily recognized than the dog.

But it needs emphasis that the model to be described stands, at this point in our investigation, merely as a hypothesis. Our purpose is to determine whether this hypothesis is true, or true in some degree, or false. The test for this truth will turn on whether the statistical and historical record supports or refutes the hypothesized relationships and their implications.

---

[1] A "model" is simply a set of propositions specifying the form of relationships among variables. These relationships may be stated in very general form, e.g. "sales will rise when production increases," or they may be stated quite specifically; i.e., $S_t = a + bX_{t-1} + c\Delta X_{t-1}$ where S is sales, X is production, and t is a given period of time.

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ASSUMPTIONS OF THE MODEL

The model to be employed as our guide rests on one definitional proposition and three major behavioral assumptions.[2]

1. Aggregate production, or GNP, during a period of time is disposed of in one or both of two ways: either this output all reaches the hands of "final buyers" during the same period;[3] or, if output exceeds what final buyers will take off the market, this excess is added to inventories, i.e. *inventory investment* occurs. When sales to final buyers ("final sales") exceed what is being produced, goods are being withdrawn from inventories; i.e., negative inventory investment or inventory *disinvestment* occurs. The output which is added to inventories will sometimes be called "production for inventory" whereas the balance of output will be referred to as "production for final sale." "Production for inventory" is an equivalent expression for "inventory investment."

2. Changes in production induce changes in the same direction in final sales. When businessmen increase their output, their expenditures rise for labor, materials, and other "inputs," including a profit share. Since these new expenditures are added income for the sellers of inputs, total purchasing power increases and aggregate demand and final sales rise.

The increase in final sales, however, is likely to be somewhat less than the rise in production and in incomes because of certain fiscal effects and saving tendencies. As production and employment increase and gross incomes rise, corporate and personal taxes take a bigger bite out of the flow, and unemployment and welfare payments usually fall, so that personal income and corporate profits, *after taxes*, increase less than gross income. Then, too, individuals and corporations will tend to save a part of additional after-tax income. Because of these net "leakages," final demand will tend to rise by a lesser amount than gross income when output expands. In the opposite case, when production is declining, final sales will tend to fall by a smaller amount than the decline in production and gross incomes.

3. Both *a priori* considerations and the literature of business management indicate that the model should take account of the fact that the "desired" level of inventory held by firms depends on how much is being sold by the enterprise. Starting from a "balanced" level of stocks, when sales increase to a higher level firms will desire to hold larger amounts of purchased materials, goods in process, and finished goods. In this situation, they will attempt to add to inventories. When sales fall, they will try to reduce their inventories.[4]

4. Finally, the model assumes that several responses to changed variables will lag over time or will be incomplete during a given period of time.

(*a*) When sales rise or fall an interval will pass before business management will recognize the change as more than a random or seasonal matter. Once recognized, an "administrative" lag will occur,

---

[2] As will be seen, this model is largely based on the inventory cycle mechanism developed by L. A. Metzler. See his "The Nature and Stability of Inventory Cycles," Review of Economic Statistics, vol. 23 (August 1941).

[3] Purchases by "final buyers" (what is known as the "final sales" component of GNP) are comprised of government purchases of goods and services, consumption expenditure, net export of goods and services and private expenditure for construction and producers' durable equipment. The model will neglect the export sector.

[4] This assumption is modified at a later stage of the investigation to take into account changes in unfilled orders.

due to necessary planning, bureaucratic inertia, and logistical difficulties, before production levels can be altered, granting for the moment that the firm desires to adjust the level of production.[5]

(*b*) Once a change in the flow of sales has been recognized as being more than a random or seasonal occurrence, a new target (desired) level of stocks will be established but the firm will attempt only a partial adjustment during the next time period to eliminate the difference between the desired and actual inventory level. The partial nature of this adjustment will reflect some uncertainty attaching to the permanence of the new level of sales as well as necessary leadtimes in ordering and, with respect to finished goods stocks, the planning and cost problems involved in changing the firm's own level of production.

(*c*) As for the income-expenditure feedbacks noted in (2), above, other lags need to be allowed for. We assume a feedback of corporate retained earnings on expenditure for plant and equipment: when retained earnings rise, expenditure for producers' durables goods increase, and conversely. Clearly, however, we must allow for a considerable lag in the expenditure response since planning and construction-installation periods are normally of fairly long duration. It is not so clear, however, that consumers' expenditure will always lag their incomes; this matter is left unsettled here.

CHARACTERISTICS OF THE MODEL

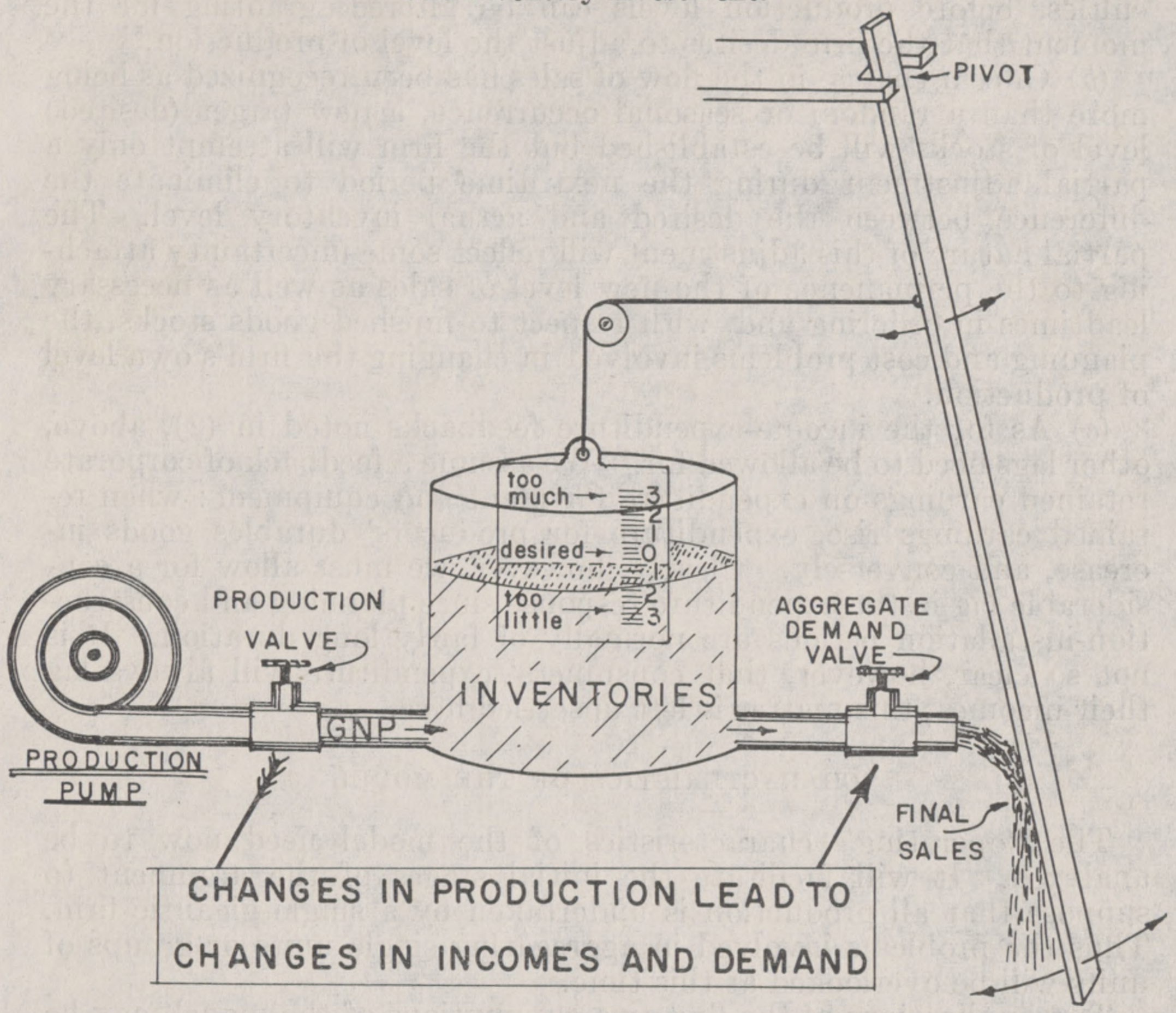
The "operating" characteristics of the model need now to be analyzed. It will facilitate the initial stages of the argument to suppose that all production is undertaken by a single gigantic firm. Thus the problems involved in aggregating single units or groups of units will be overlooked at this time.

The implications of the first two assumptions of the model may be illustrated in a schematic fashion as in chart 2. The question of lagged and partial responses will be treated later. The output of produced goods and services is depicted as a flow of liquid with GNP controlled by a "production valve." The flow travels through a vat and out the pipe marked "final sales," which are the sum of purchases by government, households, and business. The vat itself, marked "Inventories," represents the existing stock of purchased materials, goods in process, and finished goods. The liquid in the inventory vat must rise when production exceeds final sales and fall when production falls short of final sales.

The amount of inventories the firm *desires* to hold depends on the flow of final sales, as shown in chart 2. If an increase occurs in the rate of flow of final sales, the splashboard is pushed to the right and, via the pulley arrangement, the index card is pulled higher. In the situation shown in the chart the desired level of inventories marked on the index card lies above the actual level in the vat; i.e., inventories are *deficient*. In this case the firm will attempt to add to stocks by opening the production valve several notches in order to increase the flow of GNP relative to final sales. Symmetrically opposite, should final sales taper off, the index card falls lower into the vat. If the downward movement proceeds far enough, the "desired" level of stocks

[5] In the general case, a marginal cost of altering a production level can be identified, and this cost may influence the production decision. Its effects when traced in time series may appear as a production lag.

CHART 2.—Schematic presentation of relationships among production, final sales, and inventory investment.



sinks below the actual level in the vat and surplus inventories come into existence. This surplus in stocks can only be gotten rid of by shutting down production to the point where GNP is flowing at a lower rate than that of final sales.

The income-expenditure assumption needs now to be considered. We have noted that when production expands additional incomes are generated, mainly in the form of increased wages and profits, and that in consequence, final sales will rise. In the diagram, consider the case where the desired level of inventories on the index card lies *above* the actual level: inventories are deficient. To correct this deficiency, the production valve is opened further in order to expand the flow of GNP. This act, however, generates additional incomes so that final sales rise. The splash board swings a bit more to the right, the index card rises. *Desired inventories are higher than before.* The attempt to correct a given amount of inventory deficiency by increasing production in equal measure cannot remove the deficiency. Does this mean that trying to correct an inventory deficiency is always self-defeating?

A glance at the diagram of chart 2 will show that the answer depends on at least two "coefficients" of the model: First, the extent to which final sales rise when production and income increase; and, second, the degree to which the index card rises (i.e., desired levels of stocks revised upward) when final sales expand. It seems reasonable to say that the adjustment process will not, in general, be completely

self-defeating over any significant period of time. It has been assumed that fiscal and saving effects will produce "leakages" from the flow of gross incomes so that final sales will rise *less* than production during an expansionary period. And it seems likely that an increase in the flow of sales will be accompanied by an increase in desired levels of stocks sufficiently limited to assure that the deficiency can, in time, be overcome.

Finally, the assumed lagged and partial responses in the system must be taken into account. This is most conveniently done by setting the whole system into motion and describing ensuing shifts in the variables.

We start from a situation of equilibrium: the flow of production (GNP) is just equal to a constant flow of final sales and the actual inventory level is exactly in line with the desired level.[6] Suppose the system is now "disturbed." For example, suppose that the rate of State and local government expenditure for new construction is gradually curtailed by some total given amount. In the schematic diagram of chart 2, the flow of final sales declines. Our first lag may appear at this stage. The initial reaction of business managers to the commencement of the fall in sales may be a feeling that the decline is only temporary. Only after several weeks or perhaps a month or more of continuing shrinkage in sales does the conviction strengthen that the decline is more than temporary. The downward revision in the target level of inventory is likely, therefore, to lag somewhat behind the actual sales decline. In chart 2, we must imagine the index card falling deeper into the vat only after this lapse of time.

In this situation of falling sales a "surplus" in inventory stocks will come into being for two reasons. The desired level of stocks falls because sales have declined, as noted. The actual level of stocks, on the other hand, must initially rise since we have assumed that production is reduced only with a lag. With the actual level of stocks in the vat rising, and the index card (showing the desired level) falling an inventory surplus appears, measured by the difference between the desired and actual levels.

Next to be considered of the model's responses to the initial disturbance is the curtailment of production as management recognizes, though somewhat belatedly, the necessity of getting rid of some of its surplus stocks. The income-expenditure feedback now comes into play. As production is cut back, profits and wage payments fall. Reduced incomes induce a further decline in sales though with a lag. Since final sales do eventually decline as production is curtailed the amount of inventory disinvestment falls short of the amount by which production was trimmed. And while this process of interaction between production and sales is proceeding, both working in a downward direction, it must be kept in mind that desired inventory goals are continuing to be revised downward in step with declining sales. Thus, efforts to get rid of surplus inventories will be prolonged a substantial period.

What is the end result of the processes of contraction we have been describing? Again, this depends on several "coefficients" of reactions as well as the lengths of the several lags. If the fiscal and saving effects of changes in gross incomes are very powerful, meaning that

[6] This position of "static" equilibrium has been chosen for the sake of simplicity. More realistic would be a "growth" equilibrium, with total GNP equal to the flow of sales (which is rising) plus that flow into inventory which is needed to keep actual stocks on hand just abreast of rising desired inventories.

for a curtailment of production of a given amount the consequent decline in final sales is relatively small, it is obvious from chart 2 that inventory liquidation will be facilitated and surpluses gotten out of the way with a relatively small total decline in GNP. On the other hand, a larger "coefficient" of sales reaction, implying a relatively large decline in final sales when production is cut, will act to frustrate inventory liquidations and enlarge the GNP shrinkage needed to get rid of excess stocks. Also, as we have noted earlier, the "coefficient" of the desired inventory level is involved. For example, if desired levels of inventories are revised downward only slightly for a given fall in sales, the portion of total inventories that are considered to be surplus stocks (i.e., actual minus desired inventories) will be smaller. Finally, response lags must be taken into account. When sales initially fall, the length of the production lag will help to determine the extent to which stocks are *accumulated* during the early phase of the business contraction. If the lag is long a large accumulation will have to be worked off and this will prolong the process of adjustment and tend to force down the level of production at later stages of the adjustment period to lower levels than otherwise would be the case. A lag in the income-expenditure response, on the other hand, will tend to offset production lags during the correction period since a tardy sales response facilitates the adjustment of production to sales.

We will not try to specify likely magnitudes for these coefficients and lags but simply assume for the moment that they lie within ranges which make possible an eventual liquidation of excess inventories. As production (GNP) is progressively reduced, final sales fall by lesser amounts so that production eventually is brought down below the level of final sales. This means that *actual* inventories begin declining, as the diagram of chart 2 implies. Eventually, the rate of change of sales minus production exceeds the rate of downward revision of *desired* inventories, so that *surplus* inventories start to decline. This process proceeds until the surplus is eliminated.

The initial disturbance, then, induces a fall in GNP which continues until surplus stocks are gotten rid of. It should especially be noted that the extent of this decline in GNP must exceed the amount it would have declined in the absence of the need to eliminate surplus stocks. GNP must be brought down below the level of final sales to disgorge inventories. Further, every effort to increase the margin by which GNP falls short of final sales (so to hasten the liquidation of stocks) is magnified by the income-expenditure feedback. The model implies, in other words, that the inventory adjustment mechanism acts to amplify economic contractions. In a converse fashion, as will be appreciated from the discussion of the paragraphs which follow, an amplification of expansionary movements will also occur.

With surplus inventories eliminated a lower turning point in business activity is at hand. During the contraction, the production flow is smaller than that of sales. But, once surplus inventories are worked off, production will be raised back up to the level of the sales flow. When this is done, added income will be generated and final sales will rise.[7] In consequence, desired inventories will be revised upward once more, thereby creating an inventory deficiency. Since

[7] These statements are not sufficient in themselves to demonstrate, in the logical sense, that the relationships among sales, production, and inventory investment will induce a turning point. Although a turning point can be demonstrated, a fuller treatment of the dynamics of the system is deferred until pt. IV below.

production will now be further increased, the stage is set for an economic expansion.

The response lags previously mentioned may modify this turning point pattern. The rise in sales, induced by the production reversal may, at first, be discounted as a temporary phenomena. This reaction, together with the costliness of changing production levels, may cause management to put off further increases in output until the trend of sales is better identified. This lag is likely to cause *actual* inventories to continue their decline past the trough in sales, so that inventory deficiencies will eventually be larger than otherwise once the upward trend in sales is fully recognized.

The foregoing account of the model's behavior over the course of a decline in business activity and a liquidation of surplus stocks, and through the period of a lower turning point where a reversal of the processes occurs, may be employed in symmetrically opposite terms to describe a subsequent economic expansion characterized by inventory investment which eventually terminates in an upper turning point and a reversal of the processes. Here we shall only sketch this analysis, leaving the reader to fill in the detail using the symmetrical opposites of the propositions of the preceding paragraphs.

As the system reaches its lower turning point and final sales begin their rise, a lag in the production response will amplify the size of the inventory deficiency that appears at this stage. Eventually, however, production is increased but this generates still more income and final sales continue their rise, inducing further upward revisions in desired levels of stocks. With actual inventories continuing to fall for a while past the lower turning point and desired levels rising, inventory deficiencies mount rapidly. Subsequent (lagged) increases in production, both in production for inventory and in production for final sales, are stimulated by rising sales and inventory deficiencies, but each time the production valve is opened a notch (see chart 2), aggregate demand and final sales increase still more. Final sales rise less swiftly than production, however, so that actual inventories begin to increase as soon as production overtakes sales; eventually, production for inventory increases faster than the rise in *desired* stocks, and from this point on the inventory deficiency itself begins to decline.

Finally, with production running in excess of final sales while inventory bins are being replenished, the deficiency in inventories is whittled down to a zero, or near zero, value. Production for inventory is now no longer required so the production valve is closed a bit. Incomes fall in consequence. And after a short lag final sales turn down. At this lower level of sales smaller inventories are desired. It follows that an inventory surplus is now present, inducing (after a lag) further cuts in production. We are now back at our starting point, the onset of a recession in business activity.

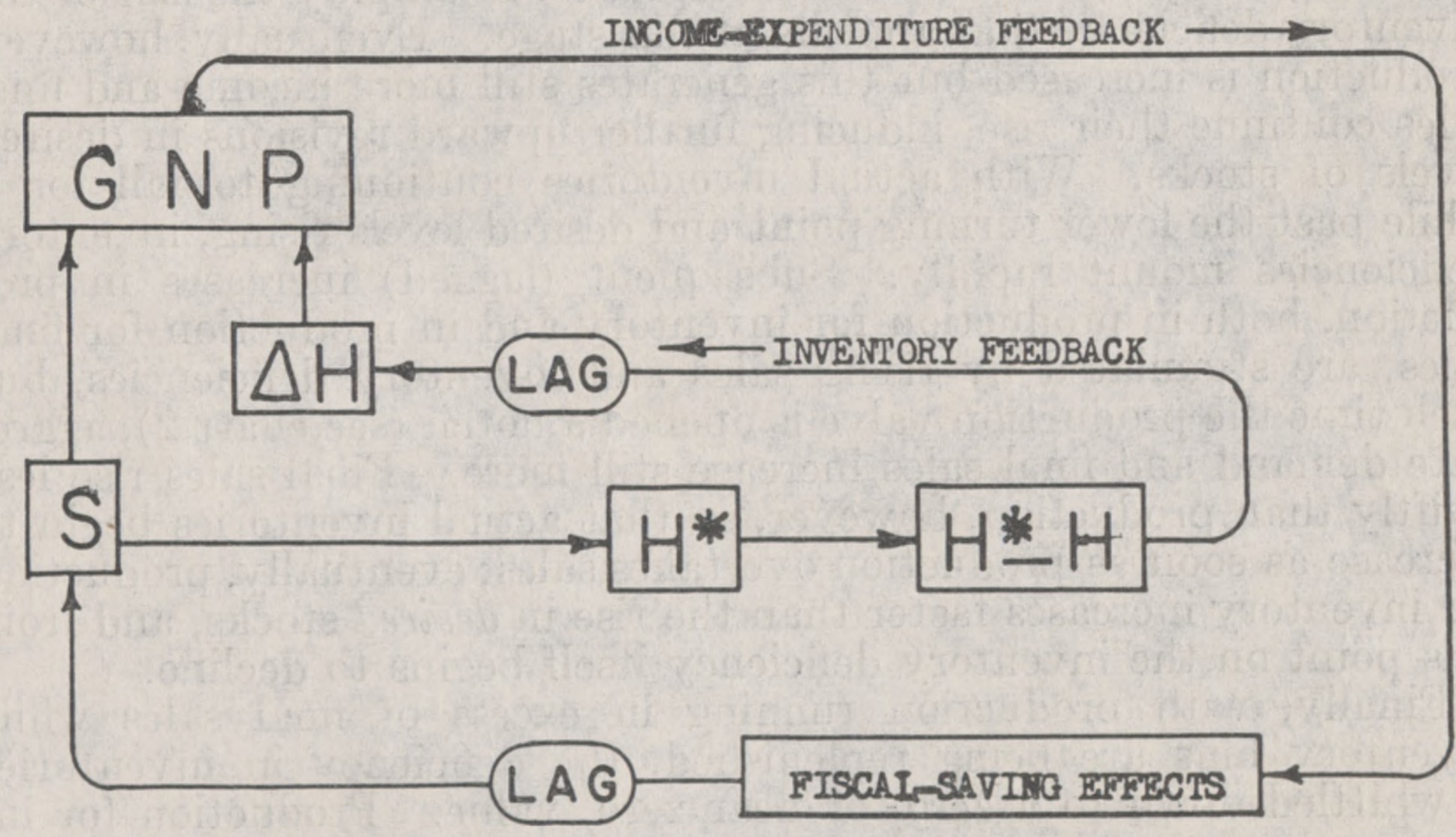
It will be useful to summarize the interrelationships in the model which produce the foregoing pattern of amplification, and, under certain "coefficient" and lag conditions, of oscillatory behavior by depicting them in the form of a "closed loop" system. Chart 3 shows the set of economic variables connected by arrowed lines which repre-

sent the influence of one variable on another. The variables shown are as follows:

GNP=Total production (gross national product)
S=Final sales
H*=Desired level of inventories
H=Actual level of inventories
ΔH=Inventory change (investment)

The amount of production, or GNP, is determined by the flow of final sales, S, plus ΔH, inventory accumulation (or minus, in the case of decumulation). A change in S induces a change in the level of desired inventories, H*. When a difference appears between desired and actual inventories, (H*—H), this information "feeds back" on production through inventory investment, ΔH. Thus, a change in the rate of inventory investment helps to determine a new level of GNP as shown by the arrow connecting the two variables. Both feedbacks are shown to operate only with a lag in response. The "fiscal-saving" effect which tends to dampen changes in S relative to changes in income generated by GNP is shown in the income-expenditure loop.

CHART 3.—"Feedback" relationships among production, sales, and inventory investment.



THE PROBLEM OF AGGREGATION

In the "real world" production is undertaken by many individual firms, not by one gigantic firm as we have assumed up to this point. If the single-firm assumption is now dropped, we must ask whether this deletion means that the model should be amended in order to make it a more accurate guideline to the "real world." The essential question that must be faced is this: are the implications for system-wide economic behavior the same for (*a*) the situation where production and inventory decisions are made and carried out by many individual firms whose inputs and outputs are interconnected in many marketplaces; and (*b*) the situation, so far assumed, where all production is undertaken by a single large business firm?

Two major problems appear when the assumption of a single large firm is dropped:

First, the stability of estimates of aggregative relationships is imperiled by changes that are bound to occur over time in the "structure" of business firms and their market relationships. An example will make this issue clear. An important variable specified in the model is the *desired* level of inventories, H^*. We may suppose that a shift to a new desired level of stocks occurs through a process of multiplying a desired marginal stock sales ratio, r, by the change in sales, $\triangle S$, and adding the product to the previous value of H^*.[8] Clearly, the value for r from firm to firm will be different, e.g., durables firms will desire larger stocks relative to sales than nondurables firms. The argument of the model, however, is based on an average, r, for all firms. It follows that a change in the composition of firms in the aggregate group may shift the value of this average, r. So, too, may other kinds of "structural" changes: new production technology including new "machine" methods for controlling inventories; amalgamation of small firms into large units; development of speedier and more reliable transportation. The reader may add to this list. One must conclude, therefore, that tests of the aggregate model must make allowance for the possibility of structural changes occurring over time.[9]

Second, and less easily dealt with, the aggregative treatment in the model of what really consists of a host of interrelated firms poses a troublesome question of dynamics. Consider two cases. On the one hand, the "vertical" sequence of production from raw material stages through stages of intermediate products to the final stages of completed goods ready for the ultimate user is the domain of one huge "vertically" integrated firm. On the other hand, consider the case where separate firm, A, produces the raw materials; separate firm B buys raw materials from A and sells an intermediate output (say electric motors) to separate firm C, with the latter producing completed washing machines for sale to ultimate consumers. Supposing a general expansion is in process throughout the economy, would the pattern of rising production, feedbacks through the inventory adjustment loop, and through the income-expenditure loops (see chart 3) be the same in both cases? Several factors would seem to suggest a negative answer. Since time lags in response will affect the way the system operates, we may question whether these lags would be the same for the single firm case (where there is no need for transactions through external markets) as contrasted with the multifirm case. Expectations and the speed and reliability of transportation and information-flow might differ in the two cases. There may be other differentiating factors which I am overlooking.[10]

The basic question concerning the dynamics of aggregation would seem to be whether an aggregative model such as we have described

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[8] Firms may not "think" marginally; perhaps they calculate in the "total" form, $H^*=a+rS$, or even—where the constant, a, is neglected—in the form, $H^*=rS$. This difference in behavior is not important to the argument. In all cases, the desired ratio, r, is involved.

[9] The allowances to be made in subsequent sections (where tests against empirical data are undertaken) will be of two sorts. First, regression equations will include a linear trend term, T, the assumption being that structural changes occur only gradually over time. Second, several empirical tests will focus on subperiods in order to compare regression coefficients.

[10] A number of economists are working on the logic and dynamics of aggregation in inventory analysis. Prof. Franco Modigliani of Northwestern University is currently collaborating with Prof. Charles C. Holt of the University of Wisconsin in a project involving the dynamics of properties of the multifirm case. A paper by Michael C. Lovell of Yale University on the same subject (now known as Cowles Foundation Discussion Paper No. 89, "Buffer Stocks, Sales Expectations, and Stability: A Multisector Theory of the Inventory Cycle") will appear in a forthcoming issue of Econometrica.

can be made to reproduce the pattern of inventory-induced fluctuations implied by a disaggregated multifirm model, or perhaps better stated, to reproduce the dynamics of a real world made up of numerous separate firms. This question has not been settled, I believe by research completed to date, and until it is an open mind is called for.

In this paper we shall proceed to explore the possibility that an aggregative model of the inventory adjustment process will reproduce with substantial realism the interaction of responses made by many individual firms. There is ground for some confidence in a successful outcome. The action-response lags, which marketplace dealings between and among firms might at first glance be expected to produce in substantial measure, are frequently reduced in duration through the effects of purchase orders. As Mack and Zarnowitz have pointed out,[11] the independent variables that guide the reactions of firms interconnected through marketplaces may be only in limited degree actual sales and purchases, which because of time-consuming procedures leading to their realization might be expected to introduce substantial lags in the system; a variable of major importance may be purchase orders transmitted from buying firm to selling firm, which action precedes purchase and sale, eliminating a substantial portion of the lag in response. Interrelated through such a network of purchase-order channels, where communication of information can be very speedily transmitted, the dynamic response patterns of a multifirm economy may turn out to be not very dissimilar from those of an economy of a single huge firm.

In a recent empirical study evidence is presented to support the position that economic intercommunication among separate firms is swift. Terleckyj has charted a diffusion index of the proportion of 27 trade and manufacturing sector inventories which are rising against the percent change in total inventories for the period mid-1951 through 1959.[12] The correlation between the two is very close and Terleckyj concludes:

> The result suggests that the phenomena of inventory change is broadly and rapidly diffused throughout the general business scene * * *. When total inventories have been declining, inventories in most industries have also declined; when total stocks have been increasing, inventories in most industries have also increased.[13]

TESTING THE MODEL

How is the inventory model described in the foregoing sections of this paper to be tested?

The procedure will be to compare the model's most important characteristics and implications with empirical observations. These observations will consist of data for the postwar period covering such variables as production, sales, and inventory investment. If the comparisons show conformity of the hypothesis and its implications with this empirical record, we will urge that the model be tentatively accepted as a reasonable partial explanation of the real world. If contradictions are found, we must either reject the model, or amend it to overcome the objections.

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[11] Ruth P. Mack and Victor Zarnowitz, "Cause and Consequence of Changes in Retailers' Buying," American Economic Review, March 1958, p. 48.

[12] See chart 11, Nestor E. Terleckyj, "Measures of Inventory Change," a study paper included in part II of the present series of reports for the Joint Economic Committee.

[13] Ibid, p. 178.

The following aspects and implications of the model will be subjected to empirical testing:

1. Desired levels of inventories are determined by the flow of sales, and the difference between desired and actual levels of stocks determines the rate of investment, though with a lag. This proposition underlies the inventory feedback "loop" of chart 3.

2. Changes in the level of aggregate production induce smaller and lagged changes in the same direction in the demand for final output. This restates the elements characterizing the income-expenditure "loop" in chart 3.

3. Aggregate production, sales, and inventory investment will move in a wave-like fashion over time, reflecting the tendency of the system to produce oscillations.

4. Over the course of the cycle in production, inventory investment will reach its maximum and turn down prior to the peak in final sales, and will rise from its cyclical trough prior to the trough in final sales. A test of this implication of the model will help determine whether it is the inventory investment reaction, or some other "cause," which leads the economy to reverse its direction and to produce oscillations.

PART II

THE INVENTORY FEEDBACK [1]

A fundamental aspect of the model hypothesized in the preceding section is the inventory feedback relationship. The relationship asserts that desired levels of stocks are functionally related to the flow of sales, and that deviations between desired and actual levels of inventories determine with a lag the rate of inventory investment. Changes in final sales therefore feedback on production by inducing a change in the demand for output to be added to inventory. If this feedback reaction occurs in the real world in the form in which we have earlier described the economy will be "destabilized" in the sense that disturbances in demand will be amplified and cyclical movements in output will emerge. If this conclusion is true, the hypothesized model may provide an explanation for the recurring recessions in business activity which have plagued the postwar economy.

But is the inventory feedback thesis a true one? The purpose of the present section of the paper is to take a sounding on this aspect of the model. Although the crucial test is whether the thesis is supported by empirical evidence, we begin by inquiring into its deductive support. If, from a set of premises widely accepted as reasonable rules of business behavior, the elements of the asserted inventory reaction can be shown to follow as a matter of logical necessity greater confidence in its truthfulness is justified than in the absence of the deductive argument. The second part of the present section will then examine the empirical evidence.

THE DEDUCTIVE CASE FOR THE HYPOTHESIS

The deductive case is based on the premise that businessmen will attempt to follow courses of action which lead to larger profits and avoid those actions which lead to lower levels of profits than otherwise could be achieved. Under conditions of uncertainty regarding future values of planning variables (e.g., future sales and costs), aspects of risk will be taken into account in making these decisions.

With regard to inventory management the search for greater profits will entail decisions concerning (1) the holding of buffer stocks to guard against the risk of running out of inventory, (2) the smoothing of production over time to avoid some part of startup and shutdown costs, and (3) the optimum lot-size to buy in order to reduce the unit costs of purchased materials. We want to show that the implication of these decisions is equivalent to the proposition that inventories will be functionally related to sales; i.e. that stocks will be increased when sales rise, and conversely.[2]

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[1] Calculations for the regressions presented in this section were performed on the Federal Reserve System's computer in Washington, D.C., and I wish to express my appreciation for this help to the Board of Governors and to Mr. M. H. Schwartz, Chief, Statistical Operations Planning, and Mr. Robert Steinberg, of the Division of Research and Statistics.

[2] The argument which follows is heavily influenced by Franco Modigliani, "Business Reasons for Holding Inventories and their Macro-Economic Implications," National Bureau of Economic Research, Studies in Income and Wealth, vol. 19, pp. 495 to 506.

Consider first the question of the risk of running out of inventory. This risk arises, of course, from uncertainty both with respect to incoming materials and the flow of sales to customers. If the availability of materials were perfectly known and if perfect forecasts could be made of future sales volume, then in the absence of a desire to smooth production or to take advantage of optimum lot-size buying, it is clear that no inventory at all would be required in the strict sense: the process of production would consist entirely of flows with no stocks being held. With perfectly known delivery schedules, materials would be ordered in advance of production so that incoming supplies would flow immediately into the first stage of fabrication. Since both the flow of inputs and outputs could be planned with certainty, no stocks would be held between stages of production. And, finally, because sales would be forecast with no error, the level of production would be established period by period to insure that finished goods coming out of factory doors could be delivered immediately to buyers.

The need for buffer stocks arises because the foregoing conditions of certainty are not fulfilled. Suppliers' abilities to fill orders and the time needed for delivery to the firm are matters not predictable without error. Since the firm's sales are not known with certainty, future production itself can only be estimated. To run out of purchased materials will involve the firm in a costly shutdown of production. A margin-of-safety reserve of materials will, therefore, be kept on hand in sufficient quantity to reduce the probability of running out of materials should an unexpected, but possible, delay in delivery or increase in production occur.

The need for holding buffer stocks between stages in the production process (goods in process) is based on similar considerations. The possibility of a shutdown of one stage of production must be planned for by keeping on hand a reserve stock of output from that stage.

With respect to inventories of finished goods, uncertainties of sales forecasts must be added to all the uncertainties involved in ordering, delivery, and production which we have noted above. In other words, a runout of finished goods might occur either because actual sales exceed those expected or because actual production falls short of what was planned.

For these reasons, buffer stocks are needed to avoid unnecessary costs of production shutdowns and startups or lost sales. Skirting around a rather difficult question regarding the method of calculation to be followed to assess the size of stocks to be held under given conditions of uncertainty, we assert that an optimum level is determinable. What change would occur in this optimum level if we now imagine the scale of operations to be changed? Suppose, for example, the volume of production and sales is doubled. It need not be concluded that the new optimum inventory would be twice as large, since a larger scale of operation may permit a diffusion of some of the risks mentioned above. But it should be clear that doubling the scale of production and sales will require a *larger* holding of stocks. In general, the conclusion is that increases in sales will lead to increases in desired levels of buffer stocks, though not necessarily in proportion to the increase in sales.

One further comment with regard to buffer stocks is needed. In a world of cyclical business fluctuations uncertainty concerning the

availability of purchased materials may itself systematically shift with phases of the cycle. Thus during the early and middle stages of an expansion in business activity short-run inelasticities in supplies may create a greater degree of uncertainty about delivery schedules and this will increase the need for buffer stocks. It should be noted that this increase in demand for buffer inventories will be over and above the increase attributable solely to rising sales. During later stages of the expansion the elimination of bottlenecks and the adjustment of capacity may improve the conditions of supply and so lead to a reduction in the holding of buffer stocks even though sales are still rising.

The holding of inventories for the purpose of permitting a smoothing of production in the face of fluctuating sales may now be considered. Here the concern is with finished goods stocks. The argument is based on the fact that changes in the level of production involve the firm in extra unit costs. Startup costs include such elements as hiring and training workers, adjusting machinery, and coordinating processes. Shutdown costs, on the other hand, may include such factors as special maintenance to avoid deterioration of machinery, discharge pay for workers released, and special storage problems. To gear production tightly to fluctuations in sales will, therefore, force the firm to bear these shutdown and startup costs. If the fluctuation in sales can be estimated, not necessarily perfectly, but with some degree of confidence, a cost-reducing strategy becomes possible. When sales are estimated to be unusually low production will be permitted to exceed sales, with finished goods inventories rising. In the converse case, with sales held to be abnormally high, production will not be increased to match this flow of sales; sales to customers will be fed partly by reducing finished goods stocks. The general pattern, then, would be a situation of fluctuating sales with smaller fluctuations in the level of production, the difference between production and sales being accounted for by changes in the level of finished goods inventory.

Now, again, consider the case of a doubling of the scale of such an operation. Suppose the same conditions hold, as described in the preceding paragraph, except that sales and production are at twice the former level. The same sort of ebb and flow in the size of the finished goods inventory will occur, but we should expect the average size of these stocks to be twice as large as before, other factors constant. In general, the rule holds that higher levels of sales will induce higher levels of stocks held for "smoothing" purposes.

Finally, the case of buying in quantity in order to obtain a lower unit cost needs attention. The problem here is a decision whether to buy in small lots at frequent intervals as contrasted with buying in large lots more infrequently. There are gains and losses connected with both alternatives. If unit costs of purchases fall as the size of the order rises, the firm on this account alone will wish to buy as much as possible at one time. But large lots must be stored; thus the costs of storage space, deterioration of materials, and interest on funds invested in stocks must be faced. A balancing of these considerations will lead to an optimum lot-size decision which will be characterized by purchased materials inventories reaching a peak immediately following the delivery of a large order and then gradually being drawn down by the production inflow until again another large lot is ordered and brought into storage.

The effect of a larger flow of sales is now to be considered. Starting from the situation of optimum lot-size buying just described an increase in the flow of sales will have the effect of drawing down more swiftly the bulge created when a large lot is delivered and brought into storage. The result of this will, of course, be more frequent purchasing of lots so that unit costs of storage will decline. This, in turn, will upset the optimum described above and lead to a decision to enlarge somewhat the lot size. The net result is a larger average inventory. Thus, again, the conclusion is that changes in sales will lead to changes in the same direction in stocks, although less than in proportion to the shift in sales.

Viewed overall, a consideration of the three basic reasons for holding inventories leads to the conclusion that increased sales will be accompanied by increased inventories. If one possessed all the data concerning degrees of uncertainty, the costs that are involved in shutdown and startup, and the gains and costs of large-lot buying, it would be technically feasible to derive a functional relationship connecting levels of stocks and levels of sales. This relationship would imply a particular marginal ratio of stocks to sales that would be desired by the firm. This is an argument, not that firms will necessarily establish a desired marginal stocks-sales ratio and govern their actions accordingly, but an argument that they will at least *act as though they were following such a rule.* Production managers and financial managers probably view this matter somewhat differently. Production men may very well consider the problem of inventory in terms of a proper schedule of ordering and a proper schedule of flows into and out of production processes. From the financial point of view, on the other hand, we know that many firms adopt rules of thumb taking the form of ratios of stocks to sales or stocks to production, both for the purposes of financial planning and for the purposes of control. These two approaches are, however, not inconsistent with one another.

AN EMPIRICAL TEST

We turn to empirical tests of the "inventory feedback" hypothesis. The method will consist of a multiple-regression analysis of postwar data in which we will attempt to test the factors which influence desired levels of inventories. The same regression procedures will be used to evaluate the second aspect of the inventory feedback hypothesis, that the difference between desired and actual levels of stocks determines with a lag the rate of investment in inventories.

The empirical investigation is based on data for the manufacturing sector of the economy. Although it would be advantageous to examine all components of nonfarm inventories, the exclusion of trade inventories (and a minor "all other" category) which the availability of time has made necessary does not seriously weaken the power of the tests to be reported. For from both the point of view of amounts of inventories held and of the tendency for inventory investment to fluctuate in the short run the manufacturing sector of the economy is of major significance. Table 2 presents measurements of the relative tendencies of components of nonfarm stocks to be affected by contractive forces during periods of recession. Considering the mean decline during the business contractions of

1948–49, 1953–54, and 1957–58, it will be seen that the manufacturing sector accounted for 64.5 percent of the change in total nonfarm inventory investment, trade for 32.9 percent, and all other for 2.6 percent. Within the manufacturing sector, incidentally, durables stocks exhibit much greater sensitivity to fluctuation as shown in the table. As for the composition of the total of stocks held, manufacturing accounted for $60.7 billion of the $110.8 billion in nonfarm inventories on December 31, 1960, measured in current dollars, or 54.8 percent.

TABLE 2.—*Changes in selected components of nonfarm inventory investment during 3 postwar recessions* [1]

[Annual rates in billions of current dollars]

	Change in inventory investment from—						Mean change for 3 recessions	
	1948, 3d quarter, to 1949, 2d quarter		1953, 2d quarter, to 1954, 1st quarter		1957, 3d quarter, to 1958, 1st quarter			
	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total
1. Nonfarm, total	−8.0	100.0	−6.8	100.0	−8.0	100.0	−7.6	100.0
2. Manufactures, total	−4.8	60.0	−6.7	98.5	−3.2	40.0	−4.9	64.5
(Durable)	(−2.4)	(30.0)	(−5.7)	(83.8)	(−3.9)	(48.8)	(−4.0)	(52.6)
(Nondurable)	(−2.4)	(30.0)	(−1.0)	(14.7)	(+.8)	(----)	(−.9)	(11.9)
3. Trade	−2.8	35.0	−1.1	16.2	−3.6	45.0	−2.5	32.9
4. All other	−.4	5.0	+.9	--------	−1.3	16.3	−.2	2.6

[1] Figures may not add precisely to totals because of rounding.

Source: Department of Commerce; seasonally adjusted data from GNP accounts (reflecting "inventory valuation adjustment").

The hypothesis to be tested consists of two parts. The first element asserts that the desired level of inventory is an increasing function of sales, which we may write as:

$$H_t^* = a + rS_t \tag{1}$$

where H^* is the desired level of stocks; S is sales; the coefficient, a, is a constant representing a minimum level of inventories that would be kept whatever the level of sales; and t is the current time period.[3] Stocks are measured at the end of periods, flow variables such as sales over the period. The coefficient, r, is the marginal stock-sales ratio. If r is equal to 20 percent of quarterly sales and S rises by $1,000 per quarter, for example, the desired level of stocks would be increased by $200.

The hypothesis also asserts that inventory investment is determined by a comparison of desired and actual levels of inventories, with a timelag:

$$\triangle H_t = c(H^* - H)_{t-1} \tag{2}$$

where H stands for actual inventories; $\triangle H$ is the change in inventories

[3] It will be noted that no provision is made in equation (1) for the possibility that changes in sales will lead to the establishment of a new level of desired inventories only after a "recognition" lag of some duration. To take this and other lag possibilities into account regressions III and IV below include a term which can be interpreted as introducing the influence of sales of a period preceding the establishment of H^*.

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(inventory investment); the coefficient, c, is the "speed-of-adjustment" factor; and t–1 is the period preceding the current one. Thus, the decision based on the comparison, (H^*-H), is made in time period t–1, with the actual investment occuring one period later.

The coefficient, c, in equation (2) is hypothesized to be less than unity but greater than zero, meaning that only a partial adjustment will be made in the current period for the difference between desired and actual inventories. Several reasons can be adduced for expecting a partial rather than a complete adjustment over such short intervals of time as the quarter-year periods used in the regression analysis below. In the first place, if a change in the level of production is required to adjust inventories, as would be the case for finished goods inventories and for some parts of goods in process, we must recognize that in the general case the cost of shifting from one level of production to another is a function not only of the total amount of the change but also of the speed of the change over time. Second, where we are considering stocks of purchased materials, a very swift adjustment involves other kinds of costs: the purchaser with urgent demand is not likely to negotiate the most favorable price; a bonus for fast delivery may be required; the most economical route and form of transportation from the supplier may have to be foregone.

The two elements of the hypothesis, represented by equations (1) and (2), will be tested jointly. By combining the two equations the joint hypothesis takes the form:

$$\triangle H_t = b_o + b_1 S_{t-1} - b_2 H_{t-1} \tag{3}$$

where $b_o = ca$; $b_1 = cr$; and $b_2 = c$. The regression test, using the method of "least squares," consists of determining how closely the observed values of inventory investment will conform to those computed from an equation in the form of (3) when the three coefficients, b_o, b_1, and b_2 are assigned values "best suited" to the pattern of variation of the data.

The data used in the regressions reported below have all been deflated to constant 1954 dollars. Inventory figures are from the Department of Commerce's GNP accounts and so reflect an inventory valuation adjustment to eliminate book-profits aspects of inventory measurement. Accordingly, $\triangle H$ is measured as the change in physical stocks, or at least as closely as one can measure this concept on the basis of present data.[4] This measurement procedure has the advantage of suppressing a relationship among the variables that might be attributable solely to changes in the price level.

The period of the data is one quarter of a year, stocks being measured at the end of each quarter and sales as the total per quarter. The *t minus 1* lag assigned to the sales and inventory terms in equation (3) assumes that the inventory decision affecting the current period's investment is made in the preceding quarter. Some aspects of this lag will be considered in a later paragraph.

[4] Thus we are hypothesizing and testing the proposition that business decisions run in terms of physical or "real" quantities of inventory in relation to "real" sales. These are probably the terms in which production men view the management of inventories. But one needs to recognize the possibility that top management may exercise control over production managers by imposing rules of thumb; e.g., maximum stock-sales ratios, that are calculated in book-value current dollar units. I have run several regression tests similar in form to those of this section of the present paper using current dollar values. The results provide for the hypothesis in question approximately equal support to that obtained from regressions based on "real" values. See my paper, "Manufacturers' Inventory Investment, 1947–58: An Application of Acceleration Analysis," American Economic Review, vol. XLIX (December 1959), especially table 1, p. 952.

TABLE 3.—*Coefficients and other statistical measures for regressions I and II*

[Based on deflated quarterly data in units of $1,000,000,000]

Regression of ΔH_t on:	Regression I, 1948, 1st quarter, through 1960, 4th quarter	Regression II, 1952, 3d quarter, through 1958, 4th quarter
S_{t-1}	+0.136 (.030)	+0.136 (.028)
H_{t-1}	−.190 (.041)	−.215 (.053)
Constant	−.432	+.671
R^2	.310	.532
S	.723	.465

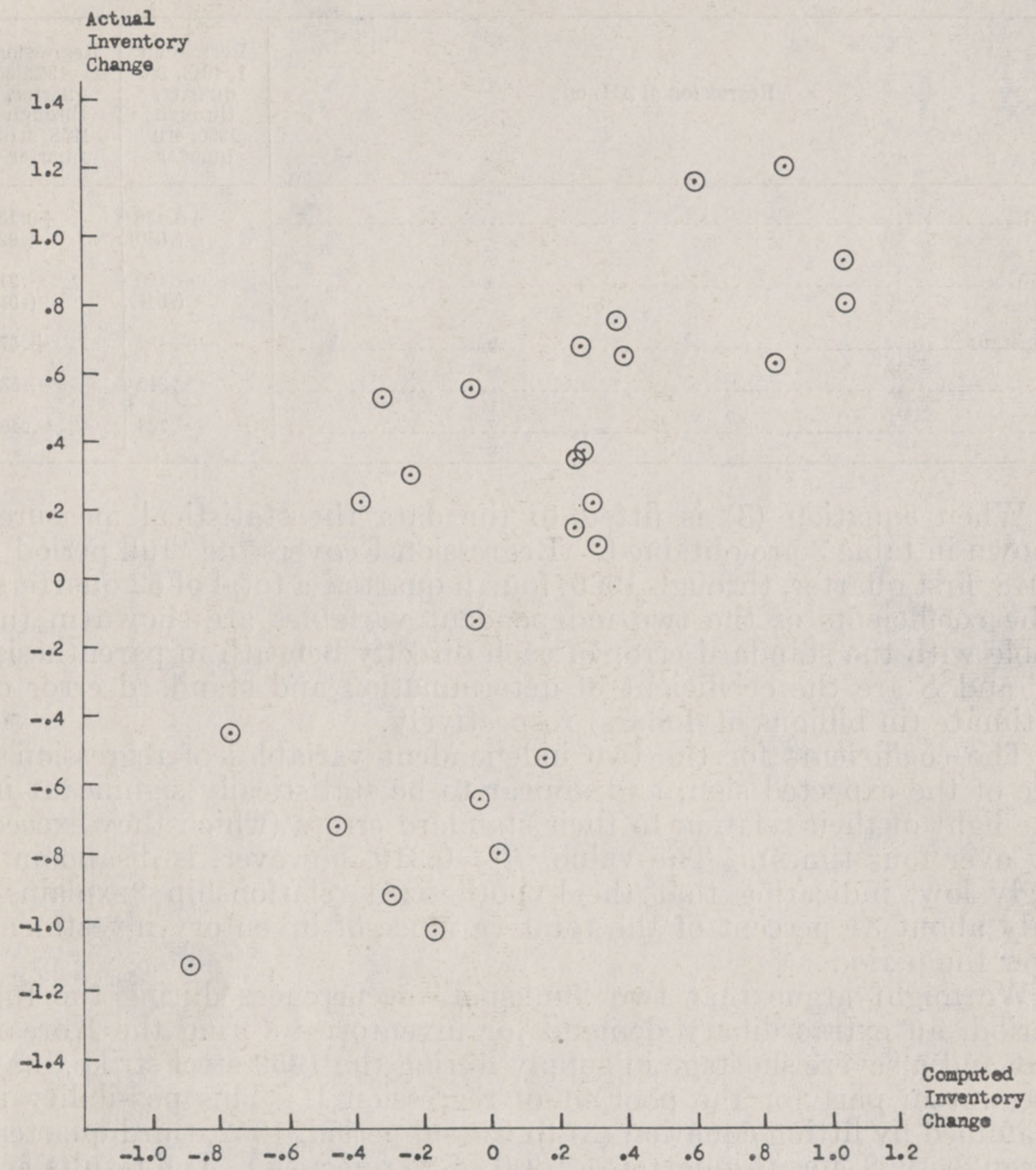
When equation (3) is fitted to the data the statistical measures shown in table 3 are obtained. Regression I covers the "full period," 1948, first quarter, through 1960, fourth quarter, a total of 52 quarters. The coefficients of the two independent variables are shown in the table with the standard error of each directly beneath in parenthesis. R^2 and S are the coefficient of determination and standard error of estimate (in billions of dollars) respectively.

The coefficients for the two independent variables of regression I are of the expected sign, and appear to be statistically significant in the light of their relation to their standard errors (which they exceed by over four times). The value, $R^2=0.310$, however, is disappointingly low, indicating that the hypothesized relationship "explains" only about 31 percent of the total variance of inventory investment over the period.

We might argue that two "unusual" occurrences during the full period, an extraordinary demand for inventories during the Korean war and a severe shortage in supply during the 1959 steel strike, may account in part for the poor fit of regression I. This possibility is examined by fitting equation (3) to the subperiod, 1952, third quarter, through 1958, fourth quarter, a total of 26 quarters. The results are shown as regression II in table 3. The coefficient of determination, R^2, is now 0.532 as compared with 0.310 for the full period, a more encouraging result. It is interesting to observe, too, that the coefficients of S_{t-1} and H_{t-1} for both periods are the same general size, suggesting the existence of a fairly stable relationship. A graphic representation of the degree of closeness-of-fit of the hypothesized equation to the actual data is presented in chart 4, where values of inventory investment computed from the fitted equation are compared to actual values. The meaning of a 53-percent "explanatory value" for the regression equation (i.e., $R^2=0.532$) is readily observed.

The foregoing empirical results can be said to provide support for the inventory feedback hypothesis. For both regressions, the independent variables appear to have significant coefficients. Pure chance is not likely to have produced these results. Yet the total explanatory values of the two fitted equations as measured by R^2 are quite low. Is there more to be said about the forces which operate on inventory decisions than is mentioned in our hypothesis? Might it be

CHART 4.—Scatter diagram of actual quarterly inventory change for manufacturing plotted against change computed from regression II, in units of $1 billion.



that our hypothesis is true as far as it goes but that it does not go far enough?

THE ROLE OF UNFILLED ORDERS

The failure of such inventory equations as regressions I and II above to explain more than about 30 to 50 percent of the variance in actual inventory investment requires further analysis. If one computes "estimated" values for each quarter's inventory investment from one of these regression equations, and then compares these estimates with *actual* inventory change each quarter, a revealing and highly suggestive pattern emerges. This has been done for the regression II equation with the results shown in table 4. For 1953, first quarter, for example, actual investment was $0.65 billion (col. 1) whereas the regression II equation "predicts" a value of $0.39 billion (col. 2). The difference, actual minus computed, is shown as $0.26 billion in column 3.

TABLE 4.—*Actual compared with computed values for inventory investment for regression II* [1]

[In billions of 1954 dollars]

Year and quarter	Col. 1 Actual inventory investment	Col. 2 Computed inventory investment	Col. 3 Actual minus computed values
1952:			
3d quarter	0.23	−0.39	0.62*
4th quarter	.53	−.33	.86*
1953:			
1st quarter	.65	.39	.26*
2d quarter	.75	.37	.38*
3d quarter	.38	.27	.11
4th quarter	−.53	.16	−.69*
1954:			
1st quarter	−.93	−.30	−.63*
2d quarter	−1.03	−.18	−.85*
3d quarter	−.80	.02	−.82*
4th quarter	.15	.24	−.09
1955:			
1st quarter	.23	.29	−.06
2d quarter	.63	.83	−.20
3d quarter	.80	1.05	−.25
4th quarter	.93	1.04	−.11
1956:			
1st quarter	1.20	.87	.33*
2d quarter	1.15	.61	.54*
3d quarter	.68	.26	.42*
4th quarter	.55	−.07	.62*
1957:			
1st quarter	.35	.26	.09
2d quarter	.10	.31	−.21
3d quarter	−.13	−.05	−.08
4th quarter	−.65	−.04	−.61*
1958:			
1st quarter	−.73	−.46	−.27*
2d quarter	−1.13	−.89	−.24
3d quarter	−.45	−.77	.32*
4th quarter	.30	−.24	.54*

[1] The figures in col. 3 which are followed by asterisks are so marked for purposes discussed in text.

The "unexplained" differences in column 3 of table 4 are clearly not randomly distributed. Notice that actual exceed computed values from 1952, third quarter, to 1953, third quarter; they fall below computed values from 1953, fourth quarter, to 1955, fourth quarter; and so on down column 3 in wavelike fashion. Why does this systematic pattern occur? Why, in other words, were inventories added to *faster* than can be explained by sales and existing inventory levels (the two independent variables of regression II) for three segments of time, and *slower* during the other two subperiods? In order to focus on the major aspects of this intriguing pattern, consider only the differences in column 3 of table 4 which are of substantial size, i.e., those in excess of $0.25 billion, disregarding sign, marked by asterisks in the table. Of these, actual inventory investment exceeds the computed amount in the following three periods: (*a*) 1952, third quarter, through 1953, second quarter; (*b*) the full year 1956; and (*c*) 1958, third and fourth quarters. On the other hand, actual investment fell short of computed values in (*d*) 1953, fourth quarter, through 1954, third quarter; and (*e*) 1957, fourth quarter, through 1958, first quarter. What is suggestive about this pattern is that (*a*), (*b*), and (*c*) were periods when durables production (excluding materials, the production of which was affected by labor stoppages) was either approaching new postwar highs, as was the case in (*a*) and (*b*), or rising very steeply, as in period (*c*); whereas (*d*) and (*e*), on the other

hand, were both periods when such durables production was falling into a recession trough. There would appear to be some relationship between inventory investment and shifts from "tight" market supply conditions for durables to conditions of "slackness" which occur during business recessions.

The form of this relationship derives, I believe, from the characteristics of a sector of production and marketing to which only passing attention has so far been given in this study. The proposition we have been investigating, that inventory is determined solely by the flow of current sales and existing levels of stocks, assumes tacitly that all production is carried on for the purpose of selling output on "the open market." Such production is characterized by the holding of finished goods inventories, kept in a balanced state so as to provide a range of selection for the purchaser and in sufficient amount to avoid running out of finished goods. Production of this kind is frequently called "production to stock." It proceeds *in advance* of a commitment by a purchaser. Only under these conditions does it make any sense to speak of changes in sales as the dominant determinant of inventory investment.

What is overlooked by the foregoing analysis is, of course, the existence of major processes of manufacturing where goods are produced only, or predominantly, *to order*. Characteristically, this sort of producer begins production of a commodity only upon receipt of an order. His stocks of purchased materials increases and subsequently his goods-in-process inventory expands, as goods move through the processes of production, all this occurring long before the actual "sale" is consumated by delivery to the customer. Clearly, in such manufacturing sectors inventory investment is more closely associated in time with receipt of the order, or more accurately with changes in the "unfilled order" backlog, than with the delivery (sale) of the goods to the buyers.[5] Indeed, the sale is an act of *dis*investment rather than a determinant of investment in stocks.

It is in the durable goods sector of manufacturing that production "to order" is predominantly found. At the end of 1960, to illustrate, total unfilled orders of manufacturers in current dollars amounted to $45.5 billion; of this total "durables" firms reported $42.9 billion, or 94.5 percent. Most firms producing nondurables report no backlog of unfilled orders since they sell at once out of stock. The emphasis in the analysis which follows will be placed, therefore, on the relationship of changes in unfilled orders (i.e., new orders minus sales) to the inventory positions of (*a*) all producers of durable goods to order and (*b*) all buyers of *intermediate* durable goods produced to order (e.g., certain components of automobiles and machine tools).

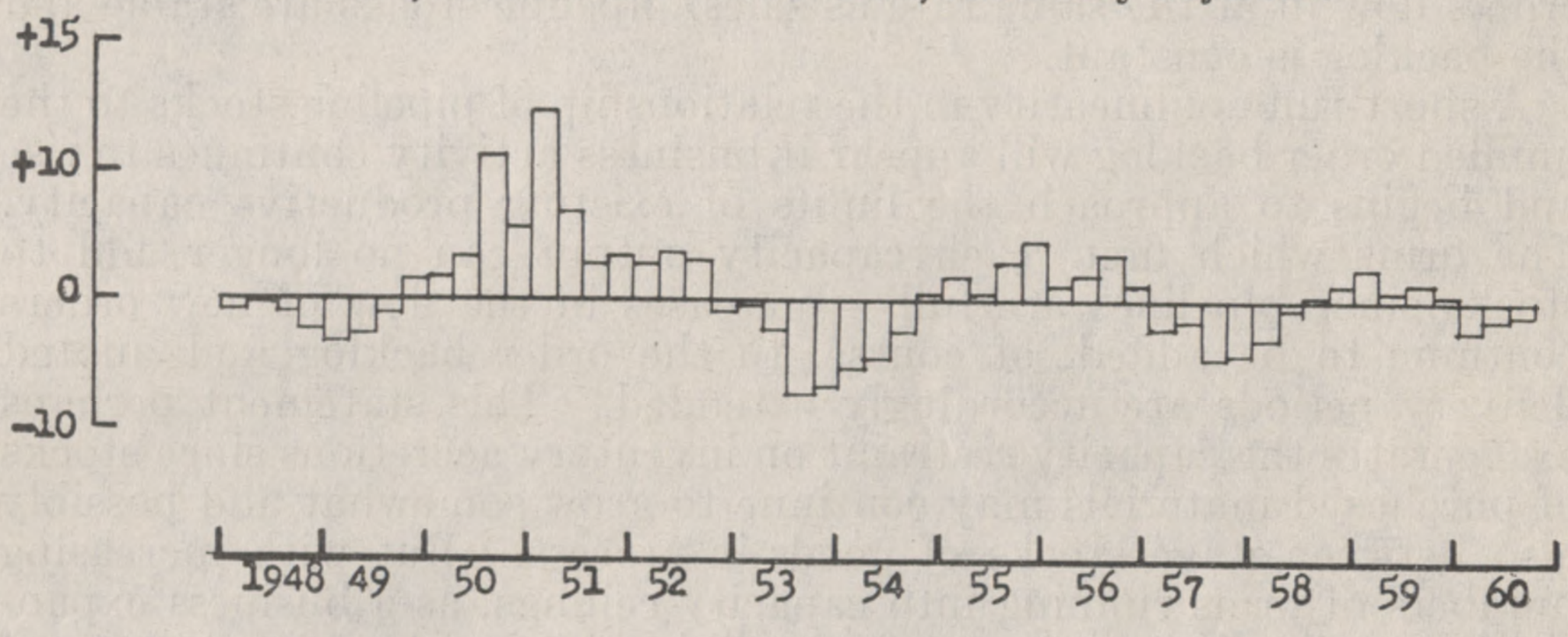
The chief characteristic of market conditions for durable output produced to order with which we must deal is the relatively large amplitude of the fluctuations which occur in the backlog of unfilled orders. This is not surprising. The demand for this kind of output is much more volatile than for nondurables. The processes of pro-

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[5] In an earlier article on the determinants of inventory investment I interpreted changes in unfilled orders as being predominantly an expectational variable, i.e., an indicator of future sales, leading firms when backlogs accumulate to increase the stock-sales ratio in anticipation of rising sales. (See "Manufacturers' Inventory Investment, 1947–58: An Application of Acceleration Analysis", op. cit., p. 955). I now feel this to be an inadequate treatment. In preparing the paragraphs which follow I find myself indebted to Thomas M. Stanback, Jr., for many ideas gained from a reading of a preliminary version of his report, "Postwar Cycles in Manufacturers' Inventories" which is to be published as one of the present series of papers for the study of inventory fluctuations and economic stabilization by the Joint Economic Committee.

duction for this kind of output, on the other hand, tend to be very time consuming. With volatile demand, inelastic supply over short time periods, and a structure of fairly inflexible prices, one is led to expect rather violent swings in the order backlog. Chart 5, which presents postwar data for quarterly changes in unfilled orders in billions of 1954 dollars, shows this expectation to be realized. One aspect of the data presented in the chart is worth noting here because it will become significant at a later point in this study. This is the marked dampening of the swings in backlog change since the huge buildup of the Korean war period. This dampening may be related to the degree of excess capacity which has been exposed by a slowing down of the growth rate in aggregate demand during recent years.

CHART 5.—Quarterly change in unfilled orders of manufacturers 1948 through 1960–III, in billions of 1954 dollars, seasonally adjusted.



Our immediate purpose, however, is to show that the relationship of inventory position to unfilled orders (in the "production-to-order" sector of manufacturing) depends on three effects of shifts in market conditions: (a) a "pipeline" effect and (b) an "exposure to risk" effect on the inventory position of all firms which produce durables to order; and (c) a "buffer stock" effect on all firms which buy "purchased materials" for stock from suppliers producing to order. These aspects are discussed in order.

The "pipeline" effect

The unfilled order backlog of a manufacturer is the accumulated difference between new orders received and sales. New orders add to, and sales reduce, the order backlog. When economic activity is expanding from a recession trough, new orders received by manufacturers rise. For firms producing *to stock*, these new orders are immediately translated into sales, and as we have posited earlier, desired levels of inventories, H*, will be revised upwards in view of the rise in sales, S. For such firms, the hypothesis underlying Regressions I and II seems reasonable, i.e. (repeating equation 1 above):

$$(1) \qquad H_t^* = a + rS_t$$

A substantial part of the rising flow of new orders, however, will represent a demand for durables produced to order. Since such production is time consuming, the immediate effect of the added flow of new orders is an increase in the backlog of unfilled orders. Roughly concurrently with the rise in backlog the producing firms begin to

purchase and acquire necessary added materials to fill the new orders; somewhat later these materials begin their flow through manufacturers' production pipelines. Thus, starting from a recession low, when many pipelines are not completely full and excess capacity exists, the rise in backlogs is associated with a rise in inventories: initially purchased materials, subsequently goods-in-process. For firms producing *to order*, consequently, we must recognize the relationship:

$$H_i^* = a_1 + r_1 O_t \tag{4}$$

where O represents the backlog of unfilled orders. Clearly, when particular lots of goods-in-process emerge from the pipeline as finished output and are sold (delivered), the backlog, O, declines. If new orders flow in at the same rate as sales, pipeline stocks are stable and the backlog is constant.

A short-run nonlinearity in the relationship of pipeline stocks to the unfilled order backlog will appear if business activity continues to rise and begins to approach the limits of existing productive capacity. The firms which first reach capacity output can no longer add to stocks since pipelines are full. Increases in the flow of new orders continue to be added, of course, to the order backlog and quoted delivery periods are accordingly extended. This statement perhaps exaggerates the capacity restraint on inventory accretions since stocks of purchased materials may continue to grow somewhat and possibly also between-stage stocks of goods-in-process. But with increasing numbers of firms running into capacity ceilings, as a business expansion proceeds, the aggregate effect will be slowing down of the rate of increase of stocks for given increases in backlog. In the longer-run capacity itself may be expanded, removing the nonlinearity.

This nonlinearity will, for the sake of simplicity, be pursued no further in this study, and we shall proceed on the basis of the linear relationship represented by equation (4) above. Study of the nonlinear case, however, might improve our understanding of inventory investment near cyclical peaks.

When both firms producing to stock and firms producing to order are combined for aggregative analysis, equation (1) and equation (4) above need to be considered jointly:

$$H_i^* = a_2 + rS_t + r_1 O_t \tag{5}$$

The "exposure to risk" effect

Firms which produce to stock must accumulate inventory in advance of commitments by buyers to purchase the resulting output. The holding of stocks therefore exposes such firms to the risk of future declines in demand for output and in market prices of purchased materials. The pressure of this risk is, of course, one of the factors taken into account when the firm sets standards for the proper relation of stocks to the flow of sales. It is, in other words, reflected in the marginal stocks-sales ratio, r, of equation (1) above.

On the other hand, firms which produce to order accumulate inventories, partly at least, in response to new orders which, in greater or lesser degree depending on terms of the order contract, commit the

ordering firm to accept delivery. To the extent that this commitment is firm, the inventory accumulated to fill the order is not exposed to the same degree of risk borne by the firm producing to stock. Hence, it seems likely that the production-to-order firm will tend to accumulate more stocks, relative to a rise in backlog, than will the production-to-stock firm, relative to a rise in sales, other factors the same. It may be that the nonlinearity in the relationship of H^* to O, which would set in as capacity ceilings are approached (see paragraphs above), will be partially offset by the effects of burgeoning backlogs in reducing the "exposure to risk." This effect may induce expansions of purchased materials and between-stage stocks in amounts which offset by a substantial proportion the decline in the rate of increase of "pipeline" stocking.

The "buffer stock" effect

Buffer stocks, as noted earlier, are maintained as precautionary "reserves" against the uncertainties involved in estimating the future availability of materials. It is obvious that the need for buffer stocks will be felt keenly by firms which buy materials from durable manufacturers producing to order, e.g., such "intermediate" durable goods as fabricated metal, machinery, electrical and instrument components.

Supply conditions in markets for intermediate durables produced to order tend to deteriorate rapidly during periods of business expansion because, as noted, the demand for this class of goods is volatile and production to order is time consuming. The purchaser of this class of output must protect himself during business expansions against two hazards: first, there is the risk that quoted delivery periods may lengthen faster than he had anticipated and planned for, so that he cannot expand sufficiently his leadtime in ordering to assure himself an uninterrupted future inflow of materials when needed. There is the further uncertainty that quoted delivery times may be dishonored by the supplier. Put differently, the risk involves both the actual state of affairs in supply markets and the accuracy of the information on which planning is based.

Except for those with "captive" suppliers all competing firms buying materials and components in the same markets during periods of expanding business activity are in the same boat, all running the same risk of runout. Competitive pressures are likely to lead to the appearance sooner or later of what amounts to panic buying, in some cases with duplicating orders being rushed to two or more suppliers. Reported backlogs by the aggregate of suppliers of durable intermediate goods will then tend to swell rapidly in amount. For these reasons the time of greatest uncertainty for purchasing firms during business expansions, and hence the period in which their need for buffer stocks will be greatest, will tend to coincide with the period during which the *rate of increase of unfilled orders is at a peak.*[6] This period would seem to be the time of maximum "disorder" in the market and greatest uncertainty for buyers.

In order to take into account "buffer stock" reactions to changing conditions in markets for intermediate durable goods, a new term,

[6] Rather than the period of maximum backlog which will tend to coincide with the interval during which quoted deliveries are of maximum length. But it is not the *length* of the delivery (leadtime) period per se which creates the need for buffer stocks, but rather uncertainty concerning future *changes* in the delivery period and the reliability of quoted delivery dates.

ΔO, the rate of change in unfilled orders, needs to be added therefore to the equation which defines the desired inventory position:

$$H_t^* = a_2 + rS_t + r_1 O_t + r_2 \Delta O_t \tag{6}$$

THE REVISED INVENTORY FEEDBACK HYPOTHESIS

From an earlier paragraph it will be recalled that the difference between desired and actual stocks on hand determines the adjustment to be made in the inventory position during the succeeding quarter, or, to repeat equation (2):

$$\Delta H_t = c(H^* - H)_{t-1} \tag{2}$$

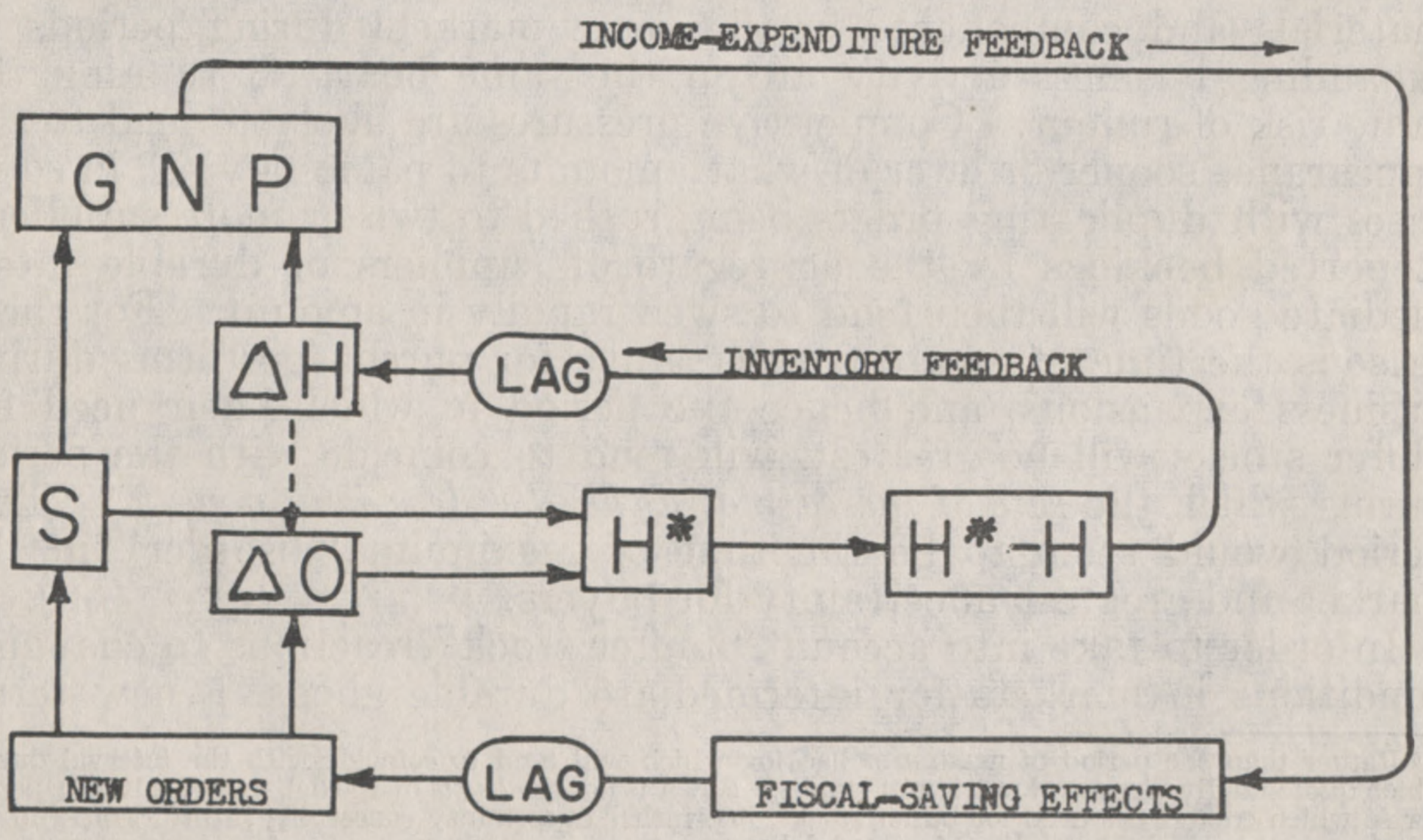
By substituting reformulated equation (6) above into the adjustment equation (2), the revised inventory-feedback hypothesis is obtained:

$$\Delta H_t = b_0 + b_1 S_{t-1} + b_2 O_{t-1} + b_3 \Delta O_{t-1} - b_4 H_{t-1} \tag{7}$$

where $b_0 = ca_2$; $b_1 = cr$; $b_2 = cr_1$; $b_3 = cr_2$; and $b_4 = c$.

Before turning to empirical tests, it may be helpful to present a revision of earlier chart 3 in order to show how the reformulated inventory hypothesis relates to the income-expenditure feedback. In the schematic diagram of chart 6, the inventory feedback loop is shown with the additional variable, ΔO, the change in unfilled orders. In order to keep the diagram as uncluttered as possible, the *level* of unfilled orders, O, is not explicitly introduced. Since, however, the backlog of unfilled orders is equal to the accumulation of past values of ΔO, one should interpret the variable, ΔO, as representing *both* (*a*) its current value and (*b*) its current value *plus* the backlog level at the end of the previous period.

CHART 6.—Schematic "feedback" diagram showing relationship of revised inventory investment hypothesis to the income-expenditure feedback.



Briefly, the system now operates in the following manner. Suppose GNP is rising, as during a recovery from a business recession. The income-expenditure feedback, moderated by fiscal-saving effects, induces a rise in new orders, as indicated in the chart. Some (probably the major) part of these new orders is addressed to firms producing to stock and thus are immediately filled, increasing sales, S. The rise in S leads these firms to revise upward desired stock levels, H^*, as shown by the arrow connecting the two variables. That part of the increasing flow of new orders which is addressed to firms producing to order is added to backlog, i.e. $\triangle O$ is positive, inducing these firms to add to pipeline stocks, including inventories of purchased materials, so on this account, too, H^* rises. If and when the business expansion accelerates, supply conditions in markets for intermediate durables goods are likely to deteriorate and buyers' uncertainties regarding delivery periods will increase. Duplicating orders may begin to be placed. This phase will be marked by *acceleration* of backlog accumulation, i.e. $\triangle O$ positive and *increasing*, and a concurrent rise in desired stocks, H^*, to provide for "buffer" inventories.

As H^* rises, relative to actual stocks on hand, H, decisions to add to inventories are made, and after some delay, these decisions bring about a rise in the rate of investment in inventories, $\triangle H$. If the planned increase in $\triangle H$ itself runs into supply difficulties, it too may affect the rate of change of unfilled orders, $\triangle O$, strengthening the flow in the inventory loop. This "short circuit" possibility is shown in chart 6 by the dotted arrow connecting $\triangle H$ to $\triangle O$.

The rise in both S and $\triangle H$ induces, of course, increases in production (GNP). An expanded flow through the income-expenditure loop then follows, its effects to be traced once more, as above. The contracting economy will be characterized by a symmetrically opposite set of forces operating through the two loops.

An important consequence of the inclusion of the $\triangle O$ variable (and by implication the variable, O) in the system, providing a new channel connecting the inventory feedback loop with the income-expenditure circuit, is that this new "linkage" will magnify the rate of increase of flows during expansions, and the rate of decrease during contractions. The system will produce larger amplification of "disturbances."

EMPIRICAL TEST OF REVISED INVENTORY HYPOTHESIS

The reformulated inventory feedback hypothesis, as represented by equation (7) above, needs to be subjected to the same form of regression test against empirical data for the postwar period as employed for regressions I and II above. Quarterly data for the manufacturing sector in deflated form are used. Comments on these data made earlier in connection with regressions I and II apply here, too, and need not be reviewed.

The additional variables, lagged inventory change, $\triangle H_{t-1}$, and a linear trend variable, T, are added to equation (7), however, to provide a test for the following two aspects of inventory behavior not previously considered:

Distributed lags in response

In equation (7) above, inventory investment of the current quarter, t, is influenced solely by events of the previous quarter, $t-1$. When

quarter $t+1$ rolls around, we assert by equation (7) that the influences of occurrences in quarter $t-1$ *vanish*, and only those in quarter, t, are now relevant. But is this reasonable? Might not the values of the independent variables, of periods $t-1$, cast some lingering partial influence on inventory investment in quarter $t+1$? For example, an increase in sales, S, during the first quarter of the year may induce a decision to purchase additional materials, but if there is a long wait for delivery the effect of this sales influence may not be reflected in inventory investment until, say, the third quarter of the year.

Because of the general possibility that the influences of the independent variables are characterized by a spectrum of "delays" it would be desirable to investigate a number of "distributed lag" possibilities. This time-consuming research could not be undertaken in preparing this paper. It is possible, however, to move a substantial distance toward this desirable goal by the simple device of adding to equation (7) the term, $\triangle H_{t-1}$, as an independent variable. Since $\triangle H_{t-1}$ is a function of the other independent variables of time period, $t-2$, the effect is to bring these past influences into the regression (although unfortunately with arbitrary relative "weights").

Change in "structure"

We have observed earlier that changes in the form of business institutions, technology, and in the composition of output may be expected to influence the "parameters" of inventory relationships with which we have been dealing. Mergers of small firms into large ones, both in a horizontal and vertical sense, may reduce the amount of stocks needed in relation to sales. Improvements in transportation and communications, as well as technological advances in the methods of inventory accounting and control, will likely have the same effect. Since stock-sales ratios differ as between durables and nondurables industries, changes in the composition of aggregate demand may alter the aggregate stock-sales ratio specified in our model. Time does not permit a specific analysis of these and other tendencies which might alter inventory relationships nor the introduction of explicit variables into the regression to take them into account. But because these structural changes probably proceed over time fairly slowly and "smoothly," an allowance for their effects may be incorporated in the regression procedure by adding a linear trend variable, T, to the equation.

The regression findings

Adding the distributed lag term, $\triangle H_{t-1}$, and the time trend variable, T, to equation (7) yields the inventory feedback equation in final form for testing:

$$(8) \quad \triangle H_t = b_o + b_1 S_{t-1} + b_2 O_{t-1} + b_3 \triangle O_{t-1} - b_4 H_{t-1} + b_5 \triangle H_{t-1} + b_6 T$$

The first regression test of equation (8) was for the "full period" from 1948, first quarter, through 1960, fourth quarter, a total of 52 quarters. The results are shown as regression III in table 5. A second test was made applying the equation to the subperiod, 1952, third quarter, through 1958, fourth quarter, or 26 quarters, this period being chosen because it eliminates most of the exogenous influence of the Korean war and stops short of the 1959 steel strike.

The second set of regression results are shown as regression IV in the table.

For both tests the regressions yield coefficients for all the independent variables with the expected algebraic signs. All coefficients are approximately three times their standard errors (shown in parentheses in table 5) or over, with the exception of those in regression III for S_{t-1} and $\triangle O_{t-1}$, which are approximately twice their errors. In assessing the statistical significance of these two coefficients for regression III, two mitigating factors need to be considered. The coefficient for the same two variables expand to three times their standard errors or better when the regression is truncated to embrace only the subperiod 1952, third quarter through 1958, fourth quarter, which excludes the "disturbance" of the Korean war and the 1959 steel strike. Observe that the equation fits the data for the subperiod with extraordinary closeness, as shown by the fact that it "explains" 95 percent of the variation in inventory investment (R^2=0.955). In the second place, by bringing $\triangle H_{t-1}$ into the equation as an independent variable, the influences of S_{t-2} and $\triangle O_{t-2}$ are implicitly introduced. A more elegant treatment of distributed lags, however, might improve the relation of the coefficients of S_{t-1} and $\triangle O_{t-1}$ to their standard errors.

The coefficients for the sales variable in regressions III and IV are less than half what they were in regressions I and II. This, of course, is to be expected since the influences of changes in unfilled orders and the rate of change of unfilled orders are now recognized. Furthermore, part of the influence of sales is now picked up by $\triangle H_{t-1}$ which indirectly introduces sales lagged by two quarters.

TABLE 5.—*Coefficients and other statistical measures for regressions III and IV*

[Based on deflated quarterly data in units of $1 billion]

Regression of $\triangle H_t$ on—	Regression III, for period 1948, 1st quarter through 1960, 4th quarter (N=52)	Regression IV, for period 1952, 3d quarter through 1958, 4th quarter (N=26)
S_{t-1}	+0.040 (.020)	+0.060 (.020)
O_{t-1}	+.035 (.011)	+.038 (.010)
$\triangle O_{t-1}$	+.055 (.028)	+.061 (.018)
H_{t-1}	−.265 (.076)	−.313 (.059)
$\triangle H_{t-1}$	+.383 (.086)	+.373 (.129)
Trend, T	+.062 (.022)	+.067 (.019)
Constant	6.297	6.850
R^2	.811	.955
S	.373	.145
Durbin-Watson ratio	2.105	2.199

The variable, O (= level of unfilled orders), appears quite important in view of the size of its coefficient in relation to its standard error. The fact that backlogs in manufacturing have fallen drastically since the Korean war period, both absolutely and in relation to inventories and sales, may very well account for the "tighter" inventory policy of recent years.

To those persons who have advanced the thesis that modern computer techniques for controlling inventories have been instrumental in reducing stock-sales ratios during the past 5 years or so, the *positive* sign for the trend variable, T, may come as a shock. For manufacturing, at least, the "upward slope" of the trend indicates that inventory investment has tended to *rise*, not fall, in relation to the other variables. The large decline in backlogs, as just noted, has operated to reduce investment in stocks; but the other unspecified influences measured by the trend term have been working in the opposite direction. One possible explanation for the upward trend in inventory investment in manufacturing is that growing competitive pressures have led buyers to push off inventory holdings onto suppliers. Thus manufacturers, as suppliers to trade firms, have been forced to keep some stocks they previously were able to pass along to their customers. There is some evidence to support this explanation. Between December 1947 and December 1957, trade stocks as a percentage of combined manufacturing and trade inventories fell from 41.7 to 39.5 percent.[7] Further, trend variables I have included in similar regression equations for the trade sector (excluding dealers' auto stocks) exhibit negative coefficients.[8]

The Durbin-Watson ratio test for serial correlation in the residuals yields values of 2.105 and 2.199 for regressions III and IV, respectively, as shown in table 5. The hypothesis that the "unexplained" part of the total variance in inventory investment is distributed randomly over time is clearly supported. This result provides some assurance that the regression has not omitted a causative variable of major significance.

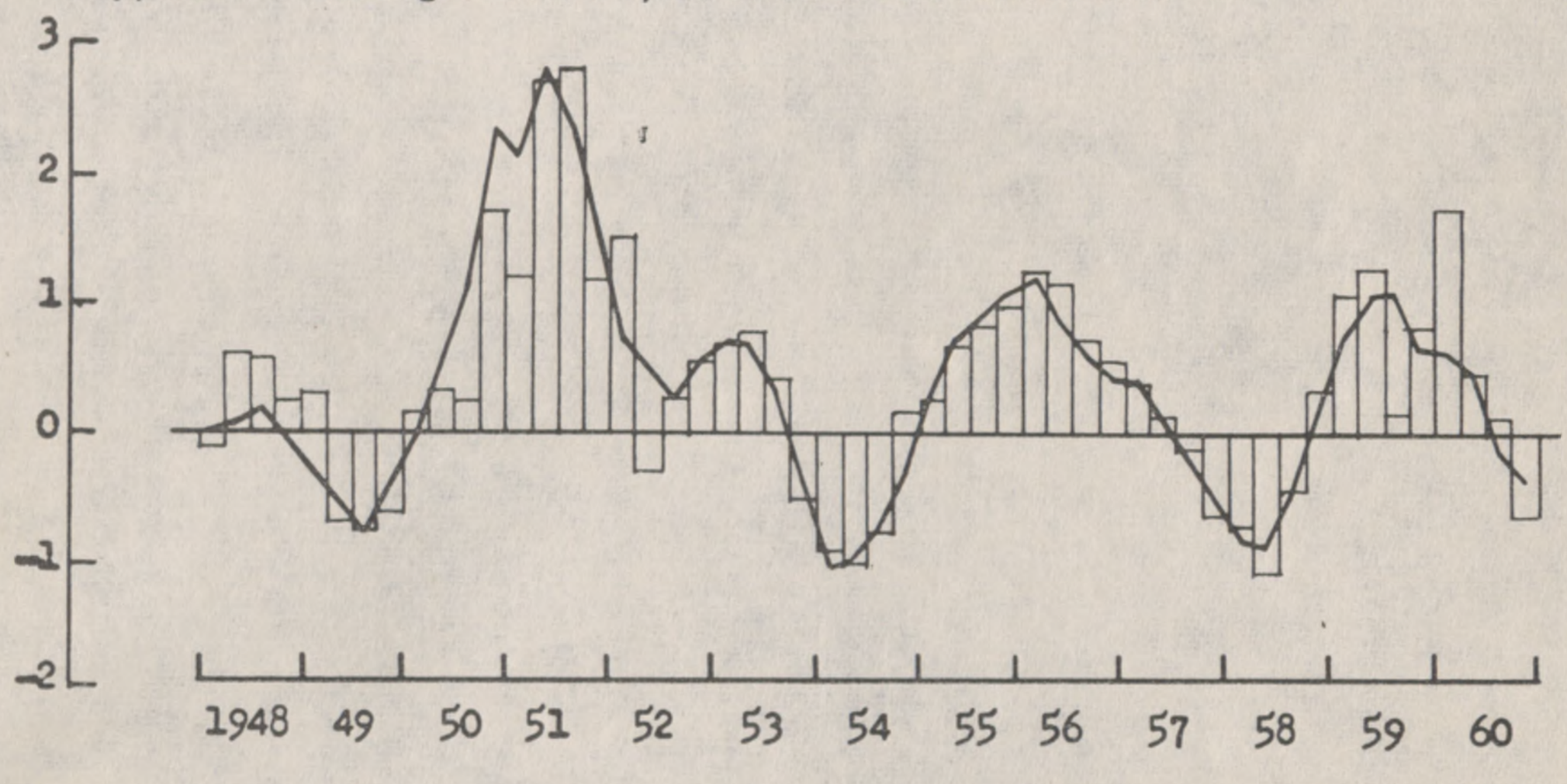
It is of interest, as a final aspect of this evaluation of the regression results, to compare quarter-by-quarter values of inventory investment computed from the regression equation to actual values. For this purpose regression IV is favored over regression III, although this is a choice principally involving only the coefficient for the sales variable; as will be seen from table 5, the other variables have coefficients for each of the two periods which are very similar in magnitude. As noted above, the period for which regression IV was fitted, 1952, third quarter, through 1958, fourth quarter, was relatively free of "disturbances" of a kind our model is not designed to handle, e.g., the impact of the Korean war and the 1959 steel strike.

Computed values from regression equation IV are shown in chart 7 as a line graph, with actual inventory investment shown in bar form. The extremely close fit between the two for 1952, third quarter, through 1958, fourth quarter, is, of course, a reflection of the very high value for R^2 of 0.955. The principal reasons for the lower R^2 for regression III which covers the full period can be seen in chart 7. The effects of the 1959 steel strike throw actual quarterly values of inventory investment considerably above computed values for the

[7] This percentage rose to 40.8 in December 1960 but shortrun cyclical factors may have been responsible.
[8] These are unpublished results which I have reported to the Social Science Research Council conference on an econometric model of the U.S. economy held at Dartmouth College, August 1961.

two quarters prior to the strike and far above computed values for the "catching up" first quarter of 1960; the actual value for the third quarter of 1959, of course, lies well below the value estimated from the equation. Then during the Korean war buildup, the equation "predicts" much more investment in stocks during 1950, third quarter, and 1951, first quarter, than actually occurred. Presumably this phenomenon is a reflection of the "scare buying" (largely out of stocks) immediately following the commencement of hostilities and the entry into the war of Red China. There is also the inordinant runup of stocks in 1952, first quarter, probably in anticipation of the nationwide steel strike which began in June, followed by liquidation during 1952, second quarter, which may be explained, in part at least, by the steel work-stoppage.[9]

CHART 7.—Actual inventory investment (bar graph) and inventory investment computed from regression IV of table 5 (line graph), all manufacturing, quarterly, 1948–I through 1960–IV, in billions of 1954 dollars.



Aside from these "disturbances," however, regression equation IV does very well in explaining the pattern of inventory change over the full period. Indeed, the line graph of computed values for the periods prior to 1952, third quarter, and subsequent to 1958, fourth quarter, may be viewed as "predictions," since the parameters of the equation were not based on these periods. Because we are concerned in this paper with the cyclical aspects of inventory behavior, it is especially heartening to observe that computed values for regression IV do not "smooth over" peaks and troughs in actual quarterly investment. For each peak and trough, the computed and actual values rise and fall with approximately equivalent amplitudes.

CONCLUSIONS REGARDING INVENTORY HYPOTHESIS

In revised form, we have proposed that inventory investment is determined by actual levels of inventories; by sales; and by the level of, and changes in, outstanding (unfilled) orders. Desired inventories respond to the influence of the last three factors named. A partial adjustment to the difference between desired and actual stocks then

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The 1952, second quarter, liquidation may also have reflected a "normal" cyclical downturn and liquidation, sharply reversed before it had run its course by the lifting of credit controls on real estate and consumer purchasing. This possibility is discussed further in pt. IV.

induces a change in inventories during the succeeding quarter. To test this hypothesis in regression form, a linear trend term was added to absorb structural changes over time and inventory change of the previous period was added to introduce a distributed lag.

Regressions III and IV provide substantial support for this hypothesis. For the full period investigated, 1948, first quarter through 1960, fourth quarter, during which a major steel strike and a major defense effort upset the economy to a considerable degree, regression III nevertheless "explains" about 81 percent of the total variance in inventory investment over the entire period. For the subperiod which excludes the two aforenamed disturbances, 1952, third quarter, through 1958, fourth quarter, regression IV explains a remarkable 95 percent of the variance. All variables possess coefficients which appear reasonable and, in relation to standard errors, probably significant.

PART III

THE INCOME-EXPENDITURE FEEDBACK

The second basic relationship characterizing the model hypothesized in part I deals with the effects of changes in production on aggregate demand for final goods and services. These effects, it is alleged, are transmitted to markets via shifts in the income stream. When, for example, production levels are rising, such incomes earned in production as wages, salaries, and profits will increase. Fiscal-saving variables, however, moderate the expansion. As gross incomes mount higher and more workers are employed, corporation and personal income tax receipts enlarge, unemployment compensation payments fall, so that disposable business and personal incomes expand by somewhat smaller increments. In turn, the expansion of disposable income induces an increase in aggregate demand for final goods and services, although saving tendencies may dampen the aggregate demand response. As shown earlier in chart 6, increased demand divides itself into two parts, the larger portion being translated into a rise in current sales with the residual taking the form of new orders for goods not currently available; i.e., an increase in outstanding (unfilled) orders. The rise both in sales and in unfilled orders induces a further expansion of aggregate production.

How realistic are these propositions?

It is the purpose of this section to identify two major channels of income-expenditure feedback and to test each of the two against empirical data. The first avenue to be examined lies entirely within the business sector and involves relationships among production, retained earnings, and expenditure for fixed capital assets. The second consists of the effects of alterations in household incomes on consumer spending.

FEEDBACK THROUGH THE BUSINESS SECTOR

One major aspect of the income-expenditure feedback is based on the association among changes in production, profits, retained earnings, and expenditure by business firms for new plant and equipment. Pretax profits, as a residual difference between sales and an assortment of costs which do not all change flexibly with output over short periods of time, will tend to rise (or fall) substantially when sales and production increase (or decrease). Business taxes on profits will, of course, reduce the amplitude of fluctuation in profits after taxes. Over the course of shortrun variations in production and profits, dividends paid to stockholders will tend to remain relatively insensitive to change. In consequence, aftertax profits retained by firms will rise and fall by relatively large amounts. We suppose, finally, that these large, shortrun fluctuations in retained earnings will be associated with rises and declines in expenditures and new orders for plant and equipment.

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It is not necessary for us to review in detail the possible *causal* connections between shifts in profits and retained earnings and shifts in demand for fixed assets. The relationship may in the short run reflect financial aspects of decisionmaking; retained earnings have become a major source of funds for fixed investment outlays [1] so that the size of fixed investment expenditure tends to be fitted to available funds. It may, on the other hand, be based, partly at least, on profit expectations which are themselves affected by shifts in currently earned profits and retained earnings. Whatever the form of these behavioral influences, we assert merely that an *association* does exist between changes in retained earnings and outlays and new orders for fixed capital assets.

If these relationships are realistically stated, they should be confirmed by observations from the manufacturing sector of the economy. Indeed, since the postwar experience of fluctuations in total GNP is known to derive largely from fluctuations in manufacturing output, testing this feedback hypothesis against data for manufacturing is obviously appropriate. Periods of contraction in manufacturing production will be examined. If the hypothesis stands up as a realistic statement of negative (declining) feedback during contractions, the opposite case of a positive feedback during expansions ought also to hold true.

The empirical record showing the actual associations among changes in manufacturing production, profits, retained earnings, and plant and equipment outlay for three postwar recessions is given in table 6. Consider first the recession beginning in the third quarter of 1948 and running to a trough in the second quarter of 1949. During this period the Federal Reserve index of manufacturing production fell from 69.2 to a low of 63.9, for a total contraction of 5.3 points. During the same interval, net profits after taxes fell from an annual rate of $9.9 billion to $7.2 billion, a decline of $2.7 billion. Dividends rose slightly, from $3.7 to $3.8 billion, an increase of $0.1 billion. Retained earnings, in consequence, contracted by $2.8 billion.[2] Associated with this sharp fall in retained earnings, we find a curtailment in plant and equipment expenditure, as shown in table 6, of $3.5 billion. Thus, the general set of relationships we have postulated is supported by the experience of 1948–49.

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[1] In shortrun analysis, depreciation recoveries may be neglected as they cannot change by very much. Shortrun changes in total net "cash flow" (retained earnings plus depreciation) will be due largely to changes in retained earnings.

[2] As noted in table 6, net profits after taxes data for the 1948–49 contraction (and hence the residual, retained earnings) are for firms with assets over $5 million only. The decline in profits and retained earnings for all manufacturing firms would, of course, be somewhat larger.

TABLE 6.—*Changes in manufacturers' profits after taxes, retained earnings, and expenditures for plant and equipment, during 3 postwar contractions*

[Dollar data at annual rates in billions of current dollars]

	Change from—		
	1948, 3d quarter, to 1949, 2d quarter	1953, 2d quarter, to 1954, 1st quarter	1957, 3d quarter, to 1958, 1st quarter
1. Quarterly average, FRB Index of Manufacturers Production (1957=100), seasonally adjusted.	69.2 to 63.9=−5.3	94.1 to 85.0=−9.1	101.1 to 88.9=−12.2.
2. Net profit after taxes [1]	9.9 to 7.2=−2.7	12.1 to 10.4=−1.7	14.9 to 9.9=−5.0.
3. Dividends [2]	3.7 to 3.8=+0.1	5.6 to 5.8=+0.2	7.6 to 7.4=−0.2.
4. Retained earnings	6.2 to 3.4=−2.8	6.5 to 4.6=−1.9	7.3 to 2.5=−4.8.
	Change from—		
	1948, 4th quarter, to 1950, 1st quarter	1953, 3d quarter, to 1954, 4th quarter	1957, 4th quarter, to 1958, 4th quarter
5. Plant and equipment expenditure. [3]	9.3 to 5.8=−3.5	11.9 to 10.6=−1.3	15.3 to 10.6=−4.7.

[1] FTC–SEC data, not adjusted for seasonal variation. For 1948–49, data cover firms with assets over $5,000,000 only.
[2] FTC–SEC data, adjusted by author for seasonal variation.
[3] Department of Commerce data: Seasonally adjusted for 1953–54 and 1957–58; unadjusted for 1948–49 recession.

Lest the reader puts too much emphasis on the exact dollar magnitudes in table 6, several comments on these tabulations should be made. The figures in rows 2, 3, and 4 in the table are nearly comparable but not precisely so. Data for net profits after taxes are not seasonally adjusted. (To what extent business management makes "mental allowances" for seasonality in profits is not known.) The dividend data are adjusted for seasonal variation. As is well known, aggregate dividend payments are highly seasonal in fluctuation due mainly to "extras" near the end and beginning of each year. The presentation of seasonally adjusted dividend data in table 6 seems reasonable since management must make allowances for this seasonal pattern in reaching decisions based on the availability of retained earnings. Finally, it needs to be pointed out that there is likely to exist a fairly complicated distributed lag relationship between fluctuations in retained earnings and fixed investment expenditure. The decisionmaking and the technological-planning processes with regard to purchases of plant and equipment and to curtailment or postponement of previously approved plans are both likely to be time consuming. If the availability of retained earnings is a factor bearing on such decisions, we must expect a lag from the time when retained earnings decline to the time when expenditure curtailments actually appear. Further, the lag interposed before a decline in expenditure may be shorter than the lag interposed between a decision to increase expenditure and the actual rise in outlays. This would be the case if, as does not seem unreasonable, decisions to curtail or postpone investment can be made more quickly than decisions to start up again on an investment project, since in the latter case a new time-consuming

review of investment alternatives is likely to be undertaken. This variable lag pattern has been assumed in table 6. As will be observed, the decline in plant and equipment expenditure is measured from *one quarter* after the beginning quarter for the measurement of the decline in retained earnings to *three quarters* after the end of the period of the retained earnings decline.[3]

For the moment, we turn next to the 1957–58 contraction shown in table 6. The same general pattern that we have described for 1948, third quarter, through 1949, second quarter, characterizes the contraction which runs from 1957, third quarter, to 1958, first quarter. The decline in the Federal Reserve index of manufacturing production was more severe, 12.2 points as compared with 5.3 for the earlier recession. The associated decline in profits after taxes amounted to $5 billion. Again the feedback hypothesis finds confirmation. The decrease in plant and equipment expenditure of $4.7 billion, as shown in table 6, is of the same general order of magnitude as the decline in retained earnings.

The contraction of 1953, second quarter, through 1954, first quarter, was accompanied by a revision of the corporate tax on profits which makes it somewhat a special case. The change in production of minus 9.1 points was about midway between the magnitudes of the production declines during the 1948–49 and the 1957–58 contractions. But because the 1954 Revenue Code eliminated the tax on excess profits, effective January 1, 1954, the shrinkage in net profits after taxes was unusually small, $1.7 billion, as seen from table 6. The slight dividend increase of plus $0.2 billion means that retained earnings fell by $1.9 billion. Of major interest as a test of the income-expenditure hypothesis is the fact that a decline in outlays for plant and equipment did occur, amounting to $1.3 billion.

In summary, during all three postwar contractions, production curtailments in the manufacturing sector were associated with substantial declines in profits, retained earnings, and outlays for plant and equipment. The production-income-demand relationship posited by the model is found to be present in this sector of the economy.

FEEDBACK THROUGH THE HOUSEHOLD SECTOR

As a second major possibility for a feedback connecting declines in production with declines in demand for final output, the channel of potential influence which runs from production through personal income to consumption expenditure needs examination. When production falls a decline in personal income should occur, though substantially modified by increases in transfer payments and decreases in personal taxes, so that disposable incomes will tend not to fall as far as gross personal income. The loss in disposable personal income should be reflected in a decrease in consumer expenditure; however, since there has been during the postwar period a very strong upward trend in expenditures for *services*, the feedback through this channel, if it exists, would most likely manifest itself as a decline in expenditures for *goods* components of GNP.

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[3] Some of these lag problems would be avoided by tracing the association between contracting retained earnings and the decline in *new orders* for plant and equipment. Unfortunately, separate data for new orders issued by manufacturers for fixed investment items are not collected. However, see below, pt. IV, table 10, and associated text material which deals with certain aspects of new orders for machinery.

Are these expectations supported by empirical observation?

In table 7 are shown data which indicate the strength of this feedback as it stems from the manufacturing sector of the economy. From 1948, third quarter, to 1949, second quarter, the period of business contraction dealt with in table 6, wage and salary incomes from manufacturing fell from $47.4 billion to $44 billion, or a net decline in this income component of $3.4 billion, these figures at annual rates. Perhaps surprisingly (because of the known effects of transfer payments and personal taxes) disposable personal income fell by $4.5 billion during the period. This large fall in disposable personal income relative to the loss of wage and salary payments for manufacturing is attributable, however, to an unusually large fall in farm income during the period. Although postwar shortages made consumers reluctant to reduce their expenditures in the face of this loss of $4.5 billion in disposable income, a considerable portion of which derives from the loss of wage and salary income from manufacturing, goods purchases were curtailed by $1 billion as shown in the last row of table 7.

TABLE 7.—*Changes in wage and salary income from manufacturing, disposable personal income, and consumption expenditure for goods during 3 postwar contractions*

[Based on seasonally adjusted quarterly data at annual rates in billions of current dollars]

	Change from—		
	1948, 3d quarter to 1949, 2d quarter	1953, 2d quarter to 1954, 1st quarter	1957, 3d quarter to 1958, 1st quarter
1. Wage and salary income from manufacturing.	47.4 to 44.0=−3.4	70.9 to 66.7=−4.2	81.1 to 75.8=−5.3.
2. Disposable personal income.	194.7 to 190.2=−4.5	252.8 to 254.6=+1.8	312.7 to 311.4=−1.3.
3. Consumption expenditure for goods.	122.6 to 121.6=−1.0	152.0 to 149.1=−2.9	180.6 to 176.0=−4.6.

Source: Department of Commerce.

The two periods, 1953, second quarter, to 1954, first quarter, and 1957, third quarter, to 1958, first quarter, may now be compared to the first recession. It will be observed from table 7 that the shrinkages in wage and salary income from manufacturing in the latter two periods were larger as compared with the 1948–49 recession, falling by $4.2 and $5.3 billion, respectively. On the other hand, disposable personal income in both cases held up strongly. In the 1953–54 recession it actually rose, primarily due to reduced rates of personal income taxation which became effective January 1, 1954. During the 1957–58 contraction, on the other hand, disposable income fell by $1.3 billion. In spite of the stabilizing affects of transfer payments and personal income taxes on disposable personal income, however, the loss in wage and salary income from manufacturing "fed through" to induce a substantial fall in consumer expenditure for goods. As table 7 shows, expenditure for goods fell by $2.9 billion during the 1953–54 contraction, and by $4.6 billion during the 1957–58 recession. Although it is true that the household sector of the economy was able to maintain an upward trend in the buying of services, the fact re-

mains that goods purchases appear to have been strongly affected by the loss of personal income from manufacturing.

Running one's eyes along the last row of table 6 shows that the shrinkage in consumer expenditure for goods has become progressively more severe during successive recessions, more than in proportion to the increasingly larger declines in wage and salary income from manufacturing.

From the foregoing examination of experience during three postwar recessions, the conclusion seems justified that an income-expenditure feedback channel through the household sector does exist. Indeed, although household shortages following World War II induced consumers strongly to resist expenditure curtailments during the 1948–49 contraction in disposable incomes, evidence exists that with these shortages now substantially overcome, the income-expenditure feedback through the household sector is likely to operate more vigorously.

OTHER FEEDBACK CHANNELS

In addition to the two just examined, other income-expenditure feedback channels might profitably be studied. Declines in expenditure for imports when domestic production falls may lead to a significant decline in expenditures by foreigners for our exports. Another case is the effect of a decline in wage and salary income on household purchases of recently constructed houses not previously occupied. Nonfarm residential mortgage loans show significant declines during the postwar recessions. The presumption here is that, in part at least, household purchases of recently built houses not previously occupied did decline in consequence of decreases in personal income during periods of business contraction. The effect of this on the construction component on GNP expenditure would be somewhat difficult to trace. Many of such purchases are from speculative builders who build in large volume and, in effect, sell to households out of their "inventory" of finished homes. A downward shift in consumer purchases of these houses may, indeed, affect the speculative builders' subsequent pattern of housing starts. But the time period involved in planning, financing, and constructing large speculative developments may impose a long lag between a fall-off in household purchases of new homes and a curtailment of speculative builders' subsequent plans for new construction.

SUMMARY OF INCOME-EXPENDITURE FINDINGS AND CONCLUSIONS

In this section we have tested empirically the proposition that changes in aggregate production induce changes in aggregate incomes and demand for final goods, thereby helping to determine the level of production in the succeeding period.

Experience during three postwar recessions was examined. It was found, first, that declines in manufacturers' production levels were accompanied by substantial reductions in their profits after taxes, in retained earnings, and, after a variable lag, in outlays for plant and equipment. The curtailments in expenditure, in fact, were of the same order of magnitude as the reductions in retained earnings. Although this feedback may channel itself through other sectors of the business community, the examination of the manufacturing case

is the critical one because the major part of the postwar fluctuations in GNP have been accounted for by changes in manufacturing output.

As a second empirical test, data for personal income and expenditure during three postwar business contractions were inspected. It was found generally true that declines in personal incomes derived from the manufacturing sector were associated with reductions in consumer expenditure for goods, and that for the three successive periods of recession the reduction in goods purchases had become progressively larger per dollar of decline in wage and salary income.

The proposition that the U.S. economy is characterized by an income-expenditure feedback is, therefore, clearly supported by the empirical record of the postwar period. The influence of this feedback on aggregate demand during the postwar period appears to have been of substantial magnitude.

PART IV

SYSTEMATIC INSTABILITY AND CYCLES

In parts II and III of this paper experience during the postwar period was examined and found to provide substantial support for the feedback propositions which from the basic elements of the model hypothesized in part I. Judged by behavior in the important manufacturing sector of the economy, changes in aggregate demand for final goods and services, reflecting themselves in changes in sales and unfilled orders, feedback on production through an inventory loop, affecting initially desired levels of stocks and then, after a short lag, the demand for output for inventory investment. Changes in the level of production, in turn, feedback on aggregate demand for final output by inducing changes in incomes and consequent changes in expenditure and the placing of new orders, though this final response will be modified by automatic shifts in government receipts and expenditures and in household and business saving.

Empirical testing of the model may be carried one step further. If we can establish a strong likelihood that a system containing two feedback loops as described will tend to be unstable and produce wavelike oscillations in production, and if we then find this wavelike movement in the empirical record, additional confidence in the truthfulness of the model will be established.

Still more confidence will be generated if we were also to find empirical confirmation for the proposition that over the course of a cycle in production inventory investment will reach its cyclical maximum and turndown prior to, or no later than, the peak in aggregate sales, and will rise from its cyclical trough prior to, or no later than, the trough in sales.[1] If this pattern is found in the actual data, support will be given for the model's explanation that inventory investment fluctuations, not some other unidentified factor x, provide the cyclical force which turns an expansion into a contraction and a contraction into an expansion.

OSCILLATORY CONDITIONS

What is the likelihood that a feedback system such as described in part I will be unstable in the sense that cycles in production, sales, and inventory investment will be produced? Is this a system which, once disturbed by an autonomous force (e.g. a shift in defense expenditure), will *not* return smoothly to a new equilibrium position but rather will overshoot an accommodation to the disturbance, then reverse its direction and overshoot in its movement toward an equilibrium, then reverse again, and so on?

[1] The qualifications "no later than" is specified because quarterly data will be employed in testing this proposition. A very short lead of inventory investment might show up as being coincidental in quarterly data.

The question raised is a complex one.[2] But what is, I believe, a reasonably approximate analysis of the cyclical possibility may be set out as follows. Suppose the economy is disturbed by an expansionary force, say an autonomous increase in the annual rate of spending by consumers. Production will rise in response to the increase in demand for final goods. The inventory feedback will induce production also for inventory accumulation and, helped by income-expenditure feedbacks, a cumulative expansion is set in motion as earlier described. Any factor which then intervenes to slow down the rate of increase of final demand will, by its influence passing through the inventory loop, *reduce* the amount of production needed for inventory accumulation. Such a factor is present: the combined fiscal-saving effect which "saps" the expansion of demand deriving from rising incomes. Thus, the rate of rise in final demand must eventually taper off.[3] The demand for production for inventory must decline accordingly. The picture that is now posed is one in which production for final sales is *rising*, but this rise is slowing down, combined with production for inventory which is *declining*. Is it not possible for these two divergencies in production precisely to offset themselves, leaving the economic system in a balanced position on a new equilibrium trend line?

A precise offsetting is possible. But intuition will suggest that this outcome would be fortuitous; in other words, that a very special set of reaction coefficients and lags would be needed to yield this "solution." The system contains no control mechanism to enforce such an outcome on the "variables" (i.e., on the behavior of firms, consumers, the government). A hairsbreadth departure from the special set of conditions would push the economy over the precipice. If the *decline* in production for inventory exceeds the *rise* in production for final sales, total production then must fall, and a cumulative contraction is begun. For symmetrically opposite reasons, a *lower* turning point is an extremely likely outcome of a downward movement of the economy. Thus, oscillatory behavior for the system would appear to be almost inevitable.[4]

The great likelihood that inventory investment during a phase of economic expansion will eventually decline faster than the rise in pro-

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[2] The dynamic properties of this double-loop system depend on the coefficients of reaction and the lags along each loop. Regressions III and IV above (see table 5) yield what I believe to be fairly reliable estimates of the coefficients and lags along the inventory feedback loop for the manufacturing sector of the economy, but I have not gone much beyond this in quantitative analysis. I have reported on some results of research on trade inventories to the July 1961, conference on an econometric model for the United States at Dartmouth College sponsored by the Social Science Research Council under a grant from the National Science Foundation, but more work is needed in this area. An important piece of research would remain: securing estimates of coefficients and lags for income-expenditure feedback channels, and then making an analysis of the dynamic properties of the system. Were all these steps now completed, the text discussion which follows could run in terms of logical implication rather than likelihoods. However, it is important to observe that other researchers, using econometric models which include equations tracing income-expenditure feedbacks and equations describing the determinants of inventory investment not unlike the regression equations of this paper, have published findings which show that these two feedback loops do indeed imply oscillatory behavior; i.e., that the phenomenon of inventory cycles is real. See James S. Duesenberry, Otto Eckstein, and Gary Fromm, "A Simulation of the U.S. Economy in Recession," Econometrica, vol. 28 (October 1960), especially experiment IV and table V, pp. 763–764; also, Lawrence R. Klein and Joel Popkin, "An Econometric Analysis of the Postwar Relationship Between Inventory Fluctuations and Changes in Aggregate Economic Activity," a paper prepared for the Joint Economic Committee and published in the present volume.

[3] This tacitly assumes that coefficients of feedback reaction do not lie in a set which implies an explosive expansion.

[4] Whether these cycles are continuously self-perpetuating, whether they will be damped cycles, or whether they tend toward larger and larger amplitudes (perhaps limited in reality by "ceiling" and "floor" constraints which have not been built into our model), are matters outside the scope of this discussion. As mentioned earlier, full information regarding all coefficients and lags along each loop in the system would be required to determine the form of oscillation. The effect of "constraints" or "propulsions" imposed on the system by such factors as changes in prices and interest rates, productive capacity, population, and labor force, would require the building of a more comprehensive model.

duction for final sales, and thus turn an expansionary phase into a contraction, rests largely on what we have learned about the form of the inventory loop from fitting regressions III and IV to postwar data. (See table 5 above.) The coefficients for the inventory feedback mechanism estimated from these regressions indicate that during the initial stages of a period of increasing final demand business firms accumulate inventories "too fast," i.e., by increments which, if continued through to later stages of the expansion when the rate of increase in final demand has been brought down to a less buoyant pace by the action of fiscal and saving effects and when market supply conditions have become more orderly by expansion of capacity and elimination of "bottlenecks" and other short-run inelasticities, would carry stocks to a level in excess of what would then be desired. Accordingly, this "too fast" rate of accumulation during early stages of the expansion must, during late stages, be corrected for by a "too slow" rate of investment, or perhaps even a liquidation of stocks. Consider these aspects of the inventory investment equation estimated as regression IV in part II of the present paper:

1. The regression equation indicates a lag of at least one quarter of a year between the decision to alter inventories and the actual change in stocks (the coefficient for the $\triangle H_{t-1}$ variable, introduced to test for a distributed lag, suggests that the average lag actually exceeds one quarter). Part of this interval is attributable to difficulties or costs involved in altering production levels promptly when a change occurs in the flow of new orders. Thus, during the very early period of a business expansion, the rise in demand is met by selling out of stocks. This creates an initial inventory deficiency which will induce during subsequent periods an extra amount of production for inventory to "make up" the initial deficiency. The production lag will also tend to cause inventory investment to "overshoot" somewhat at the topside of the cycle, leading to an initial surplus at the very beginning of a downturn which requires liquidation during subsequent periods.

2. The rise in the rate of inventory investment during the early and middle stages of a business expansion is explained in part by an increasing rate of accumulation of buffer stocks as supply conditions deteriorate in markets for intermediate durables produced to order. But these conditions tend to become more stable at a later stage and the rate of accumulation of buffer stocks then declines, contributing to a downturn in economic activity. The evidence for this phenomena is the pattern of fluctuation in the rate of change in unfilled orders. (See chart 5 above.) As explained in greater detail in part II above, a maximum degree of uncertainty will characterize the leadtime estimates of purchasers of intermediate durables, and their desire for protective buffer stocks will therefore be most intense, when the rate of accumulation of backlogs, $\triangle O$, reaches its peak. Buffer stock accumulation rises and falls with increases and decreases in $\triangle O$. That the strength of this influence is substantial is demonstrated by the finding (from regression IV of pt. II) that each $1 billion increase in $\triangle O$ raises desired stock levels by $195 million.[5] The waning influence on buffer stock accumulation of changes in backlogs during the later

[5] The regression IV coefficient for $\triangle O$ is 0.061. By comparing equations (6) and (7) of pt. II, it will be seen that this coefficient needs to be divided by the coefficient of H_{t-1} to secure the coefficient, r_2, which measures the effect of changes in $\triangle O$ on desired inventories. Thus: $0.061 \div 0.313 = 0.195$.

stages of postwar business expansions is shown by these data for manufacturing: [6]

Expansion ending in recession of—	Quarter of peak $\triangle O$	Quarter of peak production
1953–54	1952, 2d quarter	1953, 2d quarter.
1957–58	1956, 3d quarter	1957, 1st quarter.
1960–61	1959, 3d quarter	1960, 1st quarter.

It will be observed that during each of these phases rising unfilled orders produced its maximum influence on inventory investment (i.e., $\triangle O$ at its peak) well before the end of the expansion (as measured by the quarter of peak production). During the boomlet of 1952–53 (which followed the huge accumulation of backlogs in the first year of the Korean war period), the maximum rate of increase in backlogs occurred in 1952, second quarter, a full year before the peak in manufacturing production. From 1952, second quarter, onward, in other words, the influence represented by $\triangle O$ operated in the direction of *reduced* inventory investment. A similar situation prevailed during the later phases of the second and third expansions, although the period from the peak rate of increase in backlogs to the quarter of peak production was shorter.

3. In production-to-order industries pipelines need to be "stocked up" during the early phases of expansions, as new orders begin to exceed sales and backlogs rise. The rate of investment in pipeline stocks which characterizes the early and middle stages of the expansion cannot be maintained, however, since capacity limitations are eventually reached. It is true, of course, that the enlargement of capacity will provide opportunities to fill "new" pipelines but the rate of this investment is likely to be much more restrained than the rate of accumulation at earlier stages of the rise in business activity. Thus the rate of investment in pipeline stocks will eventually fall, contributing to a decline in aggregate production.

In short, there are good reasons for expecting desired levels of stocks to rise faster during early and middle stages of expansions than is warranted by the pattern of change over time in the flow of purchase orders which actually is realized. Accordingly a shift to a slower rate of investment in stocks must eventually be made. This readjustment pulls down the rate of production for inventory by more than the rate of production for sale is rising, and the upper turning point of the systematic oscillation is at hand. A symmetrically opposite analysis would explain the forces which operate to produce the lower turning point of the cycle.

What the empirical record shows

If the foregoing analysis is true, we should expect to find at least the following two patterns in the empirical record for the postwar

[6] Based on quarterly change in unfilled orders for manufacturing deflated to 1954 dollars. (For plot of time series of this data see chart 5 above.) The period of extremely large increases in backlogs associated with the first year of the Korean war is excluded in identifying the peak in $\triangle O$ for the cyclical expansion which led into the 1953–54 recession. See further discussion of the "boomlet" of 1952 in text below under caption "The Inventory Investment Peak Preceding the 1953–54 Recession." The quarter of peak $\triangle O$ during the expansion leading up to the 1957–58 recession is identified as lying in 1956, 3d quarter, when $\triangle O$ was plus $3,580,000,000. Although the figure for 1956, 1st quarter, was $4,580,000,000 this is discounted as a peak because anticipations of the 1956 steel strike are likely to have induced a substantial part of this excess of new orders over sales. For the same reason (anticipations of a steel strike) the peak for $\triangle O$ during the next period of expansion is placed in 1959, 3d quarter, although a slightly higher figure occurred in 1959, 2d quarter.

period: (a) "wavelike" or cyclical movements in production, sales, and inventory investment, and (b) a tendency for peaks and troughs in inventory investment to lead, or at least not follow, peaks and troughs in sales.[7] What does the record show?

In order to focus down on those sectors of the economy where inventory holdings and fluctuations are most important and to abstract as much as possible from the growth trend of economic activity (around which the cycles we are looking for would tend to fluctuate) chart 8 presents in the upper panel GNP "final sales" *less services and construction*. The subtraction is made for two reasons: only very small inventories are held in the service and construction sectors;[8] aggregate sales in these two sectors during the postwar period, in the second place, have not fluctuated very much in the short run. their relatively smooth upward trend indicating the influence of powerful growth factors (rising population and urbanization being perhaps the major ones). Final sales for the sectors that remain after subtracting services and construction represented 53 percent of total final sales at the middle of 1960.

Net change (investment) in nonfarm inventories is shown in the lower panel of chart 8. Both final sales and inventory change are presented in deflated 1954 dollars in order to remove the influence of price changes which might obscure turning points in "real" values. Peaks and troughs in final sales are identified by vertical lines running through the midpoints of the quarters.

The cyclical pattern

The "wavelike" oscillatory pattern which our model led us to expect is, indeed, present in the aggregate data plotted in chart 8. Abstracting from the growth trend that still remains after subtracting services and construction, cycles in final sales are clearly evident. Cyclical peaks in final sales appear in 1949, second quarter; 1953, second quarter; 1957, first quarter; and 1960, second quarter, with intervals between of 15, 14, and 12 quarters, successively. Troughs in final sales appear in 1950, first quarter; 1954, second quarter; and 1958, second quarter.

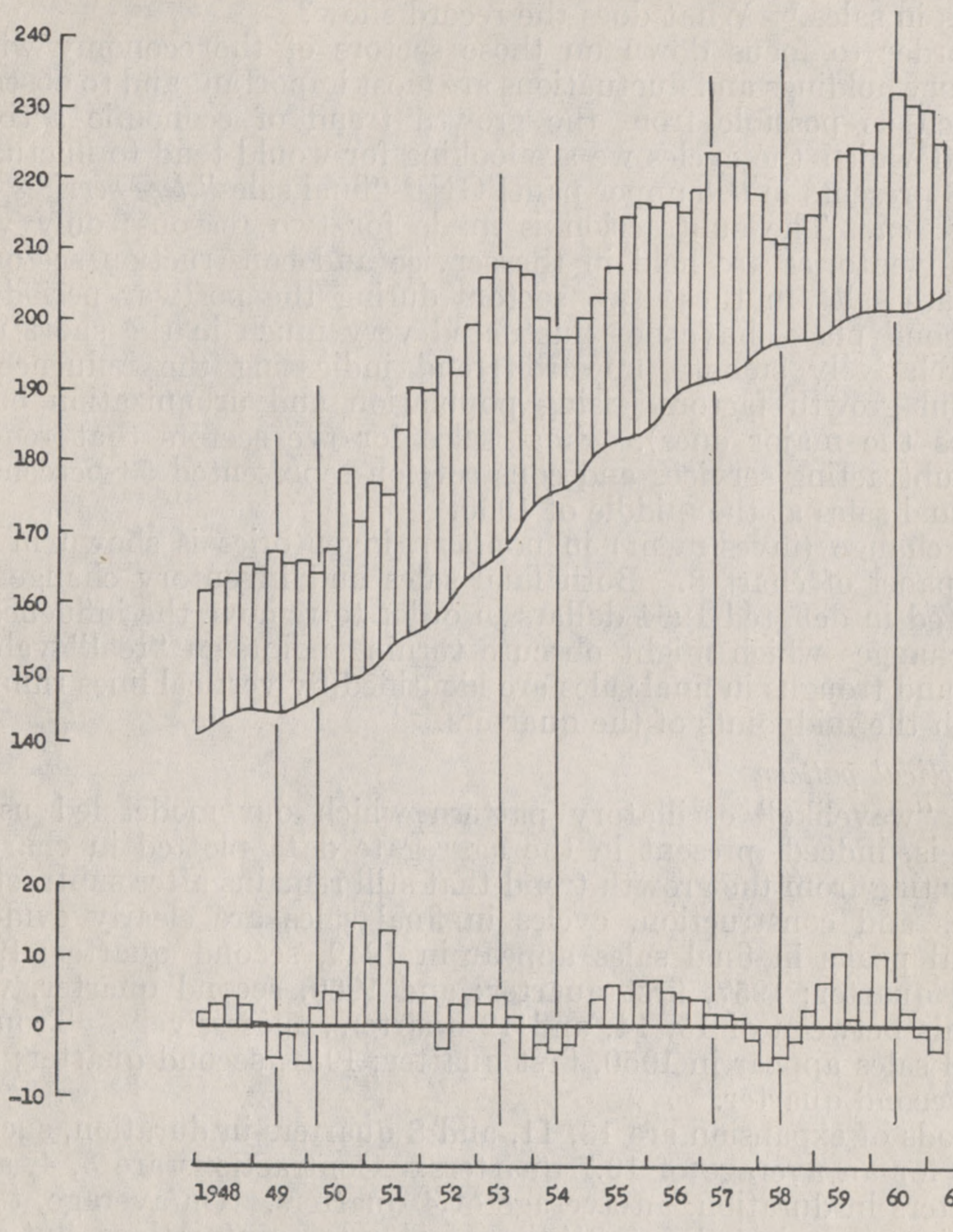
Periods of expansion are 13, 11, and 8 quarters in duration, successively, for an average of 10.7 quarters. Contractions are 3, 4, and, 5 quarters in duration, an average of 4 quarters. On average, then, expansions have lasted over 2½ times as long as contractions, but over the period of the data expansions seem to be growing shorter and contractions longer. The former characteristic is, of course, to be associated with the growth trend in the data, while the shortening of periods of expansion and lengthening of contractive phases is related to the evident decline in the rate of growth. Our model contains no features for explaining the rate of growth and its change; an analysis of this matter, important though it is, lies outside the domain of this paper.

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[7] The model incorporates only two feedback loops, one for the inventory reaction, the second tracing the income-expenditure feedback. But suppose a third loop operates in the "real world" and is primarily responsible for oscillations? If we find such oscillations in empirical data, we may erroneously ascribe them to the cyclical characteristics of our model and call them "inventory cycles" when they really are something else. To guard against this error, what seems to me the most likely "third loop" possibility, i.e., the "accelerator" aspect of producers' durable equipment expenditure, is considered below.

[8] Lawrence Grose, "New Distribution of National Output," Survey of Current Business, June 1957, p. 4.

CHART 8.—GNP final sales (excluding services and construction) in upper panel; net change in nonfarm inventories in lower panel; seasonally adjusted quarterly data at annual rate in billions of constant 1954 dollars, 1948–I through 1961–I.



The expected wavelike movement in inventory investment is also evident in chart 8, lending additional support to the thesis that we are dealing with an "unstable system" in the sense that it generates cycles. There are, however, some aberrations in the cyclical pattern of inventory change. Notice the "gap" in the 1949 recession liquidation; the rather peculiar pattern of accumulation during the Korean war period (major peaks in 1950, fourth quarter, and 1951, second quarter; liquidation for a single quarter in 1952, followed by a second, lower, peak in 1952, fourth quarter); and, then, finally, the substantial gap in inventory accumulation in 1959. These aberrations can reasonably be attributed to "autonomous" factors which will be discussed in greater detail below: the severe coal strike of 1949; the lifting of consumer and real-estate credit controls in 1952; and the great steel strike of 1959, respectively.

Although one form of empirical test for cyclical movement in inventory investment is to examine, as we have just done, the data

for *actual* inventory accumulation and liquidation, labor stoppages, government controls, and other exogenous events, may obscure somewhat the underlying oscillation. Another form of test is to investigate this underlying cyclical pattern by measuring the fluctuations in "pressures" that occur within the inventory feedback loop. The reader will recall from the feedback diagram of chart 6, that changes in sales and unfilled orders and in the rate-of-change in unfilled orders induce changes in desired inventory levels, H^*, and that divergencies between desired stocks, H^*, and actual stocks, H, induce changes in inventory positions after a short lag. This difference, (H^*-H), represents the pressure of demand for inventory accumulation (or liquidation). Consequently, the difference, (H^*-H), ought to exhibit an oscillatory pattern, and one which is relatively free of the exogenous forces which often "disturb" the pattern of actual investment in inventories. We may measure the postwar fluctuations in (H^*-H) in the following way. As noted, actual inventory investment of a given quarter is a lagged partial response to (H^*-H), or to repeat equation (2) of part II:

$$(2) \qquad \triangle H_t = c(H^*-H)_{t-1}$$

A specific function of the general form of equation (2) has been fitted to postwar data in an earlier section of the paper. We shall use regression IV (see table 5 of pt. II) as this fitted function, namely:

$$(9) \quad \triangle H_t = .060S_{t-1} + .038O_{t-1} + .061\triangle O_{t-1} + .373\triangle H_{t-1} + .067T + 6.850 - .313H_{t-1}$$

It will be seen from this equation that the coefficient of H_{t-1}, or .313, is the speed-of-adjustment coefficient, c, in equation (2). The right-hand side of equation (9) is therefore divided through by .313, and this coefficient placed outside brackets, as follows:

$$(10) \quad \triangle H_t = .313[(.192S_{t-1} + .120O_{t-1} + .195\triangle O_{t-1} + 1.192\triangle H_{t-1} + .213T + 21.884) - H_{t-1}]$$

Comparison of equations (10) and (2) shows that the six terms within the parentheses measure H^*, the desired levels of stocks: [9]

[9] The inclusion of the independent variable, ΔH_{t-1}, as a determinant of H^* requires a comment. As explained in pt. II, this term is added to the regression equation in order to introduce the "left-over" effects of $t-2$ values of the other independent variables, i.e. to achieve an approximation to a distributed lag scheme. This may be interpreted to mean that equation (2) above should be adjusted to take the form: $\Delta H_t = c(H^*-H)_{t-1} + c_1\Delta H_{t-1}$. Now the adjustment decided upon at time, $t-1$, has to recognize the fact that the "left-over" effect is going to impinge on the inventory position during time period, t; in other words, this decision determines only the "non-left-over" component of the inventory investment during period, t:

$$(A) \qquad \Delta H_t - c_1\Delta H_{t-1} = c(H^*-H)_{t-1}$$

From this point of view, then, the desired inventory position, equation (11) above, ought to exclude the ΔH_{t-1} term. On the other hand, the "desired" level of inventory may be taken to mean the target level being aimed at *both* by decisions being currently taken *and* by the "left-over" effects of decisions made earlier. This is equivalent to transposing $c_1\Delta H_{t-1}$ in equation (A) above to the right-hand side and bringing it into the parentheses, which yields:

$$(B) \qquad \Delta H_t = c\left(H^*_{t-1} + \frac{c_1}{c}\Delta H_{t-1} - H_{t-1}\right)$$

where "desired stocks" under this interpretation are measured by the first two terms in the parentheses of equation (B). This is the procedure followed in equation (11) above and in computing the data for table 8 and chart 9.

$$(11)\quad H^*_{t-1}=.192S_{t-1}+.120O_{t-1}+.195\triangle O_{t-1}+1.192\triangle H_{t-1}+.213T+21.884$$

Actual quarterly values for the independent variables are substituted into equation (11) to yield the estimates of desired stocks, H^*, which are shown in table 8. In the second column are tabulated the actual levels of inventories, H, with the differences, (H^*-H), shown in the third column. We call these differences, inventory *deficiencies* when H^* exceeds H (the positive figures in the third column of table 8), and inventory *surpluses*, when H^* is less than H (negative figures).

These inventory deficiencies and surpluses are also shown in graphic form in chart 9. The oscillatory pattern which was clouded somewhat when presented in the form of actual inventory investment in chart 8, now appears in "purer" form. Except for the large bulge and minor peak of the Korean war period, to be explained below, the pattern very strongly indicates that a cyclical force is in operation within the economic system.

TABLE 8.—*Manufacturers' inventory deficiencies and surpluses, 1948–I through 1960–III*

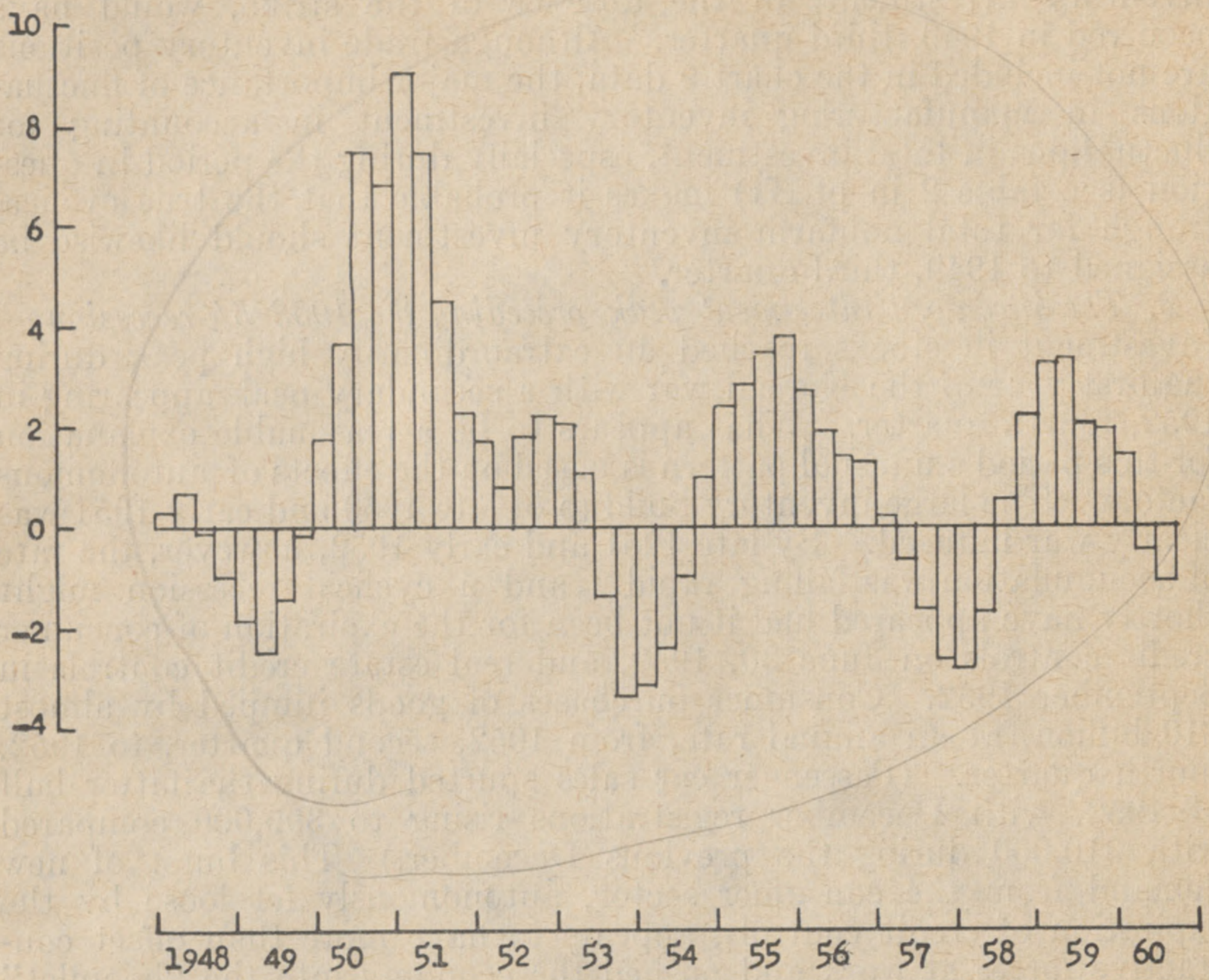
[In billions of 1954 dollars]

Period	Desired (H*)	Actual (H)	Deficiency (+) or surplus (−)	Period	Desired (H*)	Actual (H)	Deficiency (+) or surplus (−)
1948:							
1st quarter	$36.77	$36.55	$0.22	3d quarter	45.64	46.63	−.99
2d quarter	37.73	37.13	.60	4th quarter	47.76	46.78	.98
3d quarter	37.54	37.68	−.14	1955:			
4th quarter	36.90	37.88	−.98	1st quarter	49.36	47.00	2.36
1949:				2d quarter	50.41	47.63	2.78
1st quarter	36.31	38.18	−1.87	3d quarter	51.88	48.43	3.45
2d quarter	34.93	37.43	−2.50	4th quarter	53.12	49.35	3.77
3d quarter	35.18	36.65	−1.47	1956:			
4th quarter	35.87	36.00	−.13	1st quarter	53.19	50.55	2.64
1950:				2d quarter	53.58	51.70	1.88
1st quarter	37.84	36.15	1.69	3d quarter	53.70	52.38	1.32
2d quarter	40.05	36.45	3.60	4th quarter	54.19	52.93	1.26
3d quarter	44.15	36.68	7.47	1957:			
4th quarter	45.07	38.38	6.69	1st quarter	53.41	53.28	.13
1951:				2d quarter	52.69	53.38	−.69
1st quarter	48.50	39.55	8.95	3d quarter	51.65	53.25	−1.60
2d quarter	49.69	42.25	7.44	4th quarter	49.98	52.60	−2.62
3d quarter	49.48	45.05	4.43	1958:			
4th quarter	48.45	46.20	2.25	1st quarter	49.09	51.88	−2.79
1952:				2d quarter	49.08	50.75	−1.67
1st quarter	49.37	47.70	1.67	3d quarter	50.85	50.30	.55
2d quarter	48.12	47.38	.74	4th quarter	52.86	50.60	2.26
3d quarter	49.37	47.60	1.77	1959:			
4th quarter	50.26	48.13	2.13	1st quarter	54.92	51.65	3.27
1953:				2d quarter	56.20	52.90	3.30
1st quarter	50.81	48.78	2.03	3d quarter	55.01	53.03	1.98
2d quarter	50.58	49.53	1.05	4th quarter	55.78	53.83	1.95
3d quarter	48.45	49.90	−1.45	1960:			
4th quarter	45.98	49.38	−3.40	1st quarter	56.96	55.55	1.41
1954:				2d quarter	55.46	55.98	−.52
1st quarter	45.28	48.45	−3.17	3d quarter	54.95	56.08	−1.13
2d quarter	45.02	47.43	−2.41				

The "lead" of inventory investment

If the wavelike movements just examined are indeed inventory cycles, we should find in the empirical data a lead of inventory investment oscillations ahead of those in final sales for reasons explained earlier. Inventory investment should reach its cyclical peak and turn down prior to, or in quarterly data no later than, the peak in

CHART 9.—Imbalances between desired and actual inventories, all manufacturing, quarterly, 1948–I through 1960–III, in billions of 1954 dollars. Inventory deficiencies shown as positive values; inventory surpluses shown as negative values.



final sales, and rise from its trough prior to, or no later than, the trough in sales.

Before we test this implication against the empirical record, several comments are required concerning the effects of autonomous factors on actual inventory investment which obscure several peaks and troughs in the data plotted in chart 8.

1. *The 1949 trough of inventory investment.*—During late September and in October of 1949, a soft coal strike was in progress. Man-days lost during October amounted to 2.49 million, indicating that the Nation's output was substantially reduced especially in the fourth quarter. In chart 8, the effects of the strike on inventory investment are apparent. In anticipation of the work stoppage, the general recession liquidation in stocks which began in 1949, second quarter, was brought almost to a halt in 1949, third quarter. Disinvestment at annual rate amounted to only $800 million in 1949, third quarter, compared with $4.6 billion in 1949, second quarter. The work stoppage, furthermore, undoubtedly led to a higher rate of liquidation in 1949, fourth quarter, than would otherwise have occurred. One is led to conclude that the true cyclical trough occurred not in 1949, fourth quarter, but as early as in 1949, second quarter, or perhaps in 1949, third quarter.

The measurements of inventory deficiencies and surplus for the manufacturing sector which are plotted in chart 9 are of some help in deciding between 1949, second quarter and 1949, third quarter,

for this trough. As there shown, manufacturers' stocks reached the point of maximum excess in 1949, second quarter. Allowing for a one-quarter lag, this indicates that the trough of manufacturers' inventory investment, in the absence of the strike, would have occurred in 1949, third quarter. Although trade inventory positions are not included in the chart 9 data, the major importance of fluctuations in manufacturing inventory investment in accounting for fluctuations in total investment, especially during the period in question (see table 2 in pt. II) makes it probable that the true cyclical trough for total nonfarm inventory investment should likewise be assigned to 1949, third quarter.

2. The inventory investment peak preceding the 1953–54 recession.—Investment in stocks reached an extraordinarily high peak during the first year of the Korean war with a secondary peak appearing in 1952, fourth quarter. What appears to be a reasonable explanation for this period's unusual pattern is based on the effects of autonomous factors. The large inventory buildup of late 1950 and early 1951 was clearly war induced. By late 1951 and early 1952, however, the rate of accumulation was falling rapidly and a cyclical recession might shortly have appeared had it not been for the expiration of consumer credit controls on June 30, 1952, and real estate credit controls in September 1952. Consumer purchases of goods jumped by almost $10 billion, at an annual rate, from 1952, second quarter, to 1952, fourth quarter. (Passenger car sales spurted during the latter half of 1952, with December registrations rising to 399,000 compared with 310,000 during the previous December.) This burst of new demand from the consumer sector, autonomously let loose by the expiration of credit controls, appears to have more than offset contractive forces at work and pushed the economy into the "boomlet" of late 1952 and early 1953. I would, therefore, point to the peak in inventory investment during 1952, fourth quarter, as the cyclical maximum one should associate with the recession of 1953–54.

3. The 1959 peak.—The major strike which brought steel production almost to a halt in 1959, third quarter, and well into 1959, fourth quarter, makes it difficult to identify the true cyclical peak, i.e., the quarter during which nonautonomous forces in the "inventory-feedback" loop were operating to create the maximum *demand* for inventory accumulation. Clearly investment in 1959, 1st quarter, and 1959, second quarter, was partly in anticipation of the strike (see chart 7 and text discussion relating thereto). And much of the heavy accumulation in 1960, 1st quarter, was merely making up for ground lost in 1959, third and fourth quarters. The true cyclical peak probably lies in the first, second, or third quarter of 1959, but the information in chart 8 does not permit a finer distinction. By turning again to chart 9, and examining the rise and fall of inventory deficiencies for manufacturers during the period, the alternatives can be narrowed down with a fair chance of being right. For manufacturers the peak *deficiency* occurs in 1959, second quarter, although the deficiency position in 1959, 1st quarter, was almost as large. Again allowing for the one quarter lag which tends to separate the appearance of a difference (H*—H), from the actual investment the true cyclical peak would have occurred in 1959, third quarter, or possibly in 1959, second quarter. Using the deficiency situation in manufacturing as a guide we shall settle on 1959, third quarter, as the quarter of peak demand for inventory investment in total nonfarm stocks.

TABLE 9.—*Relation of turning points in nonfarm inventory investment to turning points in final sales* [1]

Prior peak and recession trough, contractions of—	Quarter of peak or trough		Lead of inventory investment turn
	Inventory investment	Final sales	
			Quarters
1948–49:			
Peak	1948, 3d quarter	1949, 2d quarter	3
Trough	1949, 3d quarter	1950, 1st quarter	2
1953–54:			
Peak	1952, 4th quarter	1953, 2d quarter	2
Trough	1953, 4th quarter	1954, 2d quarter	2
1957–58:			
Peak	1956, 1st quarter	1957, 1st quarter	4
Trough	1958, 1st quarter	1958, 2d quarter	1
1960–61:			
Peak	1959, 3d quarter	1960, 2d quarter	3
Average:			
Peaks			3
Troughs			1⅔

[1] GNP "final sales" minus services and construction. Dates for peaks and troughs taken from chart 8 except for inventory investment's trough in 1949, 3d quarter, and peaks in 1952, 4th quarter, and 1959, 3d quarter, which are based on chart 9. See text discussion.

With the foregoing three dating adjustments in mind, we turn to a test of the model's implication that cyclical turns in inventory investment should lead turns in final sales, or at worst, not lag. Table 9 summarizes the empirical data needed for the test. The dates for peaks and troughs are based on the data plotted in chart 8, except for the three adjustments discussed in preceding paragraphs: the inventory investment trough in 1949, third quarter, and the peaks in 1952, fourth quarter and 1959, third quarter.[9] As will be seen from chart 8, the final sales trough for the 1953–54 recession might be picked as either 1954, second quarter, or 1954, third quarter. The alternative least favorable for our hypothesis, 1954, second quarter, is chosen.

It is clear from the datings of peaks and troughs in table 9 that the hypothesis that turns in investment in inventories will lead peaks and troughs in final sales is corroborated without exception. The lead at peaks tends to be somewhat longer, averaging three quarters. Leads at troughs average 1⅔ quarters. I can only guess at reasons for this apparent asymmetry: an optimistic bias of decisionmaking units? An asymmetry in the impact of some of the "automatic stabilizers" in the Federal budget? Or in the lags within the system? This interesting and important point needs investigation, but needless to say our model provides no answer. In any case, the conclusion seems unambiguous that inventory investment peaks and troughs do, indeed, lead those in final sales by substantial margins.

Pattern of producers' durable goods production and orders

There still remains the possibility that cyclical turns are induced not solely, nor perhaps at all, through the operation of the inventory investment feedback channel, but by some other mechanism. The

[9] Some readers may question the dating of the inventory investment trough for the 1953–54 recession in 1953, 4th quarter, arguing that an exogenous factor was at work.

The excess profits tax was lifted from corporations, effective on Jan. 1, 1954, so that it would benefit firms to shift some part of 1953 profits into 1954, where they would be taxed at lower rates. Might not FIFO accounting firms (which are in the majority) have run down their inventories in order to push into 1953's cost-of-goods-sold as much as possible of their more recently acquired, higher priced stocks? This may have occurred, although by like reasoning LIFO firms would be expected to have accumulated stocks toward the end of 1953 thus offsetting a good deal of the FIFO liquidation. Even granting a net FIFO liquidation, its effect would have been to conceal a true cyclical trough occurring no later than 1954, 1st quarter. This would still lead the final sales trough of 1954, 2d quarter, by one quarter.

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most likely candidate, it seems to me, are systematic fluctuations in the production of producers' durable equipment.[10] We can readily conceive of an economy in which a third feedback loop operates to produce systematic variations: changes in the flow of sales and unfilled orders feedback on decisions to acquire business equipment and thence on production. In the same general manner in which an inventory investment feedback operates, this business equipment "loop" may possess the potential for amplifying disturbances and inducing turning points in aggregate activity.

If a business equipment feedback loop is primarily responsible for cyclical turns, and the behavior of inventories only secondarily or perhaps only indirectly influential, new orders for business equipment should turn down from their cyclical peak prior to (certainly no later than) the peak in inventory investment. These cyclical turns in new orders for equipment would feed back on the economy, partly via effects on ordering by manufacturers of equipment (and thence into the inventory loop) and partly through direct effects on the level of production of equipment.

In table 10, an analysis is presented of cyclical turns in both new orders and production relating to equipment compared with those in inventory investment. Unfortunately, a time series of new orders for producers' durable equipment as such is not available, and we have had to be content with an analysis of orders for "machinery" (nonelectrical, except for 1951–54 which includes electrical). The analysis of turns in production is based on the Federal Reserve index of business equipment production. The only period in which difficulties were encountered in identifying peaks and troughs was 1959–60 where the peak in orders for machinery was assigned to 1960, second quarter, although a slightly higher flow of orders is found in the last three quarters of 1959 when anticipations and direct effects of the steel strike could be expected to influence ordering. A footnote to table 10 gives the actual data for this period.

TABLE 10.—*Relation of turning points in new orders for machinery and in production of business equipment to peaks and troughs in inventory investment*

Prior peak and recession trough, contraction of	Quarter of peak or trough			Quarterly lead or lag (−) in relation to inventory investment	
	Machinery orders [1]	Equipment production [2]	Inventory investment	Machinery orders	Equipment production
1948–49:					
Peak	([3])	1948, 3d quarter	1948, 3d quarter	([3])	0
Trough	1949, 3d quarter	1949, 3d quarter	1949, 3d quarter	0	0
1953–54:					
Peak	1953, 2d quarter	1953, 3d quarter	1952, 4th quarter	−2	−3
Trough	1954, 2d quarter	1954, 4th quarter	1953, 4th quarter	−2	−4
1957–58:					
Peak	1956, 4th quarter	1957, 1st quarter	1956, 1st quarter	−3	−4
Trough	1958, 1st quarter	1958, 2d quarter	1958, 1st quarter	0	−1
1960–61: Peak	1960, 2d quarter [4]	1960, 3d quarter	1959, 3d quarter	−3	−4

[1] Peaks and troughs are those for new orders for nonelectrical machinery except for 1951–54 which are based on new orders for machinery, including electrical. New order data deflated before identification of turns.

[2] Based on peaks and troughs of Federal Reserve index of business equipment production.

[3] Not available.

[4] Quarterly nonelectrical machinery orders during 1959 in billions of 1947–49 dollars are 5.02, 5.63, 5.66, 5.59, and during 1960 are 5.48, 5.48, 5.05, 5.27. The slight bulge in orders, 1959, 2d quarter, through 1959, 4th quarter, is held to be attributable to 1959 steel strike; the cyclical peak is therefore identified as 1960, 2d quarter.

[10] The other component of business fixed investment, industrial and commercial construction, involves longer planning and production periods and does not seem as likely, therefore, to lead cyclical turns.

The tabulation of dates in table 10 shows that in no case do the peaks or troughs of either machinery orders or production of equipment lead those of inventory investment. In 8 of the 13 cases tabulated, orders and production *lag* by 2 quarters or more; and in 1 case (the trough in production in 1958) by 1 quarter. The peak in production of equipment and the trough in machinery orders and production associated with the 1948–49 recession were, however, coincident with corresponding turns in inventory investment, and the same is true for the trough of machinery orders in 1958 first quarter.

What conclusion is warranted from an examination of table 10? The experience of 1948–49, which indicates that the cyclical turns in orders for and production of producers' durable equipment were coincident with turns in inventory investment during the period as measured by quarterly data, cannot be overlooked. This record suggests that *both* inventory *and* equipment feedbacks may at times be equally responsible, at least with respect to timing, for cyclical downturns and recoveries.

But the experience since the 1948–49 recession also suggests that shifts in inventory investment are themselves capable of leading the economy through cyclical turning points. The record since 1949 indicates, indeed, that the inventory adjustment mechanism is the more likely candidate for the role of chief culprit in inducing short-run cycles in business activity.

Looking somewhat beyond the goals of this paper, the foregoing analysis would appear to have an important policy implication. From this analysis, a strong suspicion is aroused that, in addition to being characterized by a cycle-inducing inventory investment feedback loop, our economy also provides a channel for feedback from sales and unfilled orders through a producers' durable equipment loop, and that this also contributes to instability. If this is true, stabilization policy should seek to cope with fluctuations in equipment expenditure as well as those in inventory investment.

SUMMARY AND CONCLUSIONS

The model economic system hypothesized in this paper has been shown to be characterized by the strong probability of oscillatory behavior. During the early and middle stages of expansions increases in new orders placed by final buyers impel inventory investment at rates in excess of those which can be justified at later stages of the expansion. Production for inventory eventually declines, initiating a downturn and contributing to a phase of cumulative contraction. Falling new orders, in turn, induce a liquidation of stocks at a rate which is in excess of what is justified at a later stage of the contraction, and in consequence the rate of disinvestment eventually falls initiating an upturn in aggregate activity which is followed by a phase of cumulative expansion.

The examination of time series for final sales, inventory investment, and deficiencies and surplus in stocks, covering the postwar period, corroborates these characteristics of the model and so adds support to the view that the model provides a reasonable explanation of the basic forces which induce shortrun oscillations in economic activity.

An analysis of peaks and troughs of inventory investment during the same historical period shows that in all cases they occur prior to corresponding cyclical turning points in final sales. This finding

supports the thesis that it is the fluctuation in inventory investment which leads the economy through cyclical turning points. A similar analysis regarding turning points in indicators of new orders for, and production of, producers durable equipment opens up the possibility that swings in this sector of the economy may sometimes contribute to cyclical turning points, as seems to have happened in 1948–49. Since that episode, however, the decisive factor in cyclical peaks and troughs exhibited by the postwar economy has been induced changes in inventory investment.

None of the foregoing findings precludes the possibility that truly exogenous factors may also cause turning points in aggregate activity. Indeed, the lifting of credit controls on real estate and consumer purchases of durables in 1952 appears to have reversed the direction of movement of a then sagging economy and contributed to the "boomlet" of late 1952 and early 1953.

PART V

SUMMARY AND CONCLUSIONS OF STUDY

Although the U.S. economy has expanded substantially since World War II, its growth has been interrupted by four business recessions, those of 1948–49, 1953–54, 1957–58, and 1960–61. With increasing frequency over the period businessmen and economists have been describing these recurring dips in GNP as "inventory recessions" but it has not always been clear what is meant by this expression. It might mean merely that postwar recessions, *whatever their ultimate cause*, have been characterized by large liquidations of stocks and that this process of disinvestment is itself a depressant tending to amplify the downward movement of the economy. Or the terminology might be taken to mean that these contractions and subsequent recoveries were, in an ultimate sense, *caused by shifts from inventory accumulation to liquidation and from liquidation to accumulation.* The second interpretation does not contradict the first but it implies a much more comprehensive explanation. It is in effect an assertion that the U.S. economy is subject to an inventory mechanism which produces periodic reversals of movement and hence cycles in economic activity. The present study may be looked upon as an effort to determine which of these interpretations is the correct one.

The postwar record of experience does, indeed, suggest the existence of a cyclical mechanism. A smooth trend line drawn through the peaks of output during the last decade and a half (see chart I) reveals a startling similarity of recessionary movements of GNP downward from this trend, with very similar amplitudes, rates of change, and durations of the movements, for at least three of these recessions.[1] Further, the fact that the irregularities which are present in this record can reasonably be attributed to factors exogenous to a cyclical mechanism only puts the oscillatory pattern into sharper relief. This study, consequently, has proceeded to examine a hypothesis which is capable of producing the cyclical pattern of output observed during the postwar period.

We have supposed that the economic system is characterized by two feedback loops, both of which exert an influence on the level of production and, in turn, become energized into action by the direct and indirect effects of changes in production (see chart 6). The first line of influence (or feedback loop) consists of a relationship among production, income, and demand for final output, what has been termed in the study the "income-expenditure" feedback. When the level of production rises, to illustrate, gross incomes increase; however, concurrent increases in taxes and saving and decreases in unemployment and other welfare payments moderate the expansion of demand for final output.

A second feedback channel is identified by a set of relationships which influences the amount of investment in inventories. Desired

[1] Comments on the fourth, the 1960-61 recession, are summarized below.

levels of stocks are determined, it is posited, by a flow of new orders for final goods, part of this flow being immediately translated into current sales with the remaining part representing additions to backlogs of unfilled orders. The effects on desired inventory levels of increases in sales and increases in unfilled orders are not, however, identical. Rising sales influences desired inventories because some firms, predominantly those which produce for the market, plan their working capital needs on the basis of accepted stock-sales ratios. Additions to unfilled orders, on the other hand, is an important determinant of desired levels of inventories in the production-to-order sectors of manufacturing. Rising backlogs are associated with the stocking up of pipelines of production and, by providing greater insurance against the exposure to risk of holding inventory, lead to larger investment in stocks than otherwise. Finally, that part of desired stocks which serve as buffers against the risk of runouts will be influenced by supply conditions in markets for production-to-order materials and components. Shifts in the rate of change in unfilled orders appear to serve as a reliable index of uncertainty affecting buyers in these markets.

Actual investment in inventory is decided upon by a comparison of desired levels of stocks with those actually on hand. The adjustment is expected to lag behind the decision and to be only a partial adjustment over any one of a sequence of periods of relatively short duration (such as the quarter-year periods which are employed in the empirical tests).

It is recognized that the two feedback channels are interrelated in another way: the demands for output generated through both loops add up to the aggregate demand for total production, since GNP equals final output plus inventory investment. It is supposed, finally, that the response of production to a change in aggregate demand will be a somewhat tardy one. A sudden increase in demand will be initially resolved, therefore, partly by selling out of existing stocks and partly by adding to backlogs of unfilled orders.

This system is oscillatory. When shocked out of an equilibrium state, a cyclical pattern of output will emerge. The character of these cycles—whether of increasing, uniform, or damped amplitude—cannot be determined a priori without very specific information regarding the intensities of the reactions and the timelags in response within the loops. The essential reason why cycles are produced, however, is that inventory accumulation during a part of a phase of expansion in aggregate demand proceeds at too high a rate and the subsequent reduction in this rate of investment brings on a falloff in production, initiating a phase of economic contraction. The too high rate of investment is generated by several factors: (*a*) the initial deficiency in stocks appearing at the beginning of the phase of expansion and explained by the lag of production; (*b*) the need to fill production pipelines, and (*c*) the uncertainties created by temporary market shortages and unpredictable delivery dates which reinforce the demand for buffer stocks. The contractive phase is characterized by a rate of *liquidation* of inventories which is too high, impelled by a set of symmetrically opposite forces.

The basic question faced by this investigation is whether the cycle-generating features of the foregoing system and their implications are corroborated by empirical evidence. Does the hypothesized

model provide a truthful explanation of the short-run economic fluctuations of the postwar period? The findings of the empirical parts of the study and the conclusions reached on the basis of these findings may be summarized as follows:

1. The existence of a powerful inventory feedback mechanism is corroborated by empirical evidence for the manufacturing sector of the economy. A test based on this sector of activity is crucial because most of the observed fluctuation in business inventories occurs therein. Based on regression IV of part II, it was found that an increase during a given quarter of $1 billion in determinant variables produced the following increases in desired levels of manufacturing inventories: $0.192 billion increase for a rise in sales of the current quarter over those of the preceding one; $0.195 billion for a rise in the quarterly rate of accumulation of unfilled orders; and $0.120 billion for a rise in the level of unfilled orders. In addition very strong leftover effects of changes in the *preceding* quarters' sales, rate of increase of unfilled orders, and level of unfilled orders, remain to influence currently desired stock levels. With regard to investment or disinvestment in stocks, approximately one-third of the current discrepancy between desired stocks and those actually on hand is adjusted for in the following quarter.

Parenthetically, regression analyses of empirical data show that, relative to the specific determinant variables just noted, the secular trend of manufacturing inventories during the postwar period has been a *rising* one, not a declining one as supposed by some individuals. The average yearly increase has amounted to approximately $250 million.

2. The proposition that changes in aggregate production feed back on aggregate demand with substantial influence is supported by empirical evidence. Each 2-point fall in the Federal Reserve index of manufacturing production was associated with a decline of approximately $0.8 billion in manufacturers' retained earnings during the 1957–58 recession, and by a decline of about $1 billion during the 1948–49 recession when corporate income tax rates were lower.[2] In turn, each decrease of $1 billion in retained earnings during each of three recessions investigated was associated with approximately an equal decline in expenditure for plant and equipment, although the expenditure decline was distributed over a lagged period, as one would expect.

For the household sector, it was found that consumer expenditure for goods declined when decreases occurred in wage and salary income from manufacturing. During the 1957–58 contraction such incomes fell by $5.3 billion at annual rate while goods expenditure fell by $4.6 billion. The induced decline during this recession in *both* consumer expenditure for goods and manufacturers' expenditure for plant and equipment totaled $9.3 billion although the expenditure curtailment was not distributed over time in precisely the same way as the income decline.

3. The implication that an economic system with two feedback channels as postulated will produce wavelike oscillatory movements in output, sales and inventory investment is very strongly supported by the experience of the postwar period. Recognition of the empirical

[2] The experience of 1953–54 is not alluded to because of the distortion created by the removal of the excess profits tax on corporate profits effective January 1, 1954.

existence of cyclical movements, which arise largely from the manufacturing sector, is facilitated by analysis of GNP final sales after adjustment to eliminate services and construction, two sectors which are predominantly influenced by growth rather than short-run cyclical forces and are devoid of significant holdings of inventories. (See chart 8.) Analysis of the "pressures" within the inventory feedback loop, i.e., of inventory deficiencies and surpluses, helps also to lay bare the cyclical pattern of postwar experience because it abstracts to a considerable degree from such "disturbances" as the steel strike of 1959 and the coal strike of 1949. (See chart 9.)

4. Cyclical turning points in inventory investment have in all cases during the postwar period occurred prior to peaks and troughs in final sales as adjusted. The average lead of inventory investment at peaks was three quarters of a year; at troughs, 1⅔ quarters. Inventory investment should lead final sales if the inventory mechanism is responsible for the oscillatory behavior of the economy.

5. Judged by postwar quarterly data for machinery orders and for the production of business equipment, cyclical turning points have not generally been induced primarily by fluctuations in the demand for producers durable equipment. Turning points in machinery orders have never led those of inventory investment, and have lagged by two to three quarters for four of the six turning points since 1949. Equipment production has lagged inventory investment at every turning point by periods of one to four quarters, except for 1948–49 when peaks and troughs for the two series coincided as shown by quarterly data. Experience in 1948–49, and in the first quarter of 1958 when a cyclical trough occurred in both inventory investment and in machinery orders, suggests the possibility, however, that turns in producers' durable equipment demand may sometimes work in close association with inventory fluctuations in contributing to reversals of cyclical phases.

6. The overall conclusion of the investigation is that the recurrence of business recessions, four in number, during the postwar period, and the wavelike nature of postwar fluctuations in GNP, are both manifestations of inventory cycles. Periods of expansion and contraction were substantially contributed to by investment and disinvestment in inventories, and the decisive element in inducing reversals (turning points) in economic activity was the inventory mechanism described in this paper. Needless to say, this conclusion stands as a statement or probability. In my judgment the probability is high that it is a true statement. This conclusion has been reached because the empirical record of the postwar period *supports* all four of the propositions advanced as hypotheses for the purpose of testing the cycle thesis, and appears to *refute* what I consider to be the most likely alternative explanation, that fluctuations in demand for producers' durable equipment were primarily responsible for cyclical turning points. This conclusion does not, however, rule out the possibility that shifts in equipment demand may at times operate in close association with cyclical movements in inventory investment. This conclusion does not assert, furthermore, that the inventory mechanism explains all short-run changes in GNP components during the postwar period, for many powerful factors exogenous to the inventory cycle mechanism impinged on the economy, among others the Korean war, several

serious work stoppages, aspects of monetary and fiscal policy actions, and their imprint will be found in the postwar pattern of economic activity. The conclusion of this study should be interpreted to mean that the economy is based heavily on a "feedback" inventory cycle mechanism, that when shocks are imposed on the economic system this mechanism, though it may itself be "disturbed," persists in its *tendency* to generate cyclical patterns of production.

Insofar as cycles in output in the future are concerned, two other findings and conclusions of the study are pertinent. The inventory cycles that have characterized the postwar period are partly explained, as noted above, by the influence on investment in stocks of changes both in the level of order backlogs and in the rate of accumulation of backlogs. This finding implies that inventory swings will be wider and cycles in production more violent when the economy is trending close to capacity levels than when much excess capacity is available; there is therefore a relationship between the amplitude of cyclical movements and the degree to which conditions of longrun growth are being fulfilled. The reason for this association is simply that when the economy is running close to a capacity ceiling a cyclical expansion of aggregate demand quickly generates large increases in backlogs and increasing rates of backlog accumulation, both of which factors stimulate large increases in inventories. Although the steel strike of 1959, by curbing the preceding cyclical upswing, may have played a part in limiting the depth of the 1960–61 recession (which appears to have been less severe in the cyclical sense than that of, say, 1957–58), I believe the more fundamental reason for the smaller relative amplitudes of both the upswing and the recession, as compared with the two preceding cycles, is that basic growth factors in recent years have been weakening and a substantial amount of excess capacity has been exposed.

The second matter bearing on future developments concerns the behavior of consumers. The conclusion that aggregate household expenditure for goods is curtailed in response to contractions in wage and salary incomes derived from manufacturing has already been pointed out. It is significant that the magnitude of this expenditure response per dollar of income has increased during successive postwar recessions (a phenomenon which may be explained partly by declining household backlogs of unsatisfied wants since World War II and partly by a load of consumers' debt which is becoming more onerous). Thus, during the 1948–49 recession aggregate consumer expenditure. for durable and nondurable goods combined, fell by 29 cents for each dollar of decline in wage and salary income from manufacturing; by 69 cents during the 1953–54 recession; by 86 cents in the 1957–58 recession; and by $1.27 in the 1960–61 contraction. Although it is impossible to say that the particular dollars of lost wage and salary income from manufacturing accounted for the entire expenditure curtailment described, there is probably a close association between the two. If this is true, we must be prepared for the possibility that future cyclical downturns in the economy will be under the influence of a progressively stronger income-expenditure feedback through the household sector of the economy than was the case during the last 15 years.

Going beyond the main purpose of this study, the conclusions reached above point to a need for a reconsideration of economic

stabilization policy. If it is true, as I have concluded, that an inventory-cycle mechanism is the basic cause of the recurrence of business recessions and wavelike movements in production, it would pay large dividends in economic betterment to devise and implement policies to curb or counteract the oscillatory forces which are responsible. To the extent that these measures were successful, the amplitudes of both peaks and troughs of the cycles would be reduced. This result in itself might not increase the average level of employment or the rate of economic growth. But by exposing additional unused capacity as a consequence of reducing cyclical peaks it would *permit* a more rapid rate of growth. Furthermore, by moderating the force of short-run cyclical upswings, temporary bottlenecks and shortages would be less apt to appear and conditions of market supply would remain more orderly. The temptation of sellers to raise prices because of bottlenecks and shortages, and the willingness of buyers to accept price increases, would accordingly both be materially reduced. This outcome would be a significant help in permitting a higher rate of economic growth without as severe an inflationary consequence.

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AN ECONOMETRIC ANALYSIS OF THE POSTWAR RELATIONSHIP BETWEEN INVENTORY FLUCTUATIONS AND CHANGES IN AGGREGATE ECONOMIC ACTIVITY

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AN ECONOMETRIC ANALYSIS OF THE POSTWAR RELATIONSHIP BETWEEN INVENTORY FLUCTUATIONS AND CHANGES IN AGGREGATE ECONOMIC ACTIVITY

The question posed to us is how much more economic stability during postwar recessions would have resulted from a given degree of dampening of inventory fluctuations. We propose to stay strictly within the scope of this question. We do not attempt to suggest policies for stabilizing inventory movements; we merely try to assess their effect on the economy.

Our method of answering this question is by simulating patterns of actual economic development during critical periods by movements of statistical variables in an econometric model. Such a model is a system of mathematical equations with numerical coefficients that attempt to describe, approximately, the network of interrelationships within the actual economy. The numerical coefficients of the model are determined from historical data. They are determined so as to obtain as close a fit as possible between the model and observation in our historical sample period.

The model used here is one that has been constructed by the Econometric Research Unit of the Wharton School of Finance and Commerce, University of Pennsylvania. A technical statement of the model is given in the appendix. Briefly, it is a system of 34 equations, of which 5 are accounting definitions. The sample of data to which these equations are fit consists of quarterly observations of the U.S. economy, 1948–58. The main dollar magnitudes are expressed in prices of 1954, and are seasonally adjusted at annual rates. In addition there are several index numbers, counts of persons, and other variables expressed in the units indicated in the appendix. Essentially, this system is a refined version (in detail on variables, equations, and unit of time measurement) of older annual models of the economy. The annual models have been used since 1953, with a fair measure of success, in forecasting the U.S. economy.[1] The forecasting ability of models is a severe test of their validity, and it is on the basis of their past performance that we are led to use them in the present investigation. The Wharton School's quarterly model was first estimated, numerically, in 1960. Its first application has been in forecasting economic activity in 1961. In April 1961, when results of only the first quarter were known, and these only roughly, we extrapolated the model to the second and third quarters of 1961. At that time we started from a figure of $499 billion for the seasonally adjusted annual rate of the gross national product in current prices. Our projection for the second quarter was $509 billion and for the third $528 billion. As the revival of economic activity has unfolded, the first quarter figure has been revised to $501 billion. The second

[1] L. R. Klein and A. S. Goldberger, "An Econometric Model of the United States, 1929–52" (Amsterdam: North-Holland Publishing Co.) 1955. A revised and extended version of this model has been made by D. B. Suits, Research Seminar in Quantitative Economics, University of Michigan. Suits has examined the forecasting records of the models over a period of 8 years and found them to provide reliable projections of economic activity. His findings have recently been submitted for publication.

quarter estimate is $516 and the third is $526. Considering the astonishment that our figures brought forth in all circles when they were first issued, this performance of our model is highly encouraging. The overall forecast appears to have given a correct picture of the revival, but some components of the expansion in national product give much closer agreement than do others.

Another kind of test of a model falls under the heading of simulation. In these tests, the model is allowed to function as a mathematical system over a hypothetical stretch of time, with external or environmental variables fixed at realistic levels, and its performance is compared with reality. For example, the annual models cited above were put through a simulation run of many years. In this simulation, variables like population, Government spending, money supply, and some foreign (overseas) factors were allowed to grow along their established historical trends. The patterns of output, employment, consumption, and similar variables were then examined to see how closely they reproduced the characteristics of American business cycles that have been well established by the National Bureau of Economic Research. When the annual econometric model is "shocked" by drawings of random numbers (as the mathematical structure of the model says it should be), the variables trace out a path that comes remarkably close to the cycle patterns of the National Bureau.[2] The model's cycle has the same kind of periodicity, length of upswing, length of downswing, and lead-lag structure as the recorded and measured history of American cycles.

We are thus prepared to simulate our new quarterly model over the critical business cycle periods 1953–54 and 1957–58 to test the effects of alternative inventory developments. First, we have started the mathematical system functioning as of the conditions prevailing during the first quarter of 1953. We then make simulation calculations for seven more quarters, to the end of 1954. This is a test calculation, like that of Adelman and Adelman, cited above, to see if the model's path resembles the actual path, as measured by variables of key importance.[3] We made parallel calculations starting with the first quarter of 1957 and proceeding for seven future quarters. In both cases, the model clearly generates business cycle turning points that resemble those that actually occurred. The calculated values are given in detail in the appendix.

Estimated aggregate production turned up one quarter earlier than did the actual figure in 1954. In 1958, the model produced a recovery coincident in time with actual experience although the downswing in 1957 started earlier and was interrupted by one quarter with a slight advance. The amplitude of the downswing is much smaller in the computed than in the actual series on output. There are, of course, differences between the actual and simulated or computed values; therefore when we come to the second stage of our study, the appraisal of alternative hypothetical inventory developments, we compare the model's calculated values from the test run (not the actually observed values from economic life) with those computed under the alternative inventory situations.

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[2] I. Adelman and F. Adelman, "The Dynamic Properties of the Klein-Goldberger Model," Econometrica, vol. 27 (October 1959), 596–625.

[3] Our simulation calculations do not include random shocks. Lack of time has not permitted that extension of our work.

Before describing our findings, we must explain carefully some of our procedures. Some variables of the model are of minor importance, and some are not well "explained" by our equation system. For these reasons we have reduced the system to a smaller number of equations and have fixed some of the variables that would otherwise be explained by the model at their actual values over the course of time considered. In some cases, the assigned values were for variables that changed smoothly and gradually over the periods considered, and their prediction would not, in fact, have been difficult. Interest rates, prices, depreciation, exports, and money supply were the principal variables that had to be fixed over the course of the simulated cycles instead of being estimated by the equations of the model. A compelling reason for not computing price variables from the equations of the system was that they would have made the calculations highly nonlinear. Given the brief amount of time allotted us for this study, it would not have been feasible to deal with the complications of nonlinearity.

We added equations to the system for the relationship of tax payments to personal income based on estimated relationships in periods just preceding or during the simulation runs. During the 1953–54 period we had to change this relation to correspond with tax relief granted in 1954.

Each of the separate equations of the model were examined by themselves for the simulation periods to see if there were any obvious biases. We considered the "fit" of each equation to the actual data of the periods to see if there were systematic biases apparent in the residual variation. In only one case, that of the equation explaining unfilled orders, did we find a persistent bias. We added a constant to that equation for the 1953–54 calculations. We solved the equation system, by standard algebraic methods, to the point at which we reduced it to two linear relationships in X and I_t—total real output and real inventory investment. We then adjusted each constant term of these two equations so that they passed through the actual observations for X and I_t in the first period of the simulation run. Thus for these two variables—strategic ones for our problem—we adjusted the system so that we commenced from the correct values.

With this procedure of assumption, algebraic reduction, and adjustment we computed the test values discussed above. Next, we considered possible alternatives for the evolution of inventory investment. Two kinds of inventory stabilization policies were considered. (1) Inventory investment was assumed to have a cycle with an amplitude at a fixed percentage of actual inventory investment. Throughout our eight-quarter periods (1953(i)–1954(iv) and 1957(i)–1958(iv)) we autonomously made the absolute value of inventory investment a fixed percentage of actual inventory investment.[4] The fixed percentages were 75 percent (a mild stabilization) and 25 percent (a strong stabilization). (2) The coefficient relating inventory investment to sales in our equation of inventory behavior was reduced by a stated proportion. This coefficient is the "marginal inventory-sales coeffi-

[4] The deviation of inventory investment from zero was reduced by a given proportional amount over the whole cycle. This reduced the amplitude proportionally about zero. The zero level was chosen because we were interested in policies of cyclical stabilization. We might have reduced the deviations about the cyclical average by a stated proportional amount. This would have made average inventory investment slightly positive over the cycle and would have introduced an element of trend growth into the model.

cient." It, too, was reduced to a level of 75 percent of the original coefficient and 25 percent of the original coefficient.

With the first type of stabilization, we dropped the equation for inventory investment from the system and used instead fixed values of inventory investment. These fixed values traced out a milder cycle of inventory investment than that realized in the actual course of events. With the second type of stabilization, we retained the equation for inventory investment but used a smaller marginal coefficient of sales. This necessitates a new adjustment to the constant term of this linear relation between inventory investment and output to bring the computed values of output (not inventory change) to the actual values for the first solution period of the cycle.

Our model is a short-run forecasting model and has two important variables that augment its forecasting ability, yet these variables are not explained within the system itself. These two variables are consumer buying plans and business investment intentions. They are determined in advance from sampling inquiries, and in forecasting applications of the model we use them for as much as two periods ahead. In the simulations we put in the actual values of these variables for the eight quarters of test runs. However, when we reduced inventory investment in the stabilization alternatives we also reduced the cyclical swings in these two anticipatory variables in the same proportion that we reduced inventory investment or the marginal inventory-sales coefficient. The fluctuations in the anticipatory variables were dampened about their cyclical averages in stated proportions.

The postwar business cycles are often called inventory cycles. How much stabilization would occur in the economy generally if inventory fluctuations were stabilized by given amounts? That is the question to which we addressed ourselves. It is not evident how inventory investment could be stabilized, but if it were, our calculations suggest the degree to which fluctuations in output, employment, and similar variables would be accordingly stabilized.

In appendix tables I–VI, we show, during the recessions of 1953–54 and 1957–58, the actual values of several variables in the model; the values computed from the model using no adjustments to inventories; and the values computed from the model under various assumptions about different inventory fluctuations. These assumptions are, as noted above, (1) 25-percent reduction in the amplitude of the inventory cycle, (2) 25-percent reduction in the sales coefficient of the inventory equation, (3) 75-percent reduction in the amplitude of the inventory cycle, (4) 75-percent reduction in the sales coefficient of the inventory equation.

It can be seen in these tables and in charts 1–6 below that computed output turned up one quarter earlier in 1954 and recovered to a higher level than did actual output. If inventory movements are dampened by 25 percent, the trough in computed output is one billion higher but rises to a rate, at the end of 1954, that is four billion less. Dampening of inventories leads, in the simulation, to a dampening of output fluctuations by cutting off both high and low points in the cycle. At the trough, an increase in inventory investment of $0.23 billion leads to an increase in output of $0.86 billion. The multiplier value of inventory investment thus comes to something just under four. If we reduce the coefficient of sales in the model's inventory equation by 25 percent,

instead of reducing the whole course of the inventory cycle, we find in table I that the drop in output and the subsequent recovery are both reduced more markedly than in the previous case. This second assumption produces a larger value of inventory investment in 1953 but smaller values in the last three quarters of 1954. It also gives a larger multiplier value at the trough, about five.

A dampening of inventory fluctuations by 25 percent may be of small magnitude in all its ramifications, even though we do not know what kinds of policy instruments are feasible in the area of inventories. The results are more dramatic in the case of 75-percent reductions. Under the third set of assumptions, where the inventory cycle is dampened by 75 percent, we find that output hardly falls at the onset of the 1953–54 recession (second to third quarter of 1953), makes a temporary jump upward in the fourth quarter of 1953 and then settles to a fairly steady level. This same kind of pattern emerges when the sales coefficient is reduced by 75 percent. The usual type of cycle that we have experienced in the postwar period is virtually eliminated when 75-percent reductions are imposed on inventory movements or reaction coefficients.

These cyclical stabilization measures cut off both peaks and troughs. They take the trend growth out of revival in 1954; therefore they worsen the unemployment situation since labor force continues to expand at its normal trend growth in our model calculations. The rise in unemployment due to the trend growth in labor force is accompanied by a fall in the rate of capacity utilization. Technical improvement factors continue to exert a trend effect on productivity. Personal income grows almost without interruption over the cycle when the cuts in inventory fluctuations or the sales coefficient are as great as 75 percent.

In the 1957–58 simulation, output turns up from a low point in the first quarter of 1958 and rises to greater heights than did actual output. In 1957, actual output rose until the peak in the third quarter, and then fell sharply. In the model, there is a gradual fall after the first quarter, with a temporary small rise between the third and fourth. Thus the timing of the upturn is correct in the model, but there is no well-defined rise to a peak in the third quarter of 1957 as actually happened.

If inventory fluctuations are reduced by 25 percent, either by reducing the whole cycle or by cutting the sales coefficient, the fall in output is less than in the straight simulation calculation with no inventory adjustments. In one case the subsequent rise to the fourth quarter of 1958 is about the same as in the straight simulation and in the other it is slightly less. At the trough of the simulated cycle in the first quarter of 1958 we find that output is larger by $2.8 billion and inventory investment by $0.39 billion in the case of the dampening of the full inventory cycle. If the sales coefficient is reduced by 25 percent we have an output increment of $7.75 billion associated with an inventory increment of $1.52 billion. The corresponding multipliers are about seven and five. The latter is the same as that computed for the 1953–54 cycle trough, but the former is larger than the multiplier in the previous calculation.

The decline in output during 1957 is less under the more stable inventory situation, and expansion begins earlier than if inventories are allowed to fluctuate as they will. In this cycle the fit between

estimated and actual values of output is not as good as in 1953–54. The computed downswing is mild but the actual was sharp. The stabilization calculations eliminate this mild computed downswing and produce a curve of fairly steady growth. In 1953–54, we produced more of a "horizontal ironing out" of fluctuations in output. In both periods, the traditional cycle appears to be eliminated, but we qualify our findings with the note that the results appear to be better in 1953–54, and the computed cycle that is eliminated in 1957–58 is not a very serious economic crisis. In 1957–58 the peak of unemployment is less by 500,000 to 1 million persons, depending on which kind of 25 percent stabilization is used. Inventories are more stable in the case where the sales coefficient is reduced. They are negative, by a small amount, in only one period. Correspondingly, the rate of capacity utilization under a policy of inventory stabilization remains above the rates in the case of no stabilization throughout most of the cycle.

In the more drastic case where inventory stabilization is by a factor of 75 percent, there is hardly any fall in production, and the business cycle is virtually eliminated. Recovery proceeds to approximately the same level that was realized in the straight simulation by the end of 1958, but it reaches this point as the culmination of a fairly steady upward trend. In the early stages, production is lower than in the calculations for 25 percent stabilization or no stabilization of inventories, but growth from these lower points is steady. In the earlier quarters, these lower computed levels of output are associated with correspondingly higher levels of unemployment and unused capacity.

Our calculations are tedious and complicated. In the allotted time in this study we made calculations for two very different hypothetical simulations, and used a straight simulation with no adjustment of variables as a reference standard. One simulation involved a 25-percent reduction in the amplitude of inventory fluctuations and the other a 75-percent reduction. At the 25-percent level we could readily discern stabilization effects throughout the economy, and multiplier values (at troughs) of four or five indicated a powerful leverage effect.[5] We then passed over to a drastic degree of stabilization at a 75-percent reduction of amplitude and found a virtual elimination of the business cycle. Between these two extremes are a variety of plausible stabilization magnitudes. We can safely guess that a 50-percent reduction in amplitude of inventory movement would have a great effect on the cycle of economic activity, though it may not completely erase the cycle. In any case, the significance of inventory fluctuations is evident, and there is real justification in calling the 1953–54 and 1957–58 cycles "inventory cycles." This is not meant to imply that there were no other important factors in these recessions, for had we stabilized some other variable, such as fixed investment, within the framework of our model we would have found a reduction in cyclical amplitude of output fluctuations. We cannot deny, however, that the degrees of inventory stabilization considered here would have contributed immensely toward elimination of the business cycle.

[5] Short run multipliers in the annual models of the United States are generally much lower.

CHART 1.—Private gross national product (X).

[Billions of 1954 dollars]

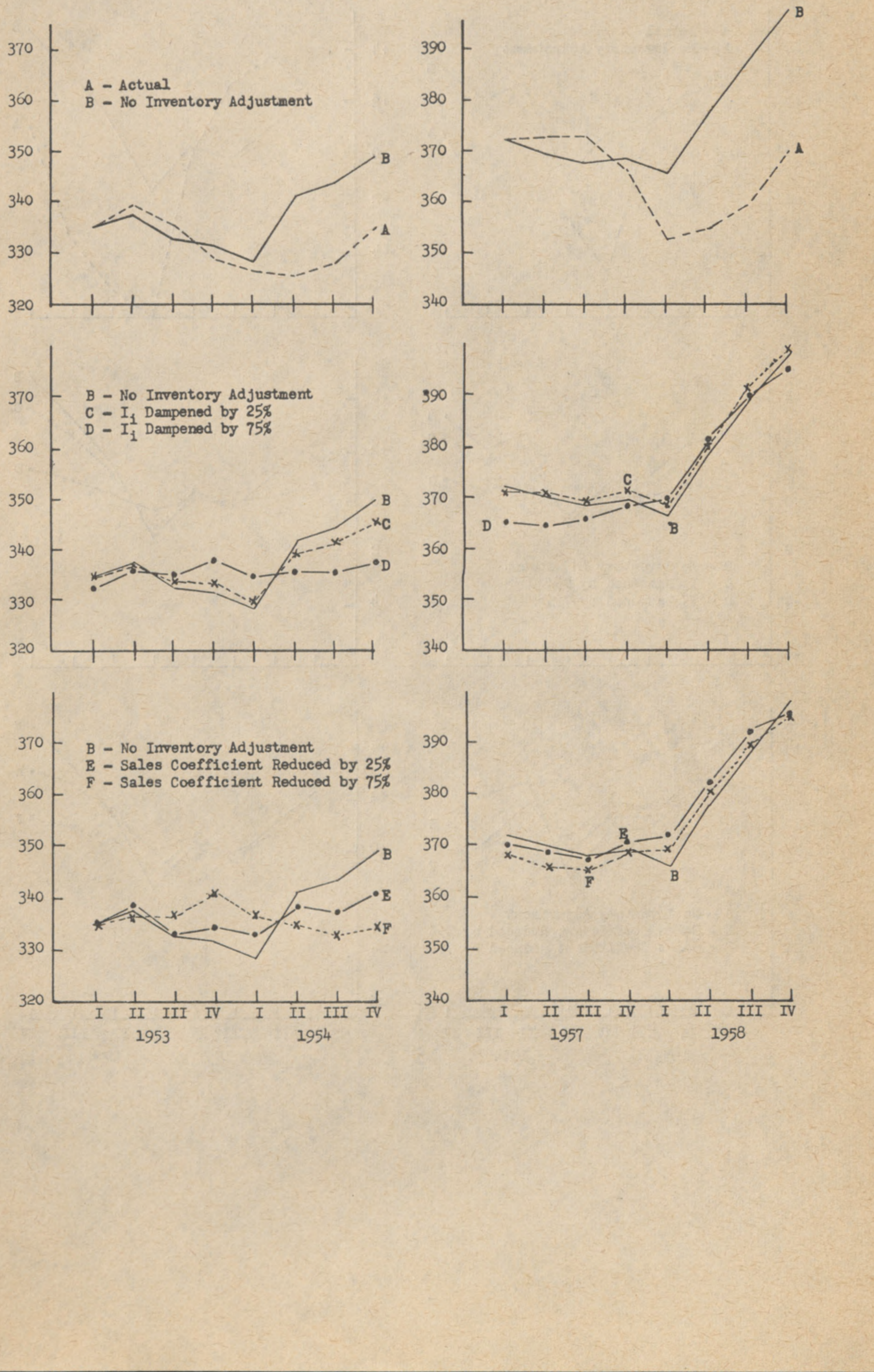


CHART 2.—Inventory investment (I_i).

[Billions of 1954 dollars]

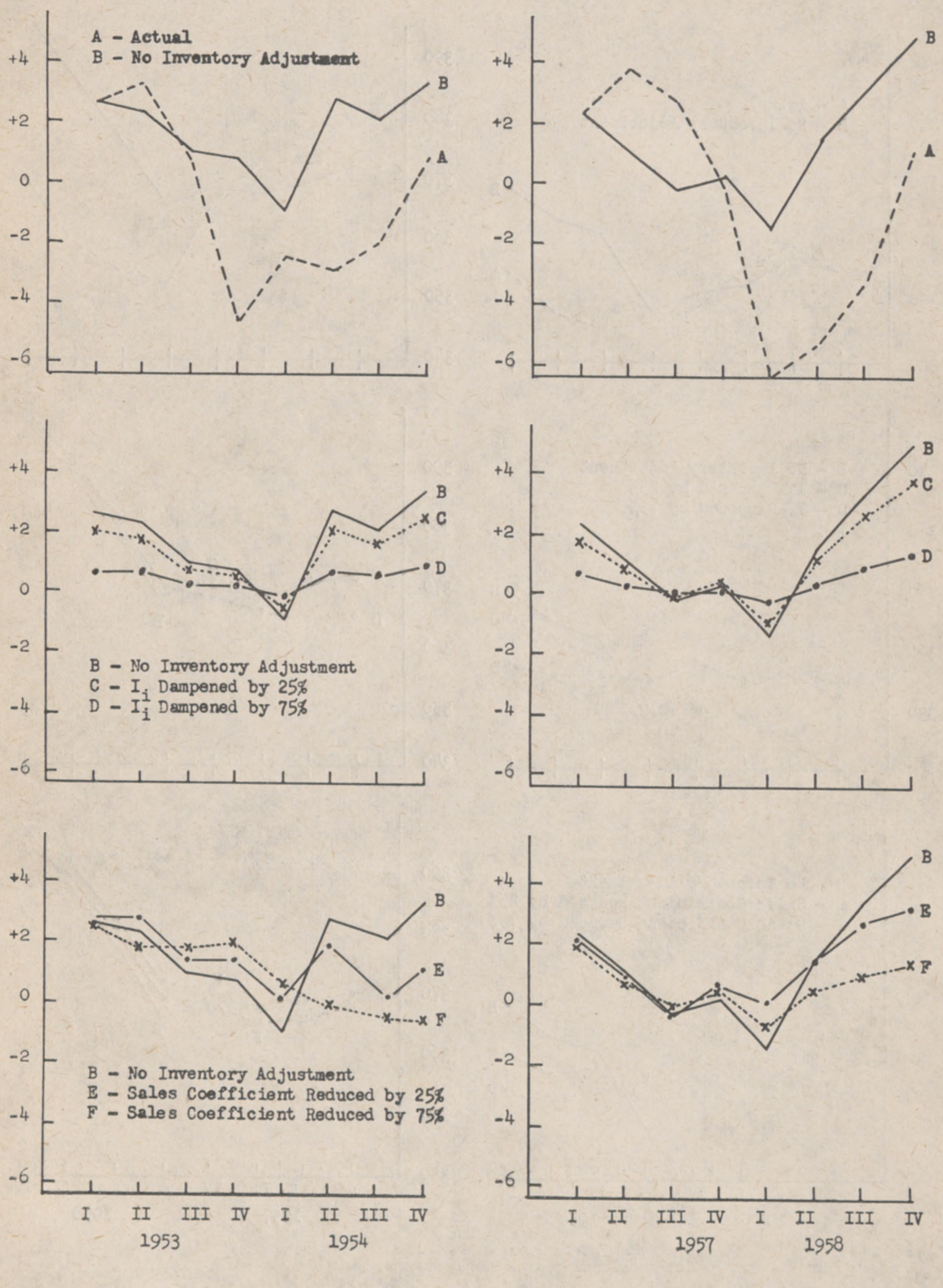


CHART 3.—Personal income (Y).

[Billions of current dollars]

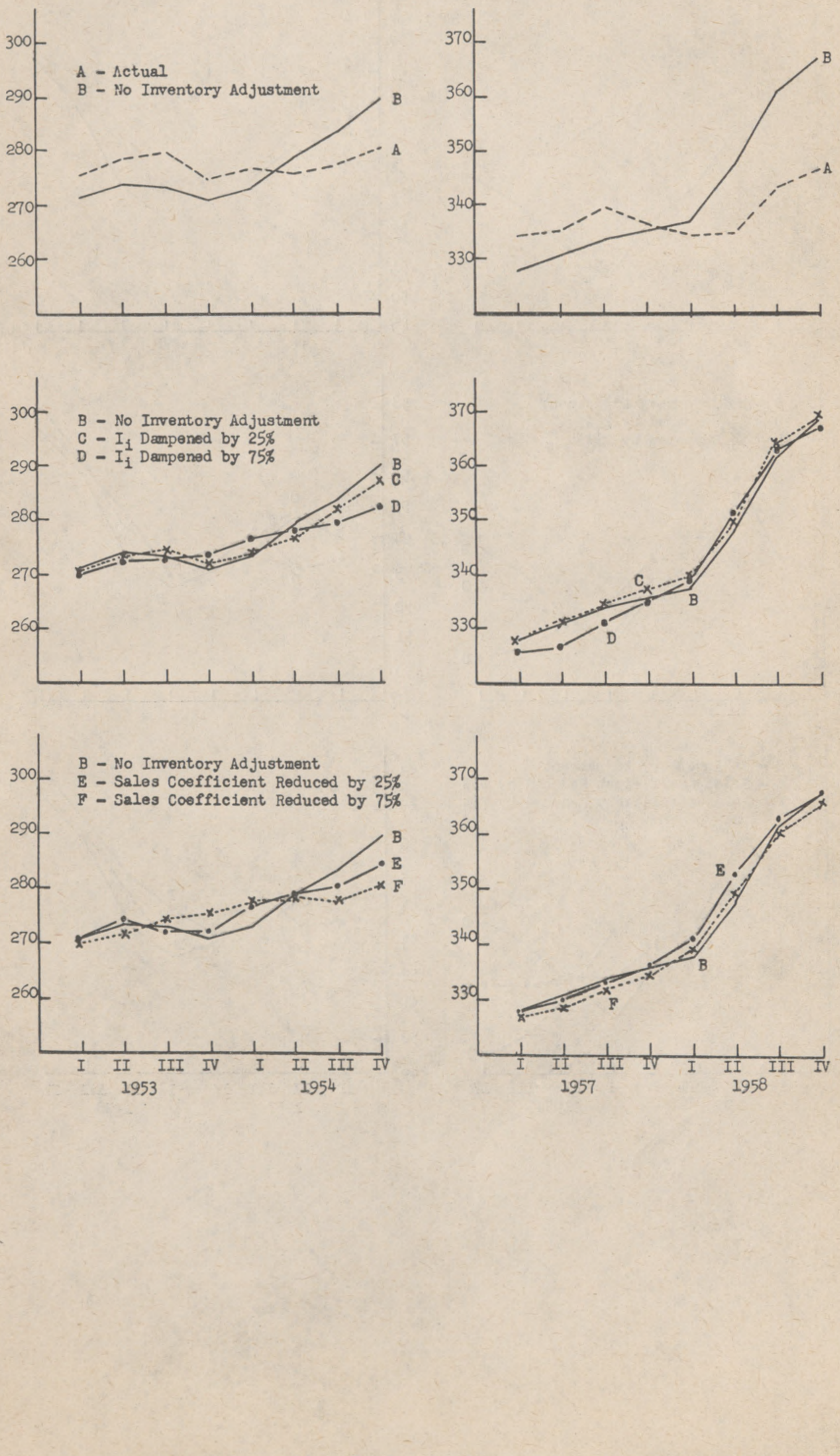
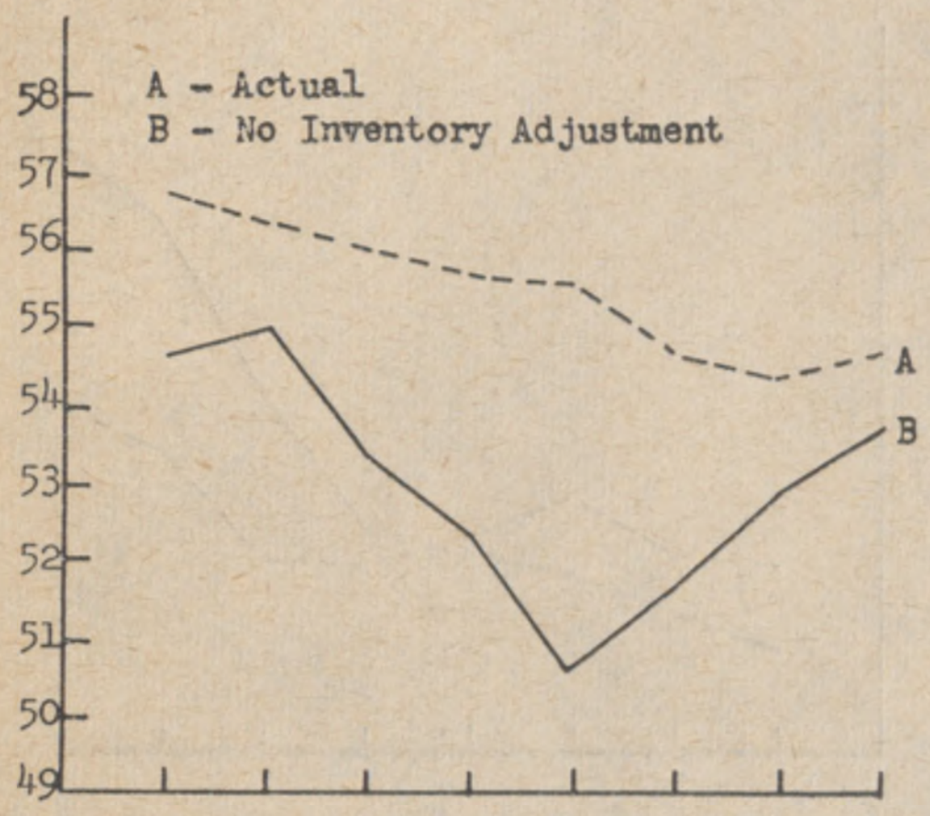
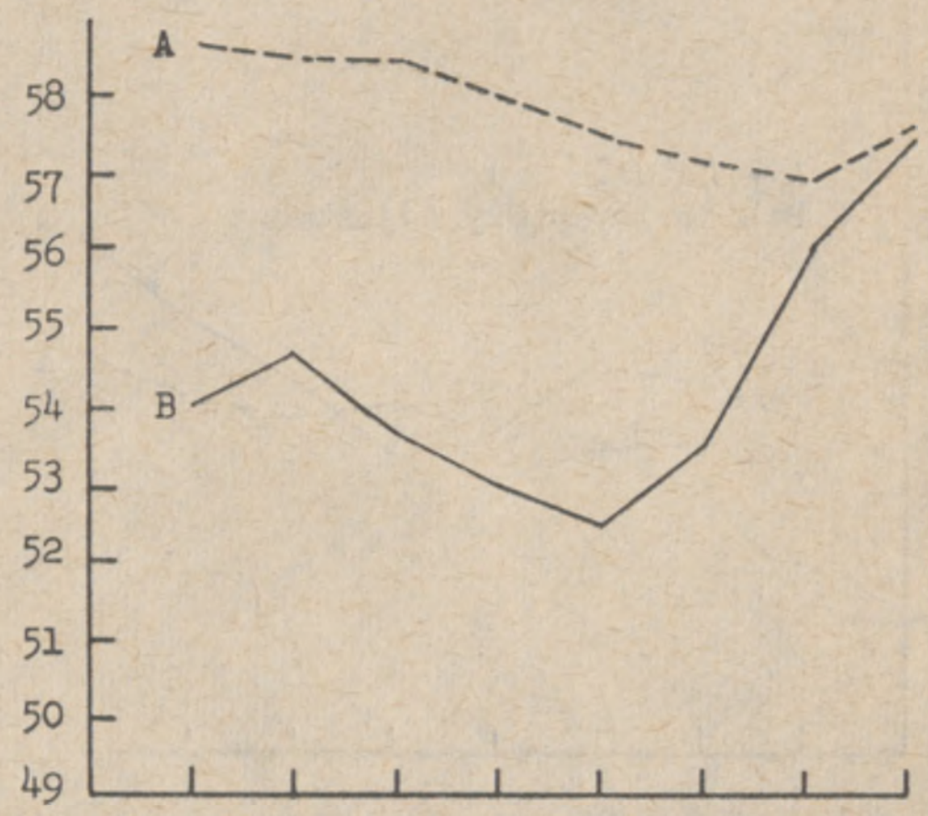
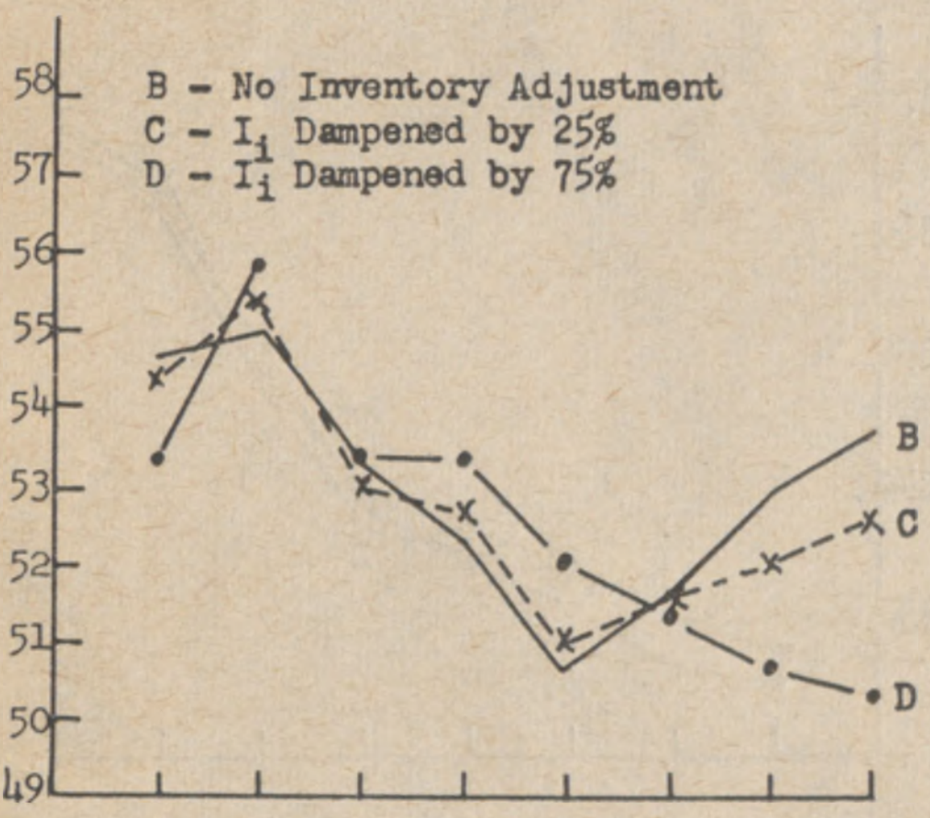


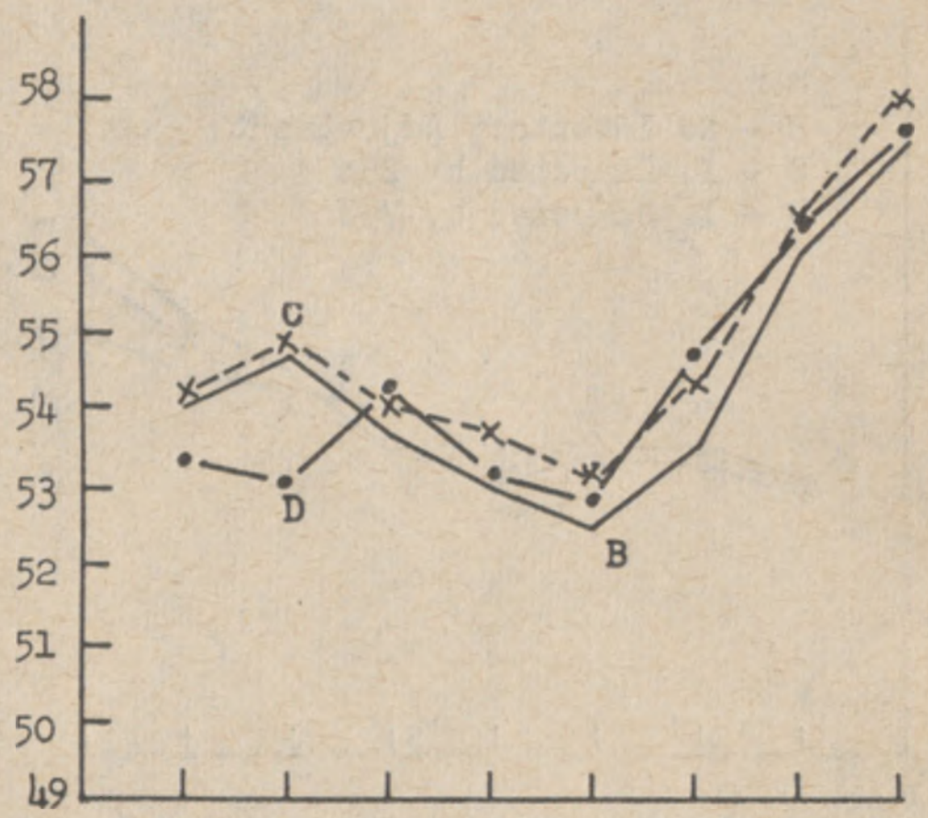
CHART 4.—Private employment (N_w).

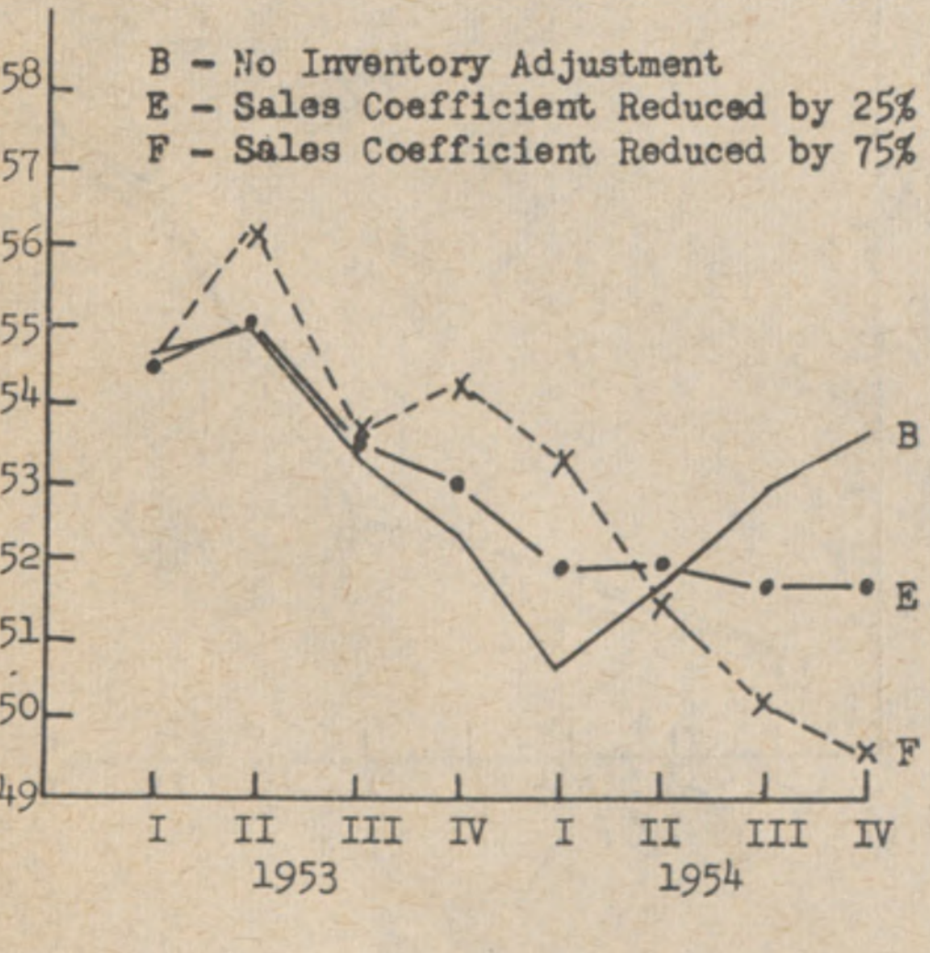
[Millions of persons











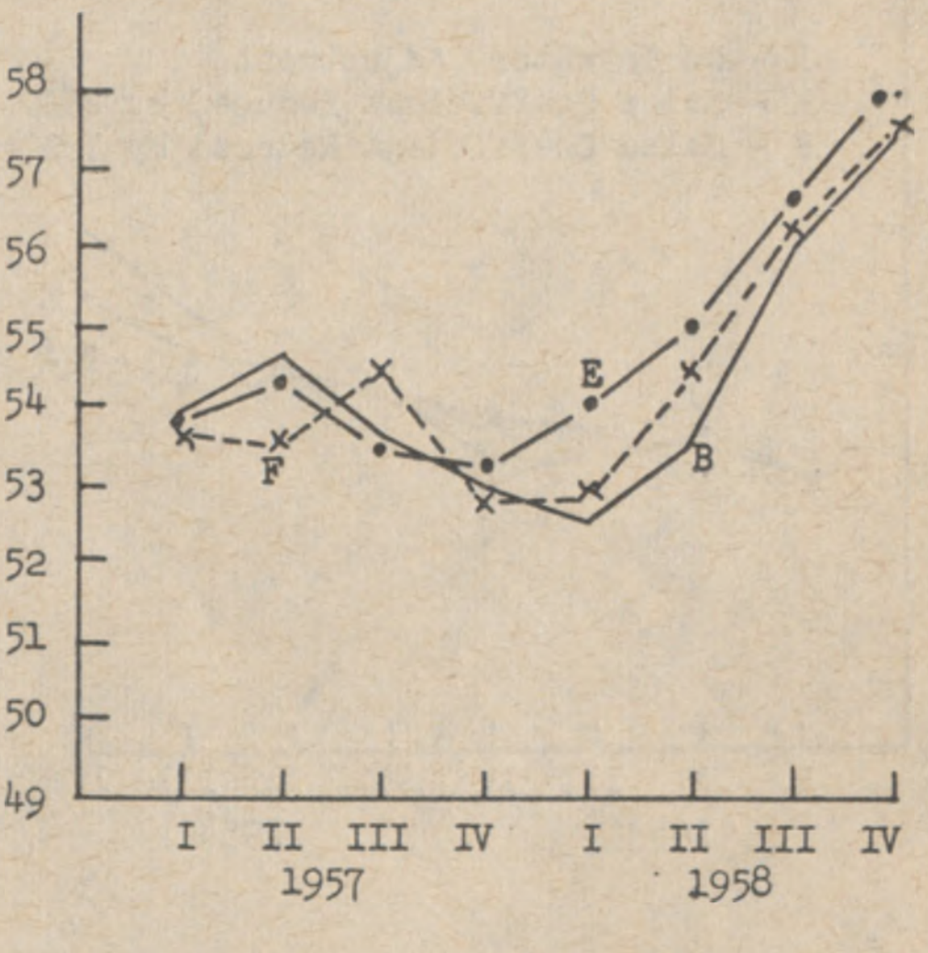


CHART 5.—Unemployment ($N_L - N_w - N_g$).

[Millions of persons]

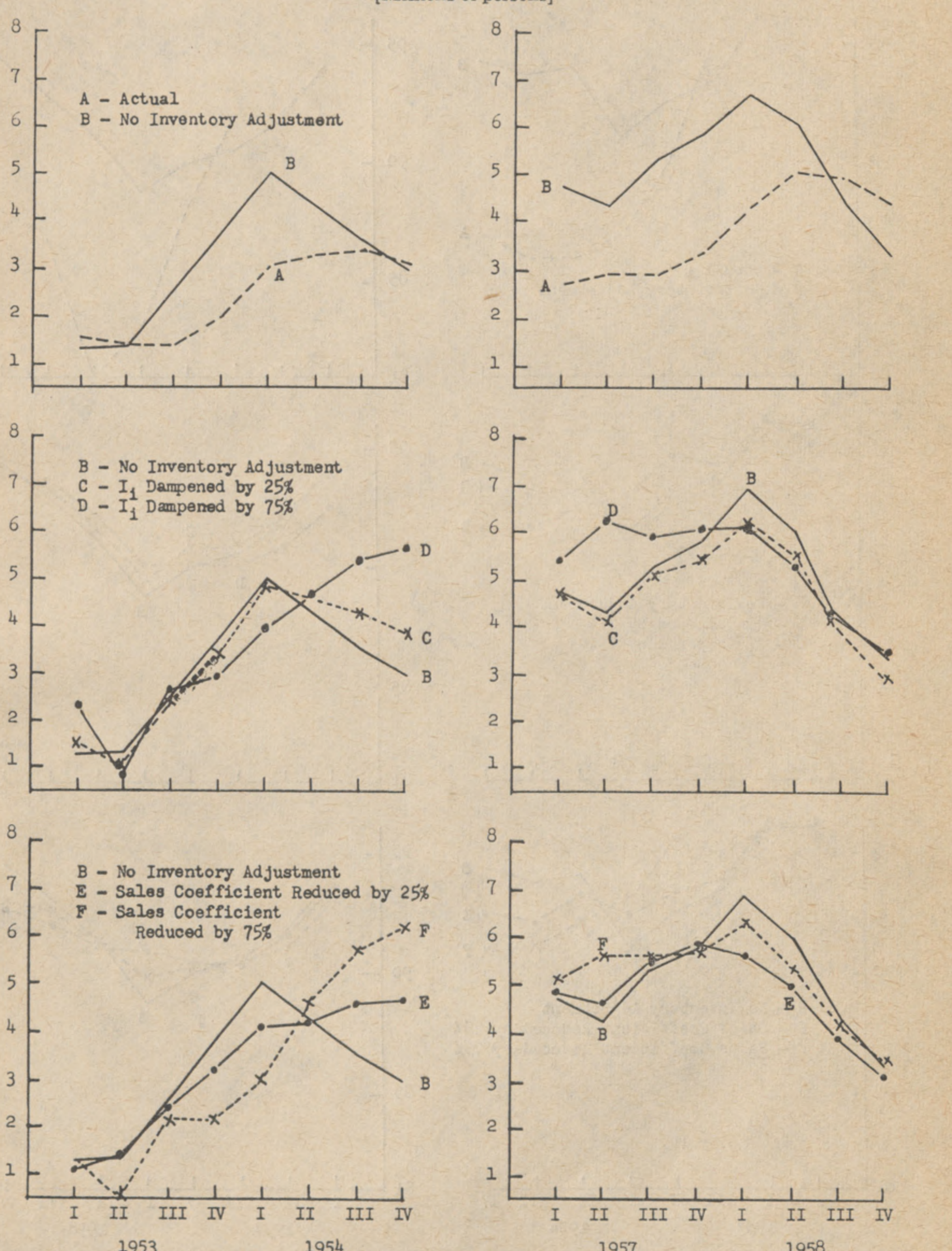
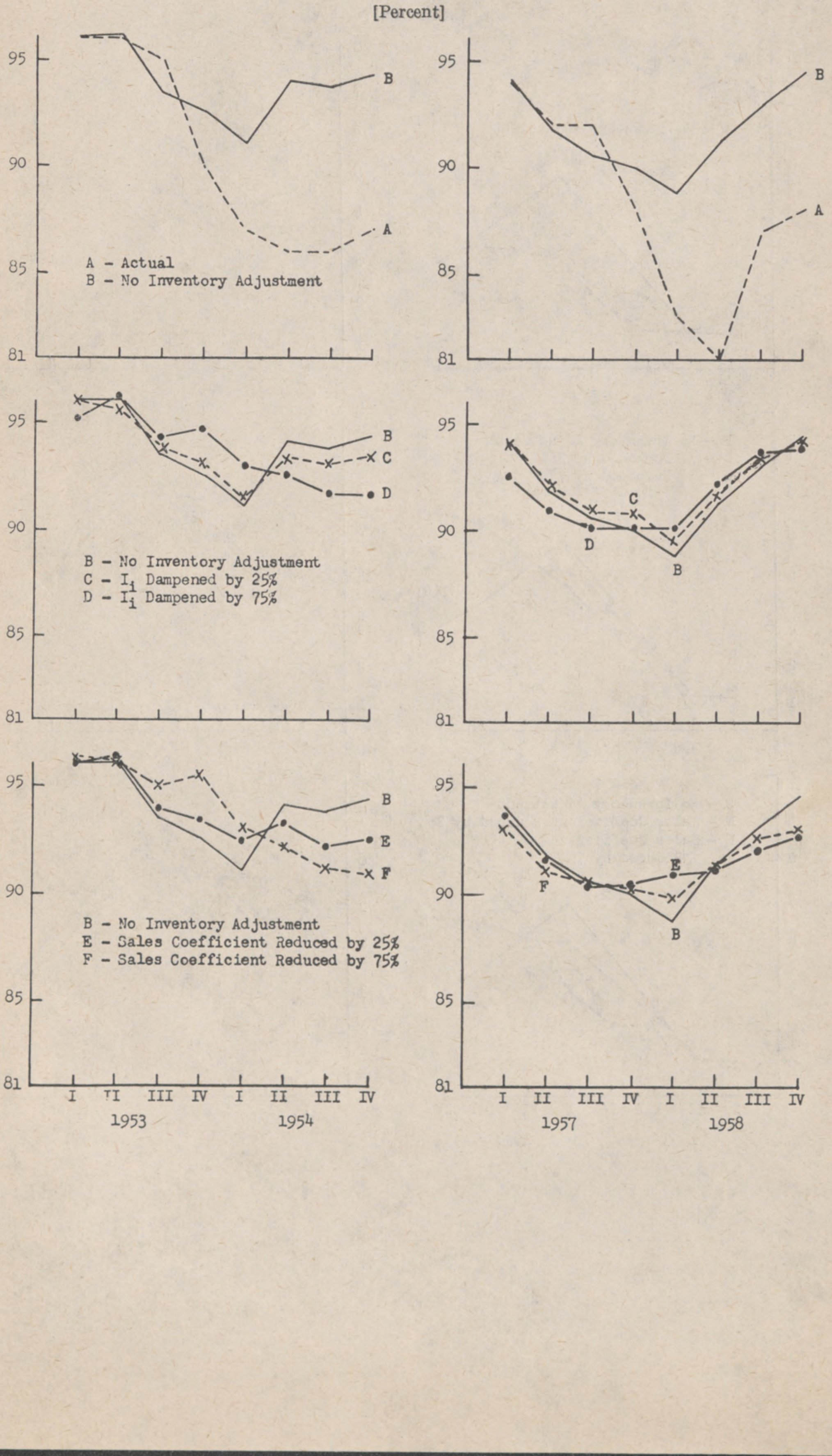


CHART 6.—Utilization of capacity (X/X_c).



APPENDIX

A Quarterly Model of the American Economy, 1948–58

Econometric Research Unit, Wharton School of Finance and Commerce,
University of Pennsylvania

List of variables:

$*C_d$	Expenditures on consumer durables, billions of 1954 dollars.
$*C_n$	Expenditures on consumer nondurables, billions of 1954 dollars.
$*C_s$	Expenditures on consumer services, billions of 1954 dollars.
$*Y-T$	Disposable personal income, billions of current dollars.
$*W$	Wages, salaries and other labor income, billions of current dollars.
$*P$	Nonlabor personal income, billions of current dollars.
C_d^e	Index of consumer buying plans for durable goods.
$*L$	End of quarter cash balances, billions of current dollars.
$*p_d$	Implicit deflator, consumer durables, 1954: 1.00.
$*p_n$	Implicit deflator, consumer nondurables, 1954: 1.00.
$*p_s$	Implicit deflator, consumer services, 1954: 1.00.
N	Population, million persons.
$*I_p$	Expenditures on private producers' plant and equipment, billions of 1954 dollars.
$*I_h$	Expenditures on nonfarm residential construction, billions of 1954 dollars.
$*I_i$	Inventory investment, billions of 1954 dollars.
$*X$	Private gross national product, billions of 1954 dollars.
$*X_c$	Private gross national product at full capacity, billions of 1954 dollars.
I_p^e	Intended investment outlays, billions of 1954 dollars.
$*q_h$	Implicit deflator, nonfarm residential construction, 1954: 1.00.
$*i_L$	Average yield, corporate bonds, percent.
F	Number of marriages, thousands.
I_h^e	Number of housing starts.
$*h$	Hours worked per week.
$*i_s$	Average yield, 90-day commercial paper.
$*O$	Manufacturers' new orders, billions of 1954 dollars.
$*U$	Manufacturers' unfilled orders, billions of 1954 dollars.
$*S_c$	Corporate retained earnings, billions of current dollars.
$*P_c$	Corporate profits, billions of current dollars.
T_c	Corporate income taxes, billions of current dollars.
$*q_p$	Implicit deflator, plant and equipment expenditures, 1954: 1.00.
$*D_r$	Capital consumption allowances, replacement cost, billions of 1954 dollars.
$*N_w$	Number of employees, million persons.
N_g	Number of government employees, million persons.
N_e	Number of self-employed, million persons.
W_g	Government wages, salaries and other labor income, billions of current dollars.
$*p$	Implicit deflator, gross national product, 1954: 1.00.
$*w$	Average annual wage, current dollars.
$*N_L$	Labor force, million persons.
$*F_e$	Exports of goods and services, billions of 1954 dollars.
X_w	Index of world production, 1954: 1.00.
$*F_{im}$	Imports of crude food and materials, billions of 1954 dollars.
p_i	Implicit deflator, imports of goods and services, 1954: 1.00.
$*F_{if}$	Other imports, billions of 1954 dollars.
R	End of quarter percentage of total bank reserves held in excess of required reserves.
i_r	Federal Reserve average discount rate.

* Denotes endogenous variable.

List of variables—Continued

U_d Manufacturers' unfilled orders of durable goods, billions of 1954 dollars.
U_n Manufacturers' unfilled orders of nondurable goods, billions of 1954 dollars.
$*C$ Total consumer expenditures, billions of 1954 dollars.
p_w Index of prices of competing exports, 1954: 1.00.
$*p_e$ Implicit deflator, exports of goods and services, 1954: 1.00.
G Government expenditures on goods and services, billions of current dollars.
D_a Capital consumption allowances, accounting prices, billions of current dollars.
T_i Reconciling item between net national product and national income, billions of current dollars.

Variables taken from the national income accounts in dollar totals are seasonally adjusted at annual rates. Most other variables are also seasonally adjusted.

Estimated equations:

(1) $$C_d = \underset{(51.0)}{-67.1} + \underset{(.15)}{.363}\frac{Y-T}{p_d} + \underset{(79.0)}{58.4}\frac{P}{W} - \underset{(.86)}{1.14}\frac{1}{8}\sum_{i=1}^{8}(C_d)_{-i} + \underset{(.093)}{.174}C_d^*$$

(2) $$C_n = \underset{(8.1)}{27.7} + \underset{(.044)}{.259}\frac{Y-T}{p_n} + \underset{(15.0)}{8.88}\frac{P}{W} + \underset{(.095)}{.191}\frac{1}{8}\sum_{i=1}^{8}(C_n)_{-i} + \underset{(.055)}{.0056}\left(\frac{L}{p_n}\right)_{-1}$$

(3) $$C_s = \underset{(19.0)}{-152.0} + \underset{(.017)}{.103}\frac{Y-T}{p_s} + \underset{(6.9)}{41.1}\frac{P}{W} + \underset{(.13)}{.0188}\frac{1}{8}\sum_{i=1}^{8}(C_s)_{-i} + \underset{(.024)}{.0596}\left(\frac{L}{p_s}\right)_{-1} + \underset{(.16)}{1.13}N$$

(4) $$I_p = \underset{(4.16)}{-8.18} + \underset{(4.76)}{32.5}\frac{X}{X_c} + \underset{(.0486)}{.557}\ I_p^*$$

(5) $$I_h = \underset{(1.2)}{-11.3} + \underset{(.0091)}{.0764}\frac{Y-T}{q_h} - \underset{(.47)}{.776}i_L + \underset{(.0015)}{.0011}F + \underset{(.0007)}{.00812}(I_h^*)_{-1}$$

(6) $$h = \underset{(.047)}{.721} + \underset{(.052)}{.320}\frac{X}{X_c} + \underset{(.0006)}{.00217}(X - X_{-1}) - \underset{(.00017)}{.00026}t$$

(7) $$i_L = \underset{(.15)}{.0541} + \underset{(.034)}{.0497}i_s + \underset{(.060)}{.959}(i_L)_{-1}$$

(8) $$I_i = \underset{(13.5)}{-48.42} + \underset{(.0707)}{.2675}(X - I_i) - \underset{(.06)}{.2997}\sum_{j=1}^{\infty}(I_i)_{-i} + \underset{(.075)}{.2693}(p - p_{-1}) + \underset{(.047)}{.2031}U_{-1}$$

(9) $$\frac{S_c}{q_p} = \underset{(2.5)}{-.448} + \underset{(.061)}{.938}\frac{P_c - T_c}{q_p} - \underset{(.17)}{.853}\frac{1}{8}\sum_{i=1}^{8}\left(\frac{P_c - T_c - S_c}{q_p}\right)_{-i}$$

(10) $$P_c = \underset{(5.1)}{5.49} + \underset{(.10)}{.627}\left(P - \frac{1}{3}P_{-1}\right)$$

(11) $$D_r = \underset{(3.10)}{10.8} + \underset{(.017)}{.0664}X + \underset{(.0034)}{.00599}\sum_{i=0}^{\infty}(I_p + I_h - D_r)_{-i}$$

(12) $$X = \underset{(60.83)}{90.9} + \underset{(1.485)}{1.758}[h(N_w - N_g) + N_c] + \underset{(.062)}{.196}\frac{X}{X_c}\sum_{i=0}^{\infty}(I_p + I_h - D_r)_{-i} + \underset{(.640)}{.135}t$$

(13) $$X_c = \underset{(60.83)}{90.9} + \underset{(1.485)}{1.758}N_L + \underset{(.062)}{.196}\sum_{i=0}^{\infty}(I_p + I_h - D_r)_{-i} + \underset{(.640)}{.135}t$$

* Denotes endogenous variable.

Estimated equations—Continued

(14) $$\frac{W-W_g}{p}=\underset{(7.4)}{-7.19}+\underset{(.015)}{.254}X+\underset{(.015)}{.254}X_{-1}+\underset{(.083)}{.221}t$$

(15) $$w-w_{-4}=\underset{(46.0)}{169.0}-\underset{(15.0)}{38.2}\ \frac{1}{4}\sum_{i=0}^{3}(N_L-N_w-N_e)_{-i}+\underset{(540.0)}{2110}\ \frac{1}{4}\sum_{i=0}^{3}(p-p_{-4})_{-i}+\underset{(.80)}{1.56}t$$

(16) $$U=\underset{(44)}{-101}+\underset{(.84)}{2.120}+\underset{(55)}{111}\ \frac{X}{X_c}$$

(17) $$O=\underset{(3.2)}{2.56}+\underset{(.0098)}{.0589}\ (X-I_i)_{-1}+\underset{(72.0)}{387}\ (p-p_{-1})$$

(18) $$N_L=\underset{(.21)}{61.2}\ -\underset{(.075)}{.308}\ (N_L-N_w-N_e)+\underset{(.0053)}{.226}t$$

(19) $$F_e=\underset{(1.112)}{2.98}\ +\underset{(.0115)}{.160}(X_w)_{-1}$$

(20) $$F_{im}=\underset{(.867)}{3.82}\ +\underset{(.0015)}{.0065}X_{-1}-\underset{(.804)}{1.04}\ (p_i/p)_{-1}$$

(21) $$F_{if}=\underset{(2.62)}{8.11}+\underset{(.0082)}{.039}\ \frac{Y-T}{p_i}-\underset{(5.3)}{24.1}\ \frac{P}{W}+\underset{(.15)}{.286}\frac{1}{8}\sum_{i=1}^{8}(F_{if})_{-i}$$

(22) $$L/(pX+W_g)=\underset{(.058)}{.815}-\underset{(.0131)}{.0743}\ i_L-\underset{(.92)}{1.38}\ (p-p_{-1})$$

(23) $$i_s=\underset{(.399)}{.502}-\underset{(.060)}{.146}R_{-1}+\underset{(.096)}{1.18}i_r$$

(24) $$p_d=\underset{(.034)}{.548}+\underset{(.039)}{.422}p+\underset{(.00017)}{.00067}\ (U_d)_{-1}$$

(25) $$p_n=\underset{(.027)}{.346}+\underset{(.024)}{.618}p+\underset{(.0021)}{.00946}(U_n)_{-1}$$

(26) $$p_s=\underset{(.090)}{.716}+\underset{(.000005)}{.000179}w-\underset{(.29)}{1.08}C_s/C$$

(27) $$q_p=\underset{(.028)}{-.508}+\underset{(.029)}{1.52}p$$

(28) $$q_h=\underset{(.021)}{.492}+\underset{(.000006)}{.000144}w$$

(29) $$p_e=\underset{(.063)}{.374}+\underset{(.088)}{.0688}p_w+\underset{(.12)}{.572}p$$

(30) $$p_dC_d+p_nC_n+p_sC_s+q_pI_p+q_hI_h+pI_i+p_eF_e-p_i(F_{im}+F_{if})+G=pX+W_g$$

(31) $$W+P+S_c-pX=W_g-D_s-T_i$$

(32) $$hwN_w=W$$

(33) $$W+P=Y$$

(34) $$C=C_d+C_n+C_s$$

The numbers written below coefficients in parentheses are sampling errors. In solving the system for 1953–54 and 1957–58 we used equations 1, 2, 3, 4, 5, 6, 12, 13, 14, 16, 17, 18, 20, 21, 30, 31, 33. We added an equation for taxes and transfers

$$T=0.2+.093Y \text{ for } 1953(\text{i})-1953(\text{iv})$$
$$T=\quad .0768Y \text{ for } 1954(\text{i})-1954(\text{iv})$$
$$1957(\text{i})-1958(\text{iv}).$$

In order to retain linearity in the solution, for each period, we used

$$P/W=(P/W)_{-1}$$

in equations 1, 2, 3, 21. In identity 33, we then wrote

$$Y_t=W_t+(P/W)W_t.$$

Equations 1, 2, 3, 4, 5, 14, 20, 21, 30, 31, 33 were reduced to a linear relation between I_i and X. After substitution of assumed or lagged values in (8), we obtained another linear relation between I_i and X. The constant terms of these equations for each 8-quarter sequence of calculations were adjusted so that both linear relations passed through the observed points (I_i, X) in the first quarter of 1953 and again in the first quarter of 1957.

The capacity variable, X_c, enters in the denominator of the "operating rate" in equations (4), (6), and (12). In order to keep our calculations linear, we computed X_c from

$$(X_c)_t=90.9+1.758(N_L)_{t-1}+.196\sum_{i=1}^{\infty}(I_p+I_h-D_r)_{t-i}+.135t.$$

In this way, $(X_c)_t$ was effectively predetermined for each quarter's solution, and linearity was preserved in the simultaneous solution of the other equations. In the starting quarter of each solution sequence we used actual values of X_c.

The constant term of equation (16) was increased by the average residual for the 5 quarters ending 1953(i). This increase was 23.8. No adjustment was made for the sequence 1957–58.

TABLE I.—*Private gross national product* (X)

[Billions of 1954 dollars]

	Actual	Model forecasts				
		No inventory adjustment	With I_i dampened by 25 percent	With sales coefficient reduced by 25 percent	With I_i dampened by 75 percent	With sales coefficient reduced by 75 percent
1953:						
I	334.72	334.72	333.95	334.99	332.07	335.03
II	338.87	337.64	337.06	338.26	335.87	336.44
III	335.69	332.65	333.54	333.45	334.34	336.60
IV	329.64	331.29	333.14	334.47	337.37	341.13
1954:						
I	326.43	328.18	329.04	333.17	334.17	336.36
II	325.35	341.27	338.65	338.73	335.70	334.86
III	327.40	343.62	340.95	337.47	335.17	333.14
IV	335.33	349.23	345.55	341.47	337.16	334.28
1957:						
I	371.90	371.90	371.65	370.31	365.76	367.96
II	373.03	369.82	370.35	368.36	364.33	365.80
III	373.24	367.90	369.16	366.89	365.57	365.58
IV	366.76	368.94	371.57	370.03	368.57	368.86
1958:						
I	353.72	365.98	368.78	373.73	369.51	369.06
II	355.02	378.10	380.77	381.94	381.16	380.98
III	360.25	388.62	390.69	389.92	389.71	389.87
IV	370.89	397.91	398.06	396.04	395.26	395.50

TABLE II.—*Inventory investment (I_i)*

[Billions of 1954 dollars]

	Actual	Model forecasts				
		No inventory adjustment	With I_i dampened by 25 percent	With sales coefficient reduced by 25 percent	With I_i dampened by 75 percent	With sales coefficient reduced by 75 percent
1953:						
I	2.6	2.60	1.95	2.65	0.65	2.60
II	3.2	2.27	1.70	2.68	.57	1.84
III	.7	.91	.68	1.26	.23	1.63
IV	−4.6	.75	.56	1.24	.19	1.91
1954:						
I	−2.5	−.93	−.70	.04	−.23	.57
II	−2.9	2.69	2.02	1.76	.67	−.11
III	−2.0	2.04	1.53	.26	.51	−.44
IV	.8	3.27	2.45	1.07	.82	−.50
1957:						
I	2.3	2.30	1.73	2.04	.58	2.05
II	3.7	1.12	.84	.93	.28	.80
III	2.5	−.24	−.18	−.30	−.06	−.18
IV	−.5	.32	.24	.63	.08	.46
1958:						
I	−6.4	−1.51	−1.13	.01	−.38	−.77
II	−5.3	1.47	1.10	1.47	.37	.40
III	−3.2	3.24	2.43	2.62	.81	.98
IV	1.1	4.90	3.68	3.20	1.23	1.37

TABLE III.—*Personal income (Y)*

[Billions of current dollars]

	Actual	Model forecasts				
		No inventory adjustment	With I_i dampened by 25 percent	With sales coefficient reduced by 25 percent	With I_i dampened by 75 percent	With sales coefficient reduced by 75 percent
1953:						
I	275.4	270.89	270.62	270.99	269.98	271.00
II	278.6	273.79	273.32	274.09	272.27	271.45
III	279.5	273.22	274.61	273.71	273.20	274.17
IV	274.9	270.88	271.81	272.23	273.54	275.60
1954:						
I	276.4	272.96	273.35	277.01	276.60	277.36
II	275.9	278.74	276.96	278.42	277.72	278.19
III	277.8	283.55	282.01	280.82	278.97	277.97
IV	281.7	289.56	287.34	284.68	282.37	280.64
1957:						
I	334.3	327.91	327.82	327.31	325.64	326.45
II	335.5	330.78	331.13	329.90	326.71	328.08
III	339.6	333.88	334.56	332.96	330.95	331.51
IV	336.5	335.77	337.26	335.82	334.76	334.88
1958:						
I	334.6	337.60	339.66	340.97	338.81	338.74
II	335.3	347.60	349.71	352.06	350.14	349.89
III	343.4	360.79	362.61	362.76	362.37	362.37
IV	346.6	367.83	368.69	367.61	367.24	367.38

TABLE IV.—*Private employment (excluding self-employed)* (N_w)

[Millions of persons]

	Actual	Model forecasts				
		No inventory adjustment	With I_i dampened by 25 percent	With sales coefficient reduced by 25 percent	With I_i dampened by 75 percent	With sales coefficient reduced by 75 percent
1953:						
I	56.80	54.67	54.32	54.79	53.34	54.53
II	56.27	54.90	55.37	54.93	55.63	56.15
III	55.87	53.28	53.48	53.48	53.33	53.83
IV	55.81	52.27	52.70	52.96	53.30	54.26
1954:						
I	55.59	50.57	50.91	51.83	52.05	53.31
II	54.80	51.79	51.48	51.93	51.36	51.49
III	54.42	52.93	52.07	51.65	50.72	50.21
IV	54.71	53.79	52.69	51.65	50.33	49.56
1957:						
I	58.56	54.09	54.10	53.90	53.24	53.66
II	58.50	54.71	54.84	54.34	53.07	53.59
III	58.45	53.76	54.01	53.45	53.29	53.39
IV	58.08	53.09	53.71	53.20	52.85	52.77
1958:						
I	57.55	52.45	53.11	53.70	53.16	52.89
II	57.25	53.53	54.26	55.02	54.61	54.50
III	56.96	56.02	56.51	56.61	56.11	56.21
IV	57.56	57.56	58.06	57.80	57.34	57.42

TABLE V.—*Unemployment* (N_L–N_w–N_g)

[Millions of persons]

	Actual	Model forecasts				
		No inventory adjustment	With I_i dampened by 25 percent	With sales coefficient reduced by 25 percent	With I_i dampened by 75 percent	With sales coefficient reduced by 75 percent
1953:						
I	1.54	1.28	1.55	1.19	2.30	1.39
II	1.45	1.42	1.06	1.40	.87	.47
III	1.43	2.64	2.48	2.48	2.60	2.20
IV	1.98	3.73	3.41	3.21	2.95	2.21
1954:						
I	3.01	5.07	4.83	4.10	3.94	2.97
II	3.30	4.32	4.56	4.22	4.65	4.55
III	3.38	3.59	4.25	4.57	5.28	5.67
IV	3.15	2.98	3.82	4.62	5.63	6.21
1957:						
I	2.66	4.73	4.73	4.88	5.38	5.06
II	2.85	4.33	4.08	4.61	5.58	5.18
III	2.85	5.27	5.08	5.51	5.63	5.55
IV	3.37	5.86	5.39	5.79	6.05	5.67
1958:						
I	4.27	6.63	6.12	5.67	6.08	6.29
II	5.04	6.09	5.53	4.95	5.27	5.35
III	4.92	4.36	3.82	3.91	4.34	4.22
IV	4.37	3.24	2.86	3.06	3.42	3.36

TABLE VI.—*Utilization of capacity* (X/X_o)

[In percent]

	Actual	Model forecasts				
		No inventory adjustment	With I_i dampened by 25 percent	With sales coefficient reduced by 25 percent	With I_i dampened by 75 percent	With sales coefficient reduced by 75 percent
1953:						
I	96	96.0	96.0	96.0	95.2	96.3
II	96	96.1	95.9	96.4	96.0	96.0
III	95	93.7	93.9	93.9	94.4	95.0
IV	90	92.6	93.1	93.4	94.6	95.5
1954:						
I	87	91.1	91.3	92.4	93.0	93.0
II	86	94.1	93.3	93.2	92.6	92.2
III	86	93.8	93.1	92.0	91.7	91.1
IV	88	94.3	93.5	92.4	91.6	90.8
1957:						
I	94	94.0	94.0	93.6	92.5	93.0
II	92	91.8	91.9	91.5	90.8	91.1
III	92	90.5	90.9	90.4	90.4	90.4
IV	88	90.2	90.8	90.5	90.5	90.6
1958:						
I	83	88.7	89.5	90.8	90.1	90.2
II	81	91.2	91.8	92.0	92.3	92.0
III	87	92.9	93.4	93.1	93.5	93.5
IV	88	94.6	94.3	93.7	93.9	93.9

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AVAILABILITY AND RELIABILITY OF INVENTORY DATA NEEDED TO STUDY ECONOMIC CHANGE

By

ELMER C. BRATT
Lehigh University

LETTER OF TRANSMITTAL

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., November 27, 1961.

Hon. WRIGHT PATMAN,
Chairman, Joint Economic Committee,
U.S. Congress, Washington, D.C.

DEAR MR. PATMAN: In response to the request of the Joint Economic Committee, the Office of Statistical Standards undertook to provide an up-to-date summary of the status of inventory statistics with particular reference to recommendations made in 1955 by the Consultant Committee on Inventory Statistics of the Board of Governors of the Federal Reserve System.

I am pleased to transmit to the committee a report on the "Availability and Reliability of Inventory Data Needed To Study Economic Change" prepared for the Office of Statistical Standards by Prof. Elmer C. Bratt, of Lehigh University, as consultant to the Bureau of the Budget.

I am certain that you will find Professor Bratt's report most useful, not only as a summary description of the current status of inventory statistics but also as a valuable commentary on the significance of inventory movements in explaining economic change.

Sincerely yours,

/s/ R. T. Bowman,
RAYMOND T. BOWMAN,
Assistant Director for Statistical Standards.

AVAILABILITY AND RELIABILITY OF INVENTORY DATA NEEDED TO STUDY ECONOMIC CHANGE

Preface

This report on the "Availability and Reliability of Inventory Data Needed to Study Economic Change" is the fourth of a series of technical reviews which the Bureau of the Budget through its Office of Statistical Standards plans to issue from time to time. It differs from the earlier reviews in that it is a report to the Bureau by a consultant rather than a report of the Bureau. This report was prepared by Elmer C. Bratt, professor of economics, Lehigh University, as consultant to the Bureau of the Budget, assisted by Charles W. King of the Office of Statistical Standards. We are indebted to Dr. Bratt for an excellent description and analysis of the present status of inventory statistics in the United States.

Major orientation in the development of the analysis presented by Dr. Bratt was provided by the 1955 report of the Consultant Committee on Inventory Statistics of the Board of Governors of the Federal Reserve System. In his report, Dr. Bratt comments on each of the 32 recommendations of the Consultant Committee, adds 10 recommended improvements in inventory statistics to those of the Consultant Committee, comments on problems associated with the timeliness, reliability and comparability of current inventory data and presents, in a statistical appendix, comprehensive historical statistics from our major inventory series and descriptions of these series.

Review of our inventory statistics was undertaken at this time in response to a request from the Joint Economic Committee of the Congress. Two major objectives of this study are:

(1) To provide users with additional insight into the strengths and weaknesses of inventory statistics; and

(2) To provide further information to guide the improvement of inventory statistics.

Consonant with the second of these objectives, the report constitutes an effective source for reference in the development of programs to improve our inventory statistics. Dr. Bratt notes most of the principal improvements that have been made in our inventory statistics since publication of the Consultant Committee's report in 1955: viz, the efforts to learn more about current inventory accounting practices and to develop survey techniques consistent with these practices; accomplished and planned improvements in the Monthly Industry Survey; improvements in both the quality and quantity of inventory statistics produced by the Internal Revenue Service; improvements in the basic data underlying our current retail trade and wholesale trade inventory statistics; and the initiation by the Office of Business Economics of a promising series on inventory anticipations. He notes, too, the major problems, stemming primarily from the fact that many—if not most—business firms do not maintain current inventory records, associated with efforts to improve

our inventory statistics and cautions against committing scarce resources to meeting those of the Consultant Committee's recommendations for which the prospects of improvements in either quality or quantity are not substantial. And, finally he recommends a series of needed improvements in addition to those proposed in the Consultant Committee's report.

Dr. Bratt's report will be studied in detail by the Office of Statistical Standards in the course of developing proposals for improvements in the Federal statistics system. Understandably, the paucity of comprehensive current inventory records, the fact that virtually all programs of the Federal Government under which inventory data are collected are components of more comprehensive programs and are, to a great extent, limited by the larger program as well as the existence of demands of competing statistical programs for the limited resources that are available for making improvements in Federal statistics must be recognized as factors to be taken into account in efforts to carry out recommendations for improvement of inventory statistics. The challenge of the recommendations is to overcome these obstacles.

Many individuals within and without the Government have contributed time and energy to this study as the work progressed. Specific recognition of all of these individuals is impractical, but as a minimum mention should be made of Messrs. Frank R. Garfield, Kenneth B. Williams, and Clayton Gehman of the Board of Governors of the Federal Reserve System; Louis J. Paradiso, Lawrence Bridge, Murray F. Foss, and George M. Cobren of the Office of Business Economics of the Department of Commerce; Irving Rottenberg, Isadore Bogdanoff, Louis Shapiro, Paul Shapiro, and Milton Eisen of the Bureau of the Census of the Department of Commerce; Ernest J. Engquist, Jr., and Miss Helen F. Demond of the Internal Revenue Service of the Treasury Department; Messrs. Edwin L. Todd of the General Services Administration; Wilbert G. Fritz of the Office of Emergency Planning; Marshall Crossman of the Department of Defense; Carey P. Modlin of the Office of Statistical Standards of the Bureau of the Budget; Frank Winters and E. F. Andrews of the National Association of Purchasing Agents; and M. K. Horne, Jr., of the National Cotton Council of America.

RAYMOND T. BOWMAN,
Assistant Director for Statistical Standards.

INTRODUCTION

The total inventory holdings in the hands of business and the Federal Government were approximately $181 billion in mid-1961.[1] As noted in the section of this paper discussing reliability, the probability is that the above figure is a bit low (for instance, $55 billion may be more probable for manufacturing than the slightly smaller, currently quoted figure given below). Furthermore, there are some areas where inventories are not covered, e.g., defense inventories in the hands of military consuming units (see note on table VI–4). The figure does, however, express the general order of magnitude.

The business inventories are comprised of—

Industry:	*Billions of dollars*
Manufacturing	53. 4
Wholesaling	13. 5
Retailing	24. 6
Farm	23. 6
Other [1]	9. 0
Total business	124. 1

[1] So far as possible, June 30, 1961, figures are employed. However, the most recent figures available for farm stocks are for January 1, 1961, for Commodity Credit Corporation December 31, 1960, and for Government defense and civilian departments June 30, 1960. If all of these figures had actually been available for June 30, 1961, the total shown would not have been significantly different. We have developed the "other" business inventory figure of $9 billion from a blowup and extrapolation of Internal Revenue Service data.

The Federal Government inventories are comprised of—

Government agency:	*Billions of dollars*
Defense	41. 7
Commodity Credit Corporation	7. 4
Stockpile	7. 8
Civilian departments	. 3
Total	57. 2

Why do we summarize only business and Federal Government inventories? To answer this question we should consider (*a*) meaning of inventories, and (*b*) availability of data.

The character of inventories is that of goods awaiting use. Presumably there is but a limited quantity of goods of that kind in the hands of consumers for any significantly extended period of time. At least, all available estimates of consumer holdings emphasize goods in use—principally various durables and clothing. Goods in use are excluded from the figures presented above.

Holdings by State and local governments might well be included in the above figures to the extent that they are awaiting use. We have no such figures for State and local governments, however. Possibly, their amount would not be great enough to be of major significance.

Inventories of the types we consider here have been compared to a pipeline. Delivery at the using end is not possible unless the pipe is fed from the supply end. In this paper we find the inventory flow important principally because of irregularities and interruptions which occur. What this comes to, as we shall elaborate below, is that at times the "pipe" can be made to flow with less water (inventory stock) than at other times. We are deeply concerned with this variation in amount which has to be held in the pipe.

It will be noted that Government inventories usually show less variation than business inventories. Occasionally the movement in Government inventories is very substantial, resulting in a major impact on business conditions. That is the reason why we should consider Federal Government as well as business inventories.

We are fundamentally interested in the interruptions and irregularity of total inventory flow. We do note however that certain "stocking points" arise in the inventory flow, where the movement from production to consumption tends to be interrupted. It is at those points where general economic influences are generated. The reason we do not give those points more consideration is that so far their nature and the relation between them is so little understood that basic facts about them are needed now before effective hypotheses can be formulated.

In this paper, we look at the problem of inventory data needed for the purpose of explaining economic conditions from a broad point of view. Since the problem to be faced centers on the explanation of economic conditions, data needed can be seen to depend on the manner by which economic conditions are explained. Our present understanding permits a wide enough range of possibilities that the pinpointing of inventory data needs should provide for the requirements visualized along the lines of a reasonable range of approaches to the problems of economic conditions.

Work now in progress promises or at least hints at many exciting developments in the explanation of economic conditions. This fact is amply indicated by other papers now being prepared for the Joint Economic Committee. Since the present study was developed simultaneously with these other papers, their precise content was not available to us in spelling out the perspective presented here. All of the work covered, however, has the common heritage of published explanations and presently available data. Starting with present accomplishments, our purpose is to point up the needs now indicated.

Clearly, such indications cannot be expected to correspond precisely with the kind of blueprint needed some years hence when we have reached new conclusions with respect to the causal influence of inventory decisions. We cannot afford to look to the ultimate requirements for inventory data. We must look to the data needed to explain what is universally agreed by informed analysts to be the action of inventories and what is surmised by the most promising theories. While that requirement may add up to more information than would be necessary with more confident information on causal influences, the prescription is similar in various fields of knowledge. We need enough information to test many promising theories, even though some of those theories probably will not prove to be helpful in a positive way. We must have enough information so that we can identify the promising hypotheses and reject the unpromising ones.

The Nature of Available Inventory Data

The principal interest in inventory data relates to relatively short periods of time, usually to changes occurring in a few months or even shorter time intervals. Information for such purposes must be obtained by current surveys.

Current surveys may be tied to more comprehensive estimates, which we may typically call benchmark data, although sampling developments now make possible substantially independent current surveys, especially in relatively small universes. The distinction between current-survey data and benchmark data is fundamental. Benchmark data provide amounts around which the current-survey data can be made to vary.

A most basic distinction for our purposes is that between the level of inventory stocks and the change in stocks. The reason for the importance of this distinction is that it is the change in inventory stocks and not their level which influences current economic production, although the change data are customarily derived from stock data. For instance, if inventory stocks amount to $100 billion both this month and next month, nothing has thereby happened to change economic conditions between the 2 months (assuming that

the composition of the inventory stock remains substantially the same). No additional production is required to add to inventory for the level of inventories is assumed to remain unchanged. If, however, the level of inventories is increased from $100 billion to $101 billion, $1 billion worth of goods has to be produced so that the inventory level can be increased. Similarly, if the inventory level is reduced from $100 billion to $99 billion, $1 billion of sales is not out of production.

Change in inventory stocks can be called inventory investment. It is just as truly investment as is expenditure for plant and equipment. That is, adding to inventory stock adds to the assets held by a company just as adding to plant and equipment does. The total stock of inventories held and the total plant and equipment owned represent balance-sheet items, contrasted with current outlays for those purposes which represent operating-statement items. It is the operating-statement items which exert a direct influence on economic conditions.

Only when we are dealing with a physical inventory count can we simply obtain the current investment outlay by taking the difference in inventory stocks and disregard price factors. Depending on the type of inventory system employed, an adjustment may be required to allow for different prices existing at different times when the inventory stock was accumulated. Otherwise, the difference in value of inventory stock at two dates may partly reflect the rate at which inventory items were priced into the inventory stock as well as the change in production required. For that reason, an inventory valuation adjustment is usually required to obtain a figure which will show current outlay on inventory investment. Unfortunately, the detailed information necessary for estimating inventory valuation adjustment is not readily available, and for only one set of data now currently published has such an adjustment been made. (See appendix tables I–2 to I–5.)

General Uses of Inventory Data—Economic Functions

Inventory stocks serve a varied list of economic functions. While current outlay for inventory investment, which is discussed in the following section, is the critical type of inventory data needed to study economic change, attention should also be directed to the most important economic functions inventory stocks reflect. Inventories represent a part of our total wealth, and as such are a part of the total resources employed in production. They share in resources used with more durable types of capital stock and labor force resources potentiality which are or may be employed in providing output. Also, inventory stocks may be increased as a buffer against future needs rather than as resources currently employed in production. A stockpile may be accumulated to take care of times of shortage or to provide for possible war. A statement of the military stockpile is presented in table VI–3 of the statistical appendix attached to this paper. As a method of caring for future shortages which might otherwise appear, inventory stocks are not generally emphasized in the United States at the present time (except in some cases of adjustment to seasonal needs).

In addition to the military stockpile, inventory stocks may be increased or decreased either passively or actively to accommodate

market changes. The accumulation of agricultural surpluses in pursuance of Government support of farm prices is largely representative of an active policy, although, in any case, an increase in stocks of agricultural products is likely to occur in years of unusually large production. Information on Government stockpiles of farm products is presented in table VI–2 of the appendix, and data on private holdings on farms are shown in table V–1.

Further illustrations are provided by policies followed in industrial production and generally in distribution. For instance, a fairly steady production schedule may be set in a manufacturing concern, so that inventories may be passively reduced or increased because sales fall short or overshoot the implied anticipations. An active policy may be pursued of accumulating or reducing inventory to stabilize production schedules. Policies of that sort are fairly common for the purpose of reducing seasonal fluctuations in production. They are much less common in relation to less regular market fluctuations, such as movements of the business cycle.

In all cases of economic functions here illustrated there is a direct relation to the economic effects produced by current outlay for inventory investment. Adding to the stockpile will, in most cases, force additional production, and reduction of it will slacken production. (Adding to the stockpile of agricultural commodities, however, may result merely from an unusually large crop.) Passive accumulation of inventory stocks as a result of maintaining production in the case of unanticipated declines in sales will support productive activity for the time being, but may result in more than an offsetting effect by dampening business anticipations. Passive reduction of inventory stocks can be expected to have opposite effects. Active policy to reduce or add to inventory stocks as a device for dampening seasonal variation in production throughout the year is unlikely to have any lasting effect on productive activity for the reductions and increases are set to balance each other out and are rather fully anticipated.

Use of Inventory Data in Interpreting Economic Change

As noted above, the major inventory influence must be traced to changes in inventory stocks rather than to level of stocks. Change in the level of inventory stocks over a period of years is relatively so insignificant that it ordinarily may be disregarded in analyzing current economic conditions. Variation in the change in inventory stocks is, on the other hand, very important largely because, in times of recession, it comes to represent a greater part of the movement in gross national product than does any other type of expenditure. The proportions from peak quarter to low quarter in the postwar recessions are as follows:

	Percent inventory change is of change in GNP (rounded figures)
Peak to low quarter:	
2d quarter 1960 to 1st quarter 1961	190
3d quarter 1957 to 1st quarter 1958	50
2d quarter 1953 to 1st quarter 1954	60
4th quarter 1948 to 2d quarter 1949	100

These percentages are surely impressive and do clearly indicate something of the importance of the movement in inventory investment in recessions. We assume that it was figures of this sort which set up chains of thought responsible for the present studies suggested

by the Joint Economic Committee. Clearly, however, care must be taken in drawing quick conclusions on causal influences. To an undetermined extent, inventory change acts as a buffer in providing successive adjustments between production and consumption or sales. At most times it would appear that the indicated lack of coordination is not looked on by the businessman as particularly undesirable: perhaps he does not feel he can afford to insist too rigidly on the level of inventory which is to be achieved. If these suppositions approximate the truth, the cause of inventory change must be sought in the production or consumption processes rather than in inventory change which would be assumed merely to reflect what takes place with respect to production and consumption decisions. In other words, the major problem would be one of achieving better coordination between production and consumption rather than of stabilizing inventory change which reflects the lack of coordination.

The situation is different when businessmen center their attention on changing inventory stock levels, as usually happens in a recession. At such a time, apparently three things are happening. (1) A change in sales levels requires a proportionate change in inventory stock levels, and this forces a disproportionate change in inventory investment: to bring stocks into line requires a quick reduction in the amount currently being invested in inventory. (2) Since the recession quickly reflects ready supply availability in most lines of business, standards on needed inventory levels may be quickly cut, adding still further to the shrinkage in inventory investment. (3) In many cases the sales level provides an overly restrictive standard because sales fall not only as a result of reduced consumption but also as a result of cuts in inventory levels in later stages of distribution.

These situations represent typical motives for reducing inventory stocks. How important they are as contrasted with other forces depends on where we center our attention. With business planning focused on a longer period, sharp reductions in inventory stocks might not be attempted if sales should show a temporary sagging. Pessimistic reactions to current market conditions also might not bring a reduction in desired inventory stocks with the existence of carefully developed market analysis. Certainly, a fuller realization of the extent to which the reduction is founded on shrinking inventories at distributive levels would alleviate the panic which may be felt by some manufacturers in recession.

Thus, the part played by intended reductions in inventory stocks will vary in relation to the type of management control employed. Furthermore, we cannot prescribe measurements which will precisely indicate different kinds of unintended inventory investment, a point which is more fully discussed in the following section.

Unintended shrinkage in inventory stocks may occur in prosperous conditions if (1) the businessman underestimates the advance to be expected in sales or (2) supplies become so scarce that all businesses cannot obtain inventories of desired levels. Historically, we do not find that these influences ordinarily exert a preponderant effect on short-term economic conditions, but contrasting these factors with later developments may provide a very important backdrop for the rapid inventory runoff which occurs in recession.

This is because of the change in attitude which may come to arise with respect to inventory stocks. If, for a period of 2 years or so,

inventory stocks have persistently appeared to be too low, little attention may come to be paid to large increases in stocks when they finally occur. If large increases do occur, they will not be unrelated to shifts in economic conditions. They will probably indicate an easing in the supply situation, and may represent a part of the unfolding influences leading to recession. Thus, inventory stocks may grow to a rather unhealthy state without arousing substantial anxiety. If this actually does happen it can be expected to contribute to the panic which develops in recession: inventories, which have become overexpanded with respect to sales at prosperous levels, will look more distressing than will those which have been kept in better balance.

Measurement of Intended Inventory Investment

The significance of data on changes anticipated in inventory stocks is apparent. If we know what businessmen are planning, we have an indicator of a decisionmaking force. Rising inventory accumulation or efforts to provide a rising accumulation is an expansionary influence. A leveling of inventory accumulation or actual runoff of inventory stocks is contractionary.

A fact which should not be overlooked is that a prediction of what will happen to the change in inventories is perhaps less important than knowledge of what change in inventories is being attempted. This is partly because the very effort to increase or decrease inventory stocks often defeats itself; when a changing rate of expenditure for inventory is attempted multiplier effects arise. A continuation of past inventory movements may occur while efforts to change the movement may work through to a change in total expenditures in the economy (a change in GNP). When inventory anticipations are thwarted by multiplier effects a powerful further anticipatory influence is induced. If inventories are not increased even though that was the intention businessmen may redouble their efforts to increase them in the next time period.

The influence is even more potent in a contractionary direction. If inventory stocks do not fall as intended businessmen tend quite universally to react with substantial violence. Knowledge of intended runoff of inventories is of major importance in understanding the economic outlook.

Inventory anticipations on the up side are not only characterized by less urgency, but may actually be quite vague. Desirable inventory levels may be characterized by a fairly wide acceptable range. Until inventory stocks have fallen in an expansionary period to what are considered to be critically low levels, production planning may be aimed almost wholly at sales requirements with little concern given to the change which may occur in inventory stocks. This introduces an unsolved problem in measuring inventory anticipations when a company is experiencing increasing sales. Since inventory changes may not be explicitly planned, the decision maker may not be able to provide a meaningful quantitative figure on inventory anticipations.

We are very fortunate in the recent publication [2] of a measurement of inventory anticipations by the Department of Commerce. The available record of inventory anticipations indicated by that survey are shown in table II–6. Knowledge of what businessmen plan reveals one of the responsible forces in the business situation. This is particularly important in our present study because such knowledge should throw into clearer light the influence of inventory decisions. We should emphasize that the important question is not how good a forecast the inventory anticipation represents. A forecast of inventory changes should take into consideration more factors than the businessman's anticipation of inventory changes at least until the forecasting of businessmen becomes more sophisticated than it is now.

The Importance of Inventory Data

Some recent work on the relation of change in inventory stocks to economic conditions highlights the importance of data on orders received by companies. The underlying idea may be stated, although in an exaggerated form, by the following proposition: if goods were produced wholly on order, rather than to, stock inventory stocks could not depart from desired (or intended) levels. With exact knowledge as to what is to be shipped, inventory change need not provide a buffer in adjusting production to sales levels. Production could be geared to sales exactly so that inventory levels might always lie at intended levels.

That type of analysis has led to the idea that disequilibrium in inventory decisions grows out of the loose-jointed relation between production and sales when production is made to care for future sales rather than for orders placed in advance. This proposition takes disturbing inventory decisions out of the realm of dependence on factors in the total economy and places them in relation to the particular variables the businessman faces. A study of the way each individual businessman faces the decisions he has to make on inventories in the light of uncertain future sales would then appear to identify the economic disturbances arising from fluctuation in inventory investment.

Although the thought is sometimes expressed, when this line of thinking is pursued, that study should be concentrated on individual companies, efforts have been made to aggregate the disturbing influence on inventory change of producing for uncertain future sales. Zarnowitz suggests the simplification: classify firms as involved in production to stock when finished goods inventories are typically greater than unfilled orders, and as involved in production to order when unfilled orders are typically greater than finished goods in-

[2] See Murray F. Foss, "Manufacturers Inventory and Sales Expectations: A Progress Report on a New Survey," Survey of Current Business, August 1961. Fortune magazine started a survey asking a limited number of businessmen for quantitative projections of inventory stocks and for a statement on the level of current inventory stocks in relation to sales in November 1953. See "An Appraisal of Data and Research on Businessmen's Expectations About Outlook and Operating Variables," Report of Consultant Committee on General Business Expectations (Board of Governors of the Federal Reserve System, September 1955), pp. 87–92 for a description of that survey. Also, for a brief appraisal, see Thomas F. Stanback, Jr., "A Critique of Inventory Forecasting Approaches," American Statistical Association 1960 "Proceedings of the Business and Economic Section," pp. 100–103. Over the years, the Fortune survey has provided interesting information, and may be rated as a useful check, but we give no further attention to that survey in this paper because of the fact that its coverage is less adequate and it is less effectively related to sales anticipations than the Commerce survey.

ventories.[3] The latter case covers principally durable goods industries, and these represent much of the disturbing inventory variation. One might be led to conclude that advance ordering is unstabilizing rather than the reverse. Industries classified as "production to stock" by this scheme do not locate the principal inventory disturbance.

Perhaps production to stock actually is much more prevalent in industries where advance ordering is found that one would expect. Advance orders may not predominantly mean "made to order" in the sense that nonstandardized goods are produced. We need to know the extent to which standard products are involved for, where they are, production to stock may actually become very important at critical times in spite of advance ordering. This might occur if the producing companies involved typically carry finished stock to fill rush orders and if the level of such stock is often viewed as satisfactory within a relatively wide range. During prosperity when such stock tends to dwindle the company may at first feel satisfied to see any increase which may ultimately occur, only to become disturbed if a recession appears and inventories continue to rise while shipments fall substantially.

Orders do not guarantee continued commensurate levels of production in the near future in all cases, and perhaps not in most cases. The existence of an order backlog does not predetermine the rate at which shipment will be requested. Furthermore, at critical times a large part of the order backlog may be canceled if supply conditions are substantially eased. A high level of orders may, to an important extent, be due to a practice of customers ordering full requirements from several different suppliers.

Until these points are better understood, it would not be prudent to place too much emphasis on order data. Later in this paper, recommendations are made for the development of additional information on the meaning of orders so that their relation to inventory variation may be seen in clearer perspective. In the meantime, we present in the statistical appendix the most important order data where inventory-stock data are also available. In reading these order data the vagueness of their meaning should be kept in mind.

The Level of Sales as an Indication of Needed Inventory Stock

Although the motivation in inventory accumulation is not entirely clear, the fact that inventories are needed to service sales is incontestable. It is generally believed that, in the United States, to an increasing extent, servicing sales represents the principal motivation and that holding inventories as a speculation on price changes has faded. If that is true the level of sales is a highly significant, if not unique, criterion of the desired level of inventory stocks. For that reason, wherever possible sales figures are shown in contrast with inventory stock figures in the statistical appendix.

While it is generally agreed that sales are the major or even predominant determinant of desired inventory levels, the exact relation has not been firmly established. We do know that the inventory

[3] Victor Zarnowitz, "The Timing of Manufacturers' Orders During Business Cycles," Geoffrey H. Moore, editor, Business Cycle Indicators, vol. I (Princeton University Press, 1961), p. 425.

sales ratio tends to decline with larger sales in an operating unit, but the nature of the declining function is rather vague. Furthermore, it appears that efficiency in the use of inventories has been increasing—that a long-term decline in the inventory/sales ratio has been occurring—but the current rate at which that change is occurring is not very clear. One factor which may have speeded up the rate is better and prompter record-keeping, especially with the aid of high-speed electronic calculators. Another factor may be faster transportaion.

An opposite influence on change in the overall inventory/sales ratio may arise from a new variety of goods and from accelerated growth of new small firms. In both cases new operations are introduced which can be expected to add relatively more to the numerator than to the denominator of the overall ratio. These operations are not likely to arise at a regular rate over time. The formation of small businesses tends to occur most rapidly early in business expansions. The rate of introduction of new varieties of goods may be less dependent on changes in the business cycle, but tends to vary a great deal from one time to another.

Clearly, more detailed information is needed to make possible more precise interpretations of prevailing levels of the inventory/sales ratio. We present below recommendations looking to that end.

The suggestion has sometimes been made that an inventory/orders ratio would be a more reliable guide than an inventory/sales ratio. One fact in this connection is that orders do not differ from sales in many types of transactions. In those types where there is a difference, orders refer more to future than to present needs; it may be more pertinent to say that inventory levels should be adjusted to future sales than to say that they should be adjusted to orders. Orders certainly do not represent a perfect forecast of future sales, and therefore order data should be employed as only one of the variables to forecast future sales rather than as a sole forecast of future sales. The use of orders as an indication of need for inventory stock could scarcely be held to replace the level of sales as a guide.

Generalizations on Needed Inventory Data

How much inventory detail is needed?—Since inventory change affects total economic production, representation of the total influence of changing inventory stocks is a significant objective. The need for measurement of the overall influence is highlighted by knowledge of multiplier effects, which relate to interrelations in the total economy. Three major facts point to the limitations of representations shown by overall figures:

(*a*) Since the movement of total production in the economy influences decisions made in changing inventory stocks, production decisions influence inventory change as much or more than inventory changes influence total production. The discovery of factors responsible for production decisions must, at least to some extent, be studied at the industry level where such decisions are made.

(*b*) The influence of a change in inventory stock is not uniform throughout industry. Notably, changes in farm inventories produce a more belated and a less clear production effect than do changes in other areas of the economy. Less important, but

significant differences, may arise in other parts of the economy because of variations in the extent to which rapid change in anticipations produce a violent reaction. Thus, the parts represented in total inventories may vary in significance.

(*c*) Substantial variation in the inventory/sales ratio among industries means that important changes in the overall inventory/sales ratio could well occur merely as a result of shifts in the total industy mix.

The conclusion is that, to an undetermined extent, study of inventory change is needed at detailed industry levels. Figures on aggregate inventory/sales cover up uncorrelated movements which are always occurring within the economy. The best way to get an early impression of the influences arising from inventory investment is to study the influences arising in particular industries where the greatest revisions in anticipations are occurring. How fine the detail needs to be is an unresolved question. The more microscopic the study is the more likely erratic influences having little to do with the total economy become.

Furthermore, the specific influences at detailed levels cannot be fully evaluated in relation to the total economy without moving to an aggregate inventory/sales relationship because most multiplier forces show up at the aggregate level. The extent to which detailed inventory data are needed is undetermined, and therefore, to provide for the study of various hypotheses, some experimentation on greater detail than is now provided would be useful.

Stages of fabrication.—We know that inventory behavior varies by stage of fabrication, and different motivations may reasonably be inferred. Unfortunately, we have found no practical way of developing the stage-of-fabrication classification by commodity without regard to its position in an individual establishment. Finished goods in one plant often become raw materials in another. Analysts, nevertheless, often emphasize the desirability of classifying commodities without respect to the establishment holding the inventory. The points made above with respect to need for detail on total inventories apply as well to classifications in relation to stage of fabrication.

Plant and company units in tabulating inventories.—Clarification is needed on differences in tabulation of inventories which result when plant, rather than company, records are employed. At the company level the inventory stock may appear to be less. Goods may pass through production lines faster, and fewer goods in process may appear to be needed. Although part of the difference may no doubt be real, another part of it may be due to less need to break stages of production down as much within individual companies as they are of necessity broken down when performed by different companies. An unsolved question is the extent to which company data on inventories should be preserved if more plant level data are obtained.

The chief argument for company data is that decisions may at least partly be generated at that level rather than solely by the plant manager. We may usefully recommend that, for an intermediate period, important inventory tabulations both from company and plant records be made so that better information will become available on the difference which results.

Comparable sales data.—Since sales represent so important a criterion, obviously comparable sales data are badly needed. Valid questions arise as to the comparability of presently collected inventory and sales data. Because of lack of response in the case of inventory data (partly founded on inadequacy of records), in most cases a better sample representation is obtained for sales data. We recommend, therefore, that some data be reported which will make possible the development of illustrative cases showing the aggregate relationship between inventories and sales for only those companies which report both.

Inventory anticipations.—Highly relevant information is what the decision maker is planning to do to his inventory stocks. Anticipatory figures are important not so much because of the hope that they will forecast inventory change as because they may reveal what the businessman is planning to do. Inventory actions taken by businessmen will reveal a good deal about the causal influence inventories may be said to exert on economic conditions. In a significant sense we may say that inventories are causal only when efforts are being made to change inventory stocks.

Unfortunately, presently available information on inventory anticipations is very limited. We may safely recommend increased emphasis on the development of anticipatory data which truly reflect what businessmen are trying to do. Background experience is too limited to chart a course the development of anticipatory data should take over any extended period in the future.

Need for figures on current investment in inventories.—The importance of inventory change figures must be kept in mind. So that change in inventory stocks may indicate significant current influences, they must be reduced to current price terms. Inventory valuation adjustment is the process employed to that end. It has been measured in currently reported series only in connection with work involved in estimating GNP. (See tables I–2 to I–5.) For physical quantity series inventory valuation adjustment of course is not required because the data are not initially expressed in price terms.

Most of the important inventory stock aggregates must be stated in price terms because it is impossible to sum unlike physical units. Basis is badly needed for showing significant changes in inventory stock figures aggregated in dollars. For instance, light would be thrown on the influences affecting economic conditions if changes could be readily and promptly shown in the manufacturing stock figures presented in table II–3. To do that effectively computations of inventory valuation adjustment would be required.

Need for deflated inventory figures.—To properly evaluate the influence on economic conditions a further needed step is an estimation of inventory change in constant prices. The idea is that the change in inventories in physical quantity terms reflects the need for handling a physical quantity of sales. While that idea is unquestionably pertinent, we have little reason for believing that deflation by price measurements now available can sensitively indicate a physical relationship in a very precise way. Since inventory prices tend to move with the prices of goods currently sold, change in inventories on a deflated basis has experienced a movement similar to that shown by change expressed in current prices. This is shown in table 1. Generally it will be noted that, in recent years, change on a deflated basis

has been less than change in current prices when the change was positive and more (in an arithmetic sense) when the change was negative. Perhaps the deflated value is useful principally for the information supplied at the few times when the difference from the current-price basis has been fairly substantial, such as indicated by the preliminary figure shown in the table for the fourth quarter of 1960.

The most satisfactory way to appraise the validity of estimated physical quantity changes obtained by deflation procedures would be to provide a contrast with physical quantity indexes developed directly from data showing physical measure or count. The industrial production index is an approach to such a measure of quantity of production. Nothing of the sort has ever been tried to obtain physical quantity changes in total business inventories. It is true, however, that the measure of changes in farm inventories shown in table V–2 is obtained in that way.[4]

TABLE 1.—*Inventory change in current and in constant prices*

Year and quarter	Nonfarm inventory change in current prices (billions of dollars) (1)	Percent of final goods sales (current prices) (2)	Nonfarm inventory change in 1954 prices (billions of dollars) (3)	Percent of final goods sales (1954 prices) (4)
1956:				
1st quarter	6.6	3.02	6.4	2.96
2d quarter	5.2	2.35	5.0	2.31
3d quarter	4.4	1.97	4.3	1.99
4th quarter	4.1	1.79	3.9	1.78
1957:				
1st quarter	2.0	.85	1.8	.80
2d quarter	2.0	.85	1.7	.76
3d quarter	1.5	.63	1.3	.58
4th quarter	−2.3	−.98	−2.0	−.92
1958:				
1st quarter	−6.5	−2.83	−5.5	−2.60
2d quarter	−5.0	−2.17	−4.3	−2.04
3d quarter	−2.5	−1.08	−2.1	−.98
4th quarter	2.6	1.11	2.4	1.11
1959:				
1st quarter	6.9	2.90	6.1	2.79
2d quarter	11.6	4.74	10.2	4.56
3d quarter	.7	.28	.9	.40
4th quarter	5.5	2.23	5.1	2.27
1960:				
1st quarter	10.8	4.30	9.9	4.33
2d quarter	5.1	1.99	4.7	2.02
3d quarter	2.0	.78	2.0	.87
4th quarter	−2.2	−.86	−1.3	−.57

The techniques used in measuring or counting farm supplies of grain and livestock provide little basis for making similar measurements in the nonfarm area. Although a physical quantity index of aggregate business inventories is a desirable objective, the need appears less pressing than other recommendations made in this paper. Until we have a clearer idea of how an effective physical quantity measurement for total stocks of business inventories can be developed it is reasonable that attention be concentrated on other data developments.

[4] A summary of some physical quantity measurements now published will be found in the first reference in note 5 below.

IMPROVEMENTS NEEDED IN INVENTORY DATA—CONSIDERATION OF RECOMMENDATIONS MADE BY THE CONSULTANT COMMITTEE IN 1955

It is the purpose of this and the following section to spell out in more detail improvements needed in inventory data. A convenient method of introducing the problem is to review the recommendations made by the Consultant Committee on Inventory Statistics set up by the Board of Governors of the Federal Reserve System in 1954 at the request of the Joint Economic Committee (then called the Joint Committee on the Economic Report).[5]

Thirty-two recommendations were made by the Consultant Committee. These recommendations are stated below in abbreviated form, and comments are added to bring the analysis up to date.

1. *Review instructions.*—Although no material improvement in instructions provided respondents is obvious, current instructions appear to be satisfactorily framed, if allowance is made for the limitation of present knowledge on the way businessmen keep inventory records. (See recommendation 2 on need for surveying accounting practices.)

2. *Current accounting practices and standards of reporting.*—Clearly, a great limitation in our understanding of the inventory changes which occur is that the actual record of inventories kept at the company level is poorly understood. We do not know clearly enough: (*a*) the type of costing records (such as LIFO or FIFO) employed in making inventory records; (*b*) what the ownership criterion (which is the comprehensive basis for assigning inventories) does in accounting for intransit goods, for Government materials used in private plants for filling defense orders, or the exact practice as to timing in charging out of inventory goods which are about to be shipped; (*c*) exact classification between inventories and durable investment in company balance sheets; (*d*) the extent to which foreign holdings are included in domestically reported figures; (*e*) how to adjust inventory questions so that they can be answered most readily, e.g., at times, businessmen have difficulty in answering inventory questions because they may be asked for balance sheet figures, when they have available only perpetual inventory physical-unit records; and (*f*) the extent to which any inventory figure reported is merely a crude adjustment of a record made at the company's fiscal year end.

We do not know that some or even all of these factors create significant errors in tabulated inventory reports, but it is reasonable to believe that serious errors do result from them. From recent experience, it is believed that the Internal Revenue Service could make additional tabulations which would clear up some of the points involved. No doubt vagueness will remain, and we recommend that the Department of Commerce formulate a plan for surveying accounting practices, e.g., concrete information might be obtained from a limited exploratory interview of individual companies. A deeper understanding of actual inventory records could be expected. As a result, more appropriate ways of obtaining basic inventory statistics might be indicated.

3. *Speed publication.*—The lag in reporting appears little, if any, less than in 1955. Experience appears to indicate that inventory

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[5] "Statistics on Business Inventories," Board of Governors of the Federal Reserve System, November 1955. The report is also published in part in "Reports of the Federal Reserve Consultant Committees on Economic Statistics," hearings, July 19 and 26, Oct. 4, and 5, 1955, pp. 402–480.

reports are not available as early as sales and perhaps the length of lag is less uniform than for sales. Under these circumstances, telephonic response to speed up reporting, in line with the suggestions of the Consultant Committee, may provide only limited advantages.

As to the Committee's suggestion regarding flash reports from a selected group of respondents on direction of change in inventory stocks, note may be taken of the fact that the National Association of Purchasing Agents Survey (see table II–7) is satisfactorily conducted by mail. Furthermore, rate of change in inventory movement is much more important than direction of change. For instance, what we wish to know at the end of a business cycle expansion is the degree of rounding off of rise in inventory stocks, and at the upturn the degree of rounding off of the decline in inventory stocks.

4. *Descriptions of inventory data including statements of limitations, potential errors and appropriate applications; revision of descriptions when data changes are made.*—All compilers of inventory statistics appear to be as deficient in providing adequate descriptions of inventory data now published as they were in 1955. An attempt is made in a later section of this paper to face the problems of potential errors in presently published inventory data. In the footnotes accompanying the statistical appendix an effort is made to describe currently published inventory data. A tendency exists among compiling agencies to center descriptions on other series, e.g., sales, with inadequate attention given to inventories.

5. *Reconciliation of different groups of inventory data.*—Limited attention has been given to reconciliation of different sets of inventory data, although the "company statistics" program of the Census Bureau represents a beginning toward linking statistics based on different reporting units. In a later section we attempt to outline the problems of reconciliation. While any forcing to produce complete comparability might restrict desirable experimentation, it would be appropriate for different Government agencies which develop inventory statistics to provide public information on what they know to be differences between their series and those produced by others.

6. *Provision of ready availability of inventory data including past data in their most recently revised form.*—At the present time, knowledge of the availability of statistical data on any subject requires more than a superficial acquaintance with sources. Because inventory data are collected or compiled by so many agencies, in which inventories frequently are considered less important than other data, cursory presentation is not surprising. Appeal for highlighting inventory data should be made to groups particularly interested in overall economic problems. Perhaps an occasional tabulation of inventory data, like the statistical appendix to this paper and possibly with additional data on quantity measurements would be the best way to satisfy the indicated need.

7 and 8. *Integration of private and public work on inventories, and exploration of possibilities of private support.*—Recognizing that there are important illustrations (some of which are noted below) of these objectives, hurdles are too great to make them widely effective at the present time. Private concerns are interested in detail for its own sake because they are dealing with detailed situations, while the public interest veers to the use of detail largely as it relates to aggregates. Inventory data of interest to private companies often relate to

physical counts of specific items which may not be readily aggregated with other data to provide comprehensive figures. For various reasons, private organizations may find it unnecessary to follow sampling techniques rigidly enough to meet Government standards. Also, at critical times, private organizations might be unwilling to release data.

On the other hand, important illustrations may be cited where cooperative efforts have been effective. In a true sense, the willingness of private companies to provide survey information is an important illustration of private industry cooperation. It does not represent the actual transfer of funds by private industry for defraying the cost involved in collecting inventory data, but it does involve an additional expense borne by the private company in providing information necessary in making possible the development of comprehensive inventory estimates. Such cooperation is clearly a vote by private industry in favor of the development of inventory data needed to study economic change.

We must note that industry participation in the collection of inventory data has been much wider in some cases than in others. A useful comparison can be drawn in the collection of inventory data in the textile and apparel industry between the information obtained in the "Current Industry Reports" series (see tables II–8 and II–9) and survey of textile manufactures for the "Industry Survey." The return obtained by the former is much higher on inventory data. This is partly because the "Current Industry Reports" figures are physical counts taken from perpetual inventory records, while value figures, which presumably are not kept currently by the company as an aid in management operations, are required for the "Industry Survey." Also, some of the "Current Industry Reports" series are collected by trade associations. (Notably information on cotton fabrics is collected by the American Cotton Manufacturers Association.)

A particularly fruitful type of private industry development relates to physical inventories at successive sequences of fabrication and distribution of individual commodities, as developed in recommendation 32 below. We must note, however, that efforts to push work along that line for the steel and textile cases noted by the Consultant Committee proved unsuccessful in 1955–56.

The net conclusion is that we may hope for some success in pushing cooperative work with private agencies, but that expectation of substantial gains is overoptimistic.

Reliance on private support appears to be generally undesirable. If inventory data are very important it would be unfortunate to rely solely on the development of private financing. The private and public objectives are different enough that we could not expect private industry to finance the major part of the inventory program. In some cases private organizations may desire tabulations which also prove to be in the public interest but there is little reason to rate such developments as of major importance.

9. *A steady review and coordination from an overall point of view to the end of providing an integrated and rational body of information on inventories.*—To quote the Consultant Committee—

> the collection of inventory data is necessarily decentralized, and the nature of the various sets of data is and will inevitably be shaped to some extent by the nature of the various programs involving them * * *. Independent agencies

can make only limited progress in coordinating their operations, particularly where inventory data collection may be rather incidental to their whole program.

One might hope that the National Income Division of the Office of Business Economics, with its overall point of view in computing GNP, would provide the proper integrating force. The OBE in its interest in assembling the necessary data for computing income and product measurements, however, does not lend direction to all aspects of the overall program. For one thing, emphasis by the Office of Business Economics is properly on satisfactory measurement. In making its wants known the Office of Business Economics has emphasized the necessary data to develop commodity statistics, which are essential in deriving estimates of personal consumption expenditures, and, of course, the ingredients necessary to get a measurement of aggregative inventory change.

Such requirements fall short of the needs we visualize for inventory data. As pointed out above, more information is required on inventory detail for the analysis of the influence inventories have on the economy; more knowledge is needed on inventory prices. Such questions as the difference in results obtained from plant compared with company reports should be explored. Better knowledge on the type of recordkeeping on inventories is necessary to obtain dependable inventory information, and there are other gaps in our information pointed to elsewhere in this paper. While the Office of Business Economics may be expected to show a greater interest in these questions than any agency now compiling basic inventory data, their interest is not specifically related to the inventory problem.

We look for broad assistance in seeking improvements. A czar on inventory statistics certainly is not a satisfactory answer. The objectives sought may be accomplished by assigning higher priority to the problem of integrating inventory statistics in the Office of Statistical Standards.

10. *New sample for the monthly industry survey on manufacturing inventories, sales, and orders recommended.*—A new sample is shortly to be introduced. The annual Survey of Manufactures will provide the benchmark list from which a probability sample will be drawn for coverage in the monthly survey. Another change which is being introduced in the new sample is "divisional" reporting by large, diversified companies. See discussion under recommendations 12 and 13.

11. *For each industry group, review should be made of the adequacy of Internal Revenue Service figures as benchmarks for the monthly industry survey, in view of the very considerable proportion of inventory stock figures reported on a basis other than the calendar year.*—Because of substantial seasonal variation in inventory stocks, an accidental combination of months for which inventory figures are totaled can be expected to produce an unreliable inventory level for the industry group involved. Furthermore, the change in level from one year to the next may be unreliable when so represented.

The level of inventory stocks is of less importance in studying economic conditions than short-period changes, and the distortion which may be produced by introducing a yearly average taken from varying months may be readily exaggerated. Incorrect levels, and especially incorrect change in levels between years, however, introduce unfortunate effects on the inventory series.

The importance of the effect could be much better evaluated if our information on the seasonal variation of inventory stocks in various industry groups were improved. For other reasons, noted below, better measurements of seasonal variation in inventory stocks would throw important light on the inventory picture. Measurement of seasonal variation is a necessary preliminary step before final decision is made on the seriousness of the distortion introduced by employing internal Revenue Service benchmarks founded on varying months.

12. *Overlapping should be reduced in the industry survey. Finer detail should be developed for significant subgroups. A "market" grouping should be developed for finished manufactured goods, subdivided into producers' equipment, consumers' durable goods, and consumers' nondurable goods; for unfinished manufactured goods, subdivided into construction materials and unfinished goods destined for further manufacture; with such further product differentiation between categories as may prove feasible.*—The desirability of such inventory information in the study of economic conditions is not in doubt. The problem turns on practical methods of obtaining it. The only approach to such information which we can now visualize turns on the initiation of divisional reporting by large and diversified manufacturing companies. The present achievements in this respect are summarized in the discussion of the succeeding recommendation. Tentatively, it is thought that the following market classification may become possible as a result of the increased information made available by divisional reporting:

I. Consumer goods:
   A. Home goods and apparel.
   B. Consumer staples.
II. Equipment and defense items, excluding automobiles.
III. Automotive equipment.
IV. Materials, supplies and intermediate products:
   A. Construction.
   B. Other.

13. *Arrangements should be made with selected manufacturing companies, chosen because of diversification in company activities, to obtain monthly reporting of detail.*—Monthly divisional reports, as shown in the accompanying classification, are now being received from about 220 companies. By the end of 1962 a gradual improvement is expected to bring a significant improvement in the comprehensiveness of the divisional reports.

For many large companies engaged in varied lines of production, records received promptly at the central office are in terms of divisional industry detail rather than by establishment, and therefore are readily made available on a divisional basis at an early date. It is hoped that this reporting will result in some improvement in the detail provided and, at the same time, reduce the overlap between industry categories. Where reports now received from a company are so classified that all inventories are thrown into the industry group with the largest representation, the data will be greatly improved by divisional industry reporting because the inventory classification will more closely approximate the industries to which the inventories are related.

TABLE 2.—*Industry publication cells planned for monthly industry survey (according to plan in September 1961)*

Industry SIC No.:	*Title*
20	Food and Related Products.
201	Meat Products.
202	Dairy Products.
208	Beverages.
203–7, 209	Other Food and Related Products.
21	Tobacco Manufactures.
22	Textile Mill Products.
221–3	Broadwoven Fabrics.
225	Knitting Mills.
224, 226–9	Other Textile Goods.
23	Apparel.
24	Lumber.
25	Furniture.
251	Household Furniture.
25–exc 251	Other Furniture.
26	Paper and Allied Products.
261–3, 6	Pulp, Paper, etc.
265	Paperboard Containers.
264	Other Paper and Allied Products.
27	Printing, Publishing and Allied Products.
2711–32	Newspapers, Books, Periodicals.
2741–2799	Other Publishing and Printing.
28	Chemicals.
2812–15, 18, 19	Industrial Chemicals, Except Pigments.
2816, 2851–2	Paints and Related Products.
283–4	Drugs, Soap and Toiletries.
282, 286–289	Other Chemical Products.
29	Petroleum Refining and Related Products.
30	Rubber and Miscellaneous Plastics Products.
301	Tires and Tubes.
30–exc 301	Other Rubber and Plastics Products, N.E.C.
31	Leather and Leather Products.
3111–31	Leather, Industrial Products and Cut Stock.
314–319	Other Leather Products.
32	Stone, Clay and Glass Products.
33	Primary Metal Industries.
331	Blast Furnaces, Steel Mills.
332	Iron and Steel Foundries.
333–6	Nonferrous Metals.
339	Other Primary Metal Industries.
34	Fabricated Metal Products.
341, 3491	Metal Cans, Barrels, and Drums.
342, 44, 3481	Hardware, Fabricated Structural Metal Products and Wire Products.
345–347, 3492–99	Other Fabricated Metal Products.
35	Machinery, Except Electrical.
351	Engines and Turbines.
352	Farm Machinery and Equipment.
353	Construction, Mining and Material Handling.
3541, 42, 48	Metalworking Machinery.
3544–5, 3562, 3565–6, 359	Miscellaneous Equipment.
355	Special Industry Machinery.
3561, 64, 67, 69	General Industrial Machinery.
357	Office and Store Machines.
358	Services Industry Machines.
36	Electrical Machinery.
361	Electrical Transmission and Distribution Equipment.
362	Electrical Industrial Apparatus.
363, 5	Household Appliances, including Radio and TV.

TABLE 2.—*Industry publication cells planned for monthly industry survey (according to plan in September 1961)*—Continued

Industry SIC No.—Continued	*Title*
	Electrical Machinery—Continued
366	Communication Equipment.
367	Electronic Components.
364, 9	Other Electrical Machinery.
37	Transportation Equipment.
3713, 15, 17	Motor Vehicles, Trucks, and Bodies.
372	Aircraft and Parts.
373, 371–99	Other Transportation Equipment.
38	Instruments.
381–4	Engineering, Measuring, and Controlling Instruments, Optical, and Surgical, and Medical Instruments.
3851–3872	Other Instruments.
39, 19	Other Manufactures.
39	Miscellaneous Manufactures.
19	Ordnance.

14. *Shift from the Internal Revenue Service to the Census Bureau's annual survey of manufactures is recommended for benchmark figures to be used in the industry survey.*—With the new divisional reporting system, which is soon to become an integral part of the manufacturing industry survey, Internal Revenue Service benchmarks would be impractical because of the company foundation on which that collection is based. Insofar as current experience is concerned, availability of data from both Internal Revenue Service and the Census annual survey of manufactures is very late, as noted elsewhere in this paper. The latter, however, provides promise of prompter reporting, at least of comprehensive data.

The Internal Revenue Service data are also inferior in respect to the fact that the inventory figures reflect various months at which the books of the company happen to be closed. Another fact which should be emphasized is that a benchmark frequently provides the basis for weighting various parts of the total. In this respect, the Internal Revenue Service data are inferior because industry classifications may become blurred. That is because company reports sometimes do not make possible clear industry distinctions. Furthermore, the kind of data obtained from Internal Revenue Service reports may be influenced by changes in the tax laws, shifting their comparability from one time to another. While the Internal Revenue Service data will continue to provide useful information on inventory stocks, recommendation that less reliance be placed on them for benchmark purposes appears to be well taken.

15. *Estimates of defense-related inventories and associated data are recommended, with publication at times when defense activity is at high or rapidly changing levels.*—We recommend that the current report of manufacturing inventories be classified according to whether the inventories are related to defense or nondefense work. For prime contractors a physical count of finished defense products as well as of certain supplied raw materials is required by law. A suitable system of developing a sample of the inventories involved, and of pricing them, should be devised. For the remaining material and goods-in-process inventories in the hands of prime contractors an allocation in relation to the proportion of orders or sales for defense work should be attempted as a basis for developing an inventory estimate. For subcontractors, the allocation system should be tried as an estimate of their total defense inventories.

To clarify any overlapping in the count of inventories by manufacturers and by the Defense Department, a question should be included in the questionnaire sent to manufacturers to find the amount of defense inventories held for which payment already has been received. Defense inventories owned by the Government are shown in table VI–4 of the statistical appendix.

16. *Expansion of inventory data in the Census Bureau's monthly wholesale trade report to include manufacturers' sales branches and other nonmerchant wholesalers is recommended.*—Inventories of manufacturers' sales branches are now included in the manufacturing data collected in the "Industry Survey." Segregation probably would face substantial difficulties. The advantages of including these inventories in the wholesale classification on a monthly basis may not be important enough to warrant the expense and trouble which would be involved. The 1954 Census of Business returns indicated that more than half of the sales made from sales branches and sales offices were to industrial and commercial users in contrast with a much smaller proportion of sales made by merchant wholesalers (about 30 percent of the total or 20 percent if we exclude food-type products and other goods little sold in sales branches and sales offices). Before launching into a difficult project of shifting inventories at sales branches to the wholesale classification we should be sure that the function involved is more closely allied to a wholesale operation than to a typical manufacturing sales operation.

Other nonmerchant wholesalers include assemblers (mainly of farm products), wholesalers' administrative offices and auxiliary units, agents and brokers, and petroleum bulk stations. Marketing stations of petroleum refiners are included in manufacturing operations in the Industry Survey, accounting for a major proportion of petroleum bulk station inventories. Representation of assemblers could be obtained in the monthly survey without substantial additional expense, and we recommend that the monthly survey be so extended. The other omissions represent a small proportion and probably move similarly to the variation occurring in inventories of merchant wholesalers. Correction for level in the monthly Office of Business Economics survey, as is now made, is perhaps satisfactory for these cases.

17. *When feasible, an additional classification of wholesale inventories should be made according to the market categories listed in recommendation 12.*—The idea of the committee, we are assured by Mr. Arthur L. Broida, who served as secretary, was that a desirable goal would be to carry the market classifications through from manufacturing to wholesaling and to retailing. Because the current surveys make possible only total inventories of the business reporting unit, classified by major industry line represented, the indicated detailed market classification is not feasible at the present time. Even if request were made from the reporting unit for further classification of the inventory figure, most of the market distribution could not be supplied because the wholesaler does not know about the ultimate use of many of the products he sells.

At the present time, the best we can hope for is the encouragement of developments which may lead to a segregation of inventories related to sales of producer goods some time in the future. As noted above the proportion of sales of merchant wholesalers going to industrial and commercial buyers as indicated by the 1954 census was about 30 per-

cent. We recommend a continuation of queries in the "Census of Business" with respect to this proportion, and that the possibility of distributing the inventories involved be investigated. Apparently, there is no feasible procedure available for obtaining the inventory proportion related to sales to industrial and commercial users in the monthly survey.

18. *A regular annual survey of wholesale trade is recommended.*—Since the universe is small and well covered in the monthly survey the need for an annual survey does not appear great enough to warrant the extra expense which would be involved. The wholesale inventory estimates obtained in the "Census of Business" furnish an adequate benchmark check.

19. *The Census Bureau's monthly retail trade report should be expanded to provide inventory data for independent retail stores.*—This expansion has been made, beginning with 1956. Inventories were included in the annual survey of retail stores beginning in 1953. We have found no way of estimating the difference which has resulted by this addition, but retail trade is better represented.

20. *When feasible, an additional classification of retail inventories should be made according to market categories listed in recommendation 12.*—As in the case of recommendation 17, we have been assured by Mr. Broida that the principal point intended relates to an emphasis on the desirability of working toward a goal of developing a consistent market classification through the various stages of distribution. Even the division of inventories between those which support sales to producers rather than sales to consumers is less practical in the case of retail trade than in the case of wholesale trade. As a first step a careful estimate should be made of the proportion of sales involved which represent final sales to producers rather than to consumers. Past data provide no basis for making such an estimate. We recommend that questions be asked in the 1963 Census of Business to furnish that information.

21. *Department store statistics should be expanded to include data on outstanding orders for selected departments or groups of departments of general analytic interest.*—The order data on department stores is a unique collection on retailers' orders. If feasible, it would be desirable to have additionally the greater detail recommended by the Consultant Committee. However, orders data as now collected are of questionable quality, and that has discouraged the initiation of the collection of order data by departments. We recommend that early attention be given to the possibility of obtaining more detailed order data.

22. *Seasonal adjustment of data on selected departments or groups of departments in the department store data is recommended.*—Consideration might well be given to the feasibility of seasonal correction for detailed departments, and as well for aggregate figures for which seasonal corrections are not now published (notably for order data).

23. *Further studies should be made of the needs for, and the costs of, current statistics on value of inventories for sectors other than manufacturing and trade.*—These include mining, construction, utilities, finance, insurance, and service industries. According to the Internal Revenue Service report for 1958–59, these areas represent about 7.5 percent of total nonfarm business inventories. The percentage is small and the probabilities are that, except for mining where some physical quantity inventory series are available on a current basis, variation in inventory

stocks is not as marked as in many other areas of the economy. Perhaps it would be wise to investigate these probabilities as well as the possible development of value series by pricing physical-quantity mining series before giving major attention to obtaining independent inventory-stock value series on a current basis in these areas, especially in view of the pressing requirements for better data in manufacturing and trade.

24 and 25. *Beginning-of-year and end-of-year inventory stock figures should be tabulated by the Internal Revenue Service.*—On the basis of this recommendation the Internal Revenue Service published in Corporation Income Tax Returns for 1955 inventory totals on manufacturing and trade corporations which showed both beginning and end-of-year inventory stocks. Beginning with 1956 these figures were tabulated not only for manufacturing and trade but for all business and included in promptly tabulated data (Business Indicators for 1956 and since called Selected Financial Data). The early inventory figures reported in Selected Financial Data cover only about half of the income tax returns, but include about 95 percent of the book value of returns which show inventory data. The 1959 data on beginning and end-of-year inventories will be reported more completely in Corporation Income Tax Returns. The Consultant Committee called for the tabulation of these figures to assist in dealing with "problems of changes in degree of consolidation and classification of companies." The Office of Business Economics requires change in inventory stocks during the year for benchmark years for the purpose of developing commodity flows in measuring consumption expenditures.

26. *The Internal Revenue Service should make tabulations, according to the fiscal periods to which the data relate, of the volume of manufacturing corporation inventories, classified by major industry group.*—On the basis of this recommendation, such tabulations were made for 1954–55 and 1955–56. Further tabulations were discontinued following a rescheduling of project priorities. On checking, however, we have found an interest in the tabulations expressed by the Office of Business Economics and by the Federal Reserve. Renewal of the tabulations is recommended. They would aid in interpreting Internal Revenue Service data and might be helpful in throwing light on seasonal variations in inventory stock figures since, to an undetermined extent, the reported figures on value of inventory stocks are derived from the figure shown on the company's annual statement.

27. *The significant intermediate results of the calculations culminating in the published GNP series on "Change in Business Inventories" should be regularly published at a time and to the extent warranted by improvement in the basic data employed. Pending publication of these intermediate results, each quarterly release of the GNP inventory change figure should be accompanied by a brief note explaining the relationship between the GNP inventory change figure and the Office of Business Economics book value data for manufacturing and trade, and a summary reconciliation of these data should be included.*—The Office of Business Economics has made no fundamental change in publishing the intermediate results culminating in the GNP inventory change series since this recommendation was made in 1955, nor has there appeared any statistical reconciliation between the published inventory change and differences in the Office of Business Economics inventory book values

for manufacturing and trade at the time of initial publication for first estimates. We believe that emphasis on such reconciliation is long past due.

28. *Net changes in selected categories of Federal Government inventories should be shown in the GNP tables as a component under "Government Expenditures," to the extent feasible on the basis of available data and consistent with national security considerations.*—As shown in appendix tables VI–1 to VI–4, principal changes in Federal Government inventories have now become available, at least on an annual basis. We believe that it will shortly be possible to carry out this recommendation, and that such a procedure would be of value in interpreting economic conditions.

29. *A pilot program of study and experimentation should be undertaken by appropriate agencies with a view to meeting needs for physical volume measures of inventories at aggregate levels and in selected detail as expeditiously as possible.*—As noted elsewhere, a physical volume index of aggregate inventory stocks would be significant, at least for checking purposes. However, the problems involved in developing such a measure are so far from being resolved that it would now appear that major attention should be given to other areas in which recommendations are made in this paper.

30. Attempts should be made to improve the information available for deflating inventory value figures by obtaining additional information about (a) accounting practices, turnover rates, and other factors influencing the values assigned to individual commodities in business accounts; (b) the appropriateness of available price information for inventory deflation; and (c) feasible means of securing additional reports on prices paid for goods in stock for use in inventory deflation.—We are in full accord with these recommendations. Little has been accomplished along these lines since 1955. As for (*a*) see comments under recommendation 2 above. As for (*b*) it might be well for the agencies responsible for deflating inventory data to spell out more explicitly the type of price data needed. As for (*c*) the problem relates principally to the adequacy of price information developed by the Bureau of Labor Statistics.

31. *Experiments should be undertaken in constructing physical volume indexes for significant broad sectors or types of products.*—We refer to our comments under recommendation 29. Certain special purpose physical volume indexes of physical stocks of inventory are highly desirable at the present time, however, as noted in our comment under recommendation 32.

32. *Studies should be made of the feasibility of developing satisfactory physical volume inventory and related data for individual commodities of outstanding importance, and for significant sequences of commodities at several stages of fabrication and distribution. Initial studies might properly be concerned with inventories of steel and textiles in various positions, and the sequences involving them, since fluctuations in production, consumption, and inventories of these commodities are often of great significance to the economy.*—The problem of flow of commodities from production to the point where the final buyer takes them and puts them into use is related to inventory needs in that, by necessity, the flow of goods must pass through "stocking" points.

To learn about these stocking points it is necessary to see how commodities meet an interruption in flow in passing through them.

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The need for the information called for by the Consultant Committee recommendation turns on this fact. The only way we can effectively follow goods through the stocking points is to follow the same goods through all of the stages found in the process of their distribution.

The value of this information is that it would make possible a breakdown of inventory stocks, in such a way that amounts held at points where important decisions have to be made would be more clearly shown. The total inventories held through the full process from production to consumption for a given type of textile, for instance, could be broken down to show amounts held at various stages of distribution.

If we get information of this kind it would provide a new kind of distribution of inventory holdings by commodity type. It would also show more clearly how change in apparent inventory needs "backup" from later stages of distribution. For instance a manufacturer may find his sales are falling off rapidly, but the reason may be an irregular change in the total amount of inventories held at later stages of distribution rather than a change in final purchases. We recommend that a high priority be given to the development of physical inventory data and related variables through various stocking points at the several stages of fabrication and distribution. Almost surely a cooperative arrangement with industry personnel would be required. At the present time, several persons in industry have expressed a keen interest in development of the necessary data.

Improvements Needed in Inventory Data—Other Recommendations

In this section we consider points worthy of careful consideration additional to those covered by the Consultant Committee. Although these are principally independent of the recommendations presented in the preceding section, we number them consecutively for the convenience of the reader in making references.

33. *Better information is needed on seasonal variation which takes place in inventory stocks.*—Importance of seasonal variation in inventory investment is illustrated by its relative size in the divisional part of GNP which represents inventory change. (The relative variation in inventory stocks is, of course, much less, but seasonal variation in relation to inventory investment is more important in understanding economic change.) The substantial part involved, especially in the first quarter, can be illustrated by data for 1959 (billions of dollars):

Change in business inventories	1st quarter	2d quarter	3d quarter	4th quarter
Unadjusted, annual level basis	3.6	2.1	−0.2	0.4
Adjusted, annual level basis	1.9	2.9	0.0	1.2
Difference	1.7	−0.8	−0.2	−0.8

Clearly, in studying seasonally corrected quarterly data, recognition must be given to the fact that the meaning of the figures depends to a major extent on adequacy of seasonal measurement.

Current seasonal measurements are developed from seasonal movements in divisional parts of total inventory stocks (for that reason,

the inventory change accounted for by seasonal factors may vary from year to year because relative importance of the divisional parts varies.) Seasonal indexes now computed from different groupings of total inventory stocks add to significantly different total seasonal indexes. Actually, a large part of the inadequacy of the seasonal measurement relates to the seasonal in automobile stocks, which has been quite uncertain in the postwar period. We need, however, to obtain a much better measurement of seasonal variation of the other parts of total inventory stocks so that substantial uncertainty regarding seasonal adjustment does not reside also in industries other than automobiles. We recommend that responsible consideration be given to measurements of detailed seasonal variation in inventory stocks.

34. *Careful attention should be given to the function of benchmark information in inventory analysis.*—Comprehensive counts of the total universe have become less important with the improvement which has been evolving in current survey techniques. There are, however, other important questions for which full enumeration can provide answers. We list here several of the functions the enumeration can perform:

(*a*) Level adjustment: This is the "traditional" function of a benchmark, and the need for it in any particular case should be reviewed in light of the adequacy of the blowup of sample survey data on the basis of probability-of-selection weights.

(*b*) Data distributions: The Office of Business Economics has emphasized the inadequacy of census inventory-stock figures from the point of view of developing commodity flow measurements, which are essential in deriving estimates of consumer expenditures. For this purpose both beginning-of-year and end-of-year inventory figures are necessary, and much detail is needed because consumer expenditures are to be estimated in some considerable detail. This illustrates the requirement for benchmark figures in the solution of problems in related data fields which have been often overlooked. For instance, in spite of the need illustrated, inventory stocks held in retail trade have not been asked for in recent censuses of business. Wholesale inventory aggregate totals have been collected in the censuses, but not in the commodity detail needed for measuring commodity flow. We recommend that careful consideration be given to these requirements in the 1963 census.

To generalize more broadly, we may note that benchmarks may be usefully applied in obtaining a reliable distribution of the total shown at a particular level. One important application is the use of such a distribution to assign weights in combining parts of a total inventory stock which may be separately measured in current surveys.

(*c*) Also, the Census should be used to help clear up questions on coverage and overlap, e.g., with respect to inventories in transit, development of estimates of inventory stocks in nonfarm business other than manufacturing and trade, and clarification of overlapping counts, such as the extent to which producer durable equipment may get counted in inventory and, at the same time, be counted in durable capital formation.

(*d*) Changing inventory-stock requirements because of change in composition of industry. Shifts in inventory requirements may occur because of changing types of business, such as the relative need for inventories in mail-order retail selling compared with those required for

sales in retail stores, and any relative increase which may be occurring in inventories in service businesses.

(*e*) The degree to which inventory records are changing, e.g., the extent to which inventory counts are being made by use of electronic data processing. Also, the benchmark data should develop more information on the kinds of accounting methods employed in maintaining inventory records, e.g., the part of the inventory stock which is recorded by LIFO, FIFO, the lower of cost or market, etc.

35. *In line with the suggestions under recommendation 2 above, a careful study is needed of the adaptation required in inventory questions and instructions in the light of improved information businessmen may have readily available.*—This is made as a separate recommendation because needed improvements in instructions will not be apparent until studies of the kind suggested in recommendation 2 have been completed, and because, at that time, the desirable procedure will not be merely to ask for the information businessmen are found to have readily available, but to formulate questions on the basis of an organized plan for using that information. For instance, assume that the available records relate principally to quantity data. The problem may then be to find the best way to price these inventories to develop value figures.

36. *In the light of what already is known, some experimental studies on improvement in reporting can be made immediately.*—For instance, it is known that many retail stores find the reporting of an inventory stock figure in value terms a virtual impossibility on a monthly basis because nothing in current records gives any indication of what that stock may be. It has been suggested that an actual count of number of sample items which represent some major types of inventory might be made by enumerators,[5] and that the number of items of each type might be multiplied by recorded prices to provide a sample inventory figure converted to value terms. This method was used with some success in a survey of food stocks in retail stores, made jointly by the Federal Civil Defense Agency and the Department of Agriculture.[6] We recommend that experiments in collecting inventories in retail stores by item count be started at an early date.

37. *The use of orders could be made more effective in the study of inventories if the meaning of order data were more clearly understood.*—We need to know the extent to which a "new order," as the term is used in business, relates to a made-to-order product, the extent to which all specifications on the product, except the date of delivery, are made at the time the order was placed, and the extent to which order cancellation is permitted without penalty. The new order series reported in the "Industry Survey" are net of cancellations, and have been so adjusted that new orders equal the sum of estimated monthly sales and change in unfilled orders.

We recommend that a pilot study be made by surveying companies in some of the durable goods industries where advance ordering is most prevalent to determine the conditions under which orders are booked.

38. *It is well known that in many of the current surveys the number of companies reporting inventory stocks is substantially less than the number*

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[5] See Ralph S. Woodruff, "A New Approach to the Estimation of Inventories," American Statistical Association "Proceedings of the Business and Economics Section," 1957, pp. 234-237.

[6] "Number of Days' Supply of Food and Beverages in Retail Stores," Marketing Research Report No. 286, Agricultural Marketing Service, U.S. Department of Agriculture (U.S. Government Printing Office, November 1958).

reporting sales.—Yet, these reports are usually used as if they came from the same sample. The inventory-sales ratio developed from the blownup figures for an industry so represented may be distorted.

To indicate the extent of the distortion occurring we recommend that some tabulations be made to show the comparison indicated when only the companies reporting both figures are employed.

39. *December inventory levels may poorly represent the inventory condition for the whole year.*—For instance, if the particular December happens to fall in a recession period the inventory stock figures are likely to be low in relation to that prevailing for the year as a whole. The full year is less likely to represent conditions which are so extreme.

Furthermore, yearly figures taken from annual statements are likely to be low because of the practice in many companies of making a special effort to clear out any excess inventories before the time comes to issue annual statements. If major reliance is placed on inventory stocks shown in the company's year-end report, whether or not a calendar year is represented, the benchmark level accepted may be low.

At the present time imaginative methods of interpolation and extrapolation are employed in adapting the various inventory stock surveys to benchmark levels. It appears probable, however, that more confidence could be placed on adjustment to benchmark levels if better measurements were available on seasonal variation in inventory stocks, because the position of December inventory stocks is partly determined by seasonal factors. Also, some knowledge of the extent to which a company's annual statement shows lower than average yearly stock figures would aid in developing correct inventory levels. We recommend that the problem of developing estimated average yearly inventory stock levels for key benchmark years be investigated.

40. *Better information is needed on the differences found in inventory aggregates derived from company as compared with industry or establishment.*—The company data may add to a larger aggregate because operations in supporting activities such as mining may be included in the company report. They may add to a smaller aggregate because some of the inventories at intermediate stages may fail to get counted when reporting is by the company as a whole.

We recommend that some pilot figures, directly comparable to those derived from divisional reporting, be developed on a company basis in the "Industry Survey." (The company-statistics program of the Census Bureau will aid in this effort.) Such figures should throw light on the difference between company and industry figures on inventories. Knowledge of this difference would aid in interpreting Internal Revenue Service figures, and would be especially useful as divisional reporting is adopted in the "Industry Survey." Also, inventory stocks on a company basis may be of some value in that sometimes they may be more important as a basis for business decision than inventory figures shown in the divisional product classification (especially in the case of companywide decisions).

41. *As emphasized repeatedly in this paper, inventory change, rather than inventory stocks, represent the way influences are transmitted to economic conditions.*—The actual data, however, as shown in the statistical appendix, are generally reported in terms of inventory stocks. We recommend that progress be made as rapidly as feasible in the reporting of these series in terms of inventory change. The

series could be so reported if data on inventory valuation adjustment were available. The needed inventory valuation adjustments depend both on the availability of satisfactory price series and on studies of the various inventory stock series to find breakdown for the parts which were accumulated under different prices. The particular methodology, of course, will vary with the accounting procedure employed in recording the inventory.

42. *The influence of business decisions on inventories can be most effectively traced through the analysis of inventory anticipations.*—The new Office of Business Economics series should throw a great deal of light on what we need in anticipation surveys. As experience is gained in the OBE survey, we should learn much about the kind of pertinent information which can be developed. We recommend that high priority be given to the development of surveys on inventory anticipations.

Reliability of Current Inventory Data

No fully satisfactory method is available for evaluating inventory data. This fact should become clear as our discussion proceeds in the following paragraphs. The lack of a satisfactory quantitative method of evaluation, however, could not excuse us for failure to pursue the subject of reliability in accordance with possible lines of qualitative analysis. Along those lines, reliability is discussed in relation to the following subjects:

1. Sampling variability.
2. Degree of nonresponse.
3. Other errors unmeasurable in probability terms.
4. Extent of editing required.
5. Nature of accounts on which inventory reports are based.
6. The relative error which builds up when stock figures are differenced to develop current inventory investment.
7. Error inherent in price measurement upon which inventory valuation adjustment depends.
8. Contrasting error of current-change and benchmark figures.
9. Particular vulnerability of early released figures.

1. *Sampling variability.*—No estimate of sampling variability of current inventory investment figures is available. The Census provides statistical reliability estimates for inventory stock figures. The sampling variability (percentage deviation which will include expected values two-thirds of the time either above or below the estimate) of monthly total merchant wholesaler inventories is about 1 percent. For divisional parts of that total the sampling variability is larger. For instance, for monthly estimates of inventories of merchant wholesalers dealing in durable goods the sampling error is about 1½ percent. Rather similar figures are estimated for the sampling variability of yearly estimates of retail inventories, but no such estimates are made for the monthly survey of retail inventories. Also, no figures are now available on sampling variability in the monthly industry survey of manufacturing, but as the new benchmark system (founded on the "Annual Survey of Manufactures") becomes fully developed it is planned to release such figures.

2. *Degree of nonresponse.*—The estimates of statistical sampling variability do not include consideration of biases such as those inherent

in failure of response from some of the companies included in the sample. Generally, nonresponse is higher in the monthly surveys for inventory stocks than for sales. In the monthly survey of wholesale trade it is 10 percent of the total dollar amount for sales and 25 percent of the total dollar amount for inventory stocks. Satisfactory nonresponse figures are not available for the monthly manufacturing survey, but the rate is known to be large.

In the case of monthly reports on retail inventory stocks two kinds of nonresponse are involved. In the first place, at the present time reports from the initial panel set up 5 years ago have fallen to about two-thirds of the original number of firms in the sample. This decline has been explained by firms going out of business or by refusal of firms to report an inventory stock figure on a nonmandatory basis. Of the firms still in the reporting sample a nonresponse rate of about 5 percent is found in the final report, about the same as in sales. The nonresponse may not be very serious in relation to the part of the curtailed sample now reporting, but the fact that a substantial proportion of the firms originally selected in the sample has dropped from the survey means that no meaningful sampling variability can be applied to monthly reports on retail inventories.

The existence of nonresponse significantly reduces the reliability of reports on inventory stocks. Clearly, better response can be expected as survey questions on inventories are more clearly integrated with data which may be made readily available by responding firms. These facts reinforce the need for the points made on current accounting practices and standards of reporting in recommendation 2 discussed above.

3. *Other errors unmeasurable in probability terms.*—Such errors can be illustrated by lack of satisfactory industry classification and difficulties of getting annual inventory stocks which represent a common date for all reports included. The fact that industry classifications are unsatisfactory adds to uncertainty with respect to the amount of inventories reported in each industry, although reliability of total inventories may not be thereby reduced. Annual total inventories in the Internal Revenue series are assumed to represent December, but many of the reports used represent other months; the total differs to an uncertain extent from the result which would be obtained from reports all taken at the year end.

4. *Extent of editing required.*—The extent of necessary editing in preparing returned questionnaires provides some indication of the reliability of data. It is believed that more editing is found necessary with inventory data than with sales and other coordinate series. The major reason for the greater need for editing is that the respondent more frequently finds that the inventory figures requested cannot be taken directly from his records, leaving a greater need for care in examining the reported figures.

The editing criterion can usefully be considered of some importance in evaluating reliability, but we have found no way of using it quantitatively. Probably, the reliability increases inversely with amount of editing required. The nature of the relationship is not likely to be a simple one, however, and we have not felt that efforts to develop quantitative figures on time required in editing would be too helpful. Rather, editing difficulties point to the need for a better understanding of accounting practices used by business and adaptation of that

knowledge to the development of inventory questions and survey instructions, as indicated in the above recommendations 2 and 35.

5. *Nature of accounts on which inventory reports are based.*—Likelihood that the information called for on many of the inventory surveys presents difficulties to the respondent because the requested figures are not coordinate with currently maintained management reports has been pointed out repeatedly in this paper. This situation no doubt reduces the reliability of the inventory data collected. Partly, that is because of seasonal differences in inventory reports arising from the fact that some of them are for a different month than the one for which they are assumed to relate in the tabulated data. For instance, in the "Annual Survey of Manufactures" inventory stock figures 2 months either way from the calendar year end are accepted, without revision, as a December 31 figure.

Furthermore, to an undetermined extent, lack of actual financial accounting figures on inventory stocks requested from the responding firms may sometimes result in vague estimates. This is illustrated by the complaint by the Current Retail Surveys Section of the Census Bureau with respect to the inadequacy of accounting records kept by stores for reporting monthly inventory stocks in dollars.

6. *The relative error which builds up when stock figures are differenced to develop current inventory investment.*—The relative error in figures on change in inventories no doubt may be very large. A simple, mechanical illustration might convince one that change figures are meaningless. For instance, we can scarcely hope that error, however measured, is less than 1 percent in inventory stocks, and therefore a 1 percent change might be considered meaningless. A quarterly rise from $100 billion to $101 billion might then be said to lack significance. But the indicated inventory investment, stated in terms of annual averages as is customary in the reports of the Office of Business Economics, would be 4 times the $1 billion dollar change, or $4 billion. This is large enough to account for substantially all of the growth required for inventory stocks.

The indication would seem to be that current inventory investment figures may be quite undependable. Doubt is thrown on such striking conclusions by the fact that errors in successive figures in time series often tend to be in the same direction, as explained at the end of this section. If that were not true, clearly current inventory investment figures which are now collected might be held to have no reliability at all.

7. *Error inherent in price measurements upon which inventory valuation adjustment depends.*—As developed earlier in this paper, the changes in inventory stock figures have no clear meaning until the prices in the two stock levels from which they are derived are made comparable. The process of doing that is called inventory valuation adjustment. The price series upon which the adjustment depends are of only limited adequacy for the purpose required, and thus it adds an additional type of unreliability. Unfortunately, the error thus introduced cannot be readily evaluated in quantitative terms.

8. *Contrasting error of current-change and benchmark figures.*—The adequacy of inventory stock figures often emphasized involves level rather than short-period changes. The level of inventory stock estimates depends on benchmark figures. The evidence appears, at the present time, to point to the probability that important in-

ventory stock series not recently revised, notably the Office of Business Economics series on inventory stocks of manufacturers and of retailers, are too low. Not only is that indicated by preliminary work on revisions which is now in process, but there appear to be basic reasons why a downward bias may have developed in inventory stock levels:

(*a*) The date of the benchmark has become successively remote. While this could drive the coverage relationship either way, the actual tendency appears to be to underestimate the blowup because of difficulties in maintaining sample coverage and of incompleteness of coverage that existed in earlier benchmark figures. Difficulties of maintaining sample coverage are illustrated by the fact that the panel in the monthly retail survey conducted by the Census has been permitted to fall to two-thirds of the coverage in number of companies at which it was set 5 years ago. As to incompleteness in benchmark coverage, apparently Census methods now being used tend to lead to improved coverage on inventory universes.

(*b*) The use of year-end inventory figures to represent calendar years is likely to place the average inventory figures for the year at too low a level. This is because of the tendency of companies to improve their inventory position before the date of their year-end report.

The most important questions of reliability, however, relate to short-period changes in inventory stocks. Problems of reliability in that connection are more fully discussed in other parts of this section.

9. *Particular vulnerability of early released figures.*—The substantial extent to which early estimates of current inventory investment are of questionable significance is illustrated by table 3. This shows the difference between first and final estimates of change in business inventories in the Office of Business Economics series, as computed to provide a divisional part of GNP. The importance of questions which may be raised by early estimates made is indicated by the fact that, on the average, the first estimate of quarterly change in business inventories, from 1948 to 1960, differed by over $2 billion (at annual rates) from the latest available revisions. This fact highlights the need for following through on the Consultant Committee recommendation 27 on publication of significant intermediate results, discussed above. That recommendation calls for accompanying each quarterly release of first inventory change estimates with a note explaining the relationship between the GNP inventory change figure and inventory book value figures and the inclusion of a summary reconciliation.

That the striking revision in the total figure on changes in business inventories may not be principally founded on the difficulties of estimating inventory valuation adjustment is illustrated by the large relative revision which has occurred in the estimated change in farm inventories, as shown in table 3. Farm inventories are founded on physical quantity changes in inventory stocks, and therefore do not involve an inventory valuation adjustment. Furthermore, the revision which is made in grain stocks is small; the large revisions shown are dependent almost entirely on reevaluation of livestock figures. Livestock represents about 66 percent of farm inventories. (See appendix table V–1.)

TABLE 3.—*Change in business inventories, 1st estimates and latest revisions, Office of Business Economics seasonally corrected data in billions of dollars at annual rates*

	Total			Farm		
	1st estimate	Latest revision	Absolute difference	1st estimate	Latest revision	Absolute difference
1948:						
1st quarter	4.1	3.3	0.8	−0.4	1.0	1.4
2d quarter	2.3	5.1	2.8	.9	2.2	1.3
3d quarter	2.8	6.1	3.3	1.4	2.2	.8
4th quarter	5.3	4.3	1.0	1.2	1.5	.3
1949:						
1st quarter	2.2	0	2.2	.4	−.6	1.0
2d quarter	2.8	−5.3	8.1	−.7	−1.2	.5
3d quarter	−2.4	−1.7	.7	−1.0	−1.1	.1
4th quarter	−3.7	−5.3	1.6	−.9	−.5	.4
1950:						
1st quarter	1.7	2.5	.8	−.5	.3	.2
2d quarter	3.4	4.9	1.5	.1	.7	..6
3d quarter	−1.5	4.9	6.4	.2	1.1	.9
4th quarter	11.2	15.0	3.8	−.2	1.2	1.4
1951:						
1st quarter	7.9	10.5	2.6	1.5	1.2	.3
2d quarter	14.4	15.2	.8	1.7	1.2	.5
3d quarter	6.1	10.2	4.1	1.8	1.1	.9
4th quarter	4.9	4.9	0	1.6	1.1	.5
1952:						
1st quarter	.2	5.1	4.9	.7	1.1	.4
2d quarter	.1	−2.2	2.3	.9	1.0	.1
3d quarter	3.7	4.3	.6	.7	.9	.2
4th quarter	8.1	5.3	2.8	.6	.6	0
1953:						
1st quarter	1.7	2.5	.8	−.3	−.5	.2
2d quarter	8.8	3.1	5.7	−.7	−.9	.2
3d quarter	4.5	.7	3.8	−1.1	−.8	.3
4th quarter	−3.0	−4.6	1.6	−.7	−.3	.4
1954:						
1st quarter	−4.8	−2.6	2.2	.0	.2	.2
2d quarter	−3.8	−2.7	1.1	.2	.5	.3
3d quarter	−4.8	−2.1	2.7	.2	.7	.4
4th quarter	−1.3	.8	2.1	.3	.6	.3
1955:						
1st quarter	1.3	4.4	3.1	.0	.6	.6
2d quarter	4.3	6.1	1.8	.1	.4	.3
3d quarter	2.4	5.7	3.3	.4	.2	.2
4th quarter	5.3	6.7	1.4	.2	.0	.2
1956:						
1st quarter	4.0	6.2	2.2	−.1	−.3	.2
2d quarter	3.5	4.4	.9	−.4	−.7	.3
3d quarter	2.0	4.0	2.0	−.4	−.5	.1
4th quarter	4.1	4.0	.1	−.3	−.1	.2
1957:						
1st quarter	−1.2	2.3	3.5	.3	.3	.0
2d quarter	1.7	2.7	1.0	.5	.7	.2
3d quarter	2.0	2.5	.5	.7	.9	.2
4th quarter	−2.7	−1.2	1.5	.7	1.1	.4
1958:						
1st quarter	−9.0	−5.5	3.5	1.1	1.0	.1
2d quarter	−8.0	−4.0	4.0	1.3	1.0	.3
3d quarter	−5.0	−1.6	3.4	1.2	.9	.3
4th quarter	.0	3.3	3.3	.9	.7	.2
1959:						
1st quarter	5.7	7.1	1.4	.9	.2	.7
2d quarter	10.4	11.7	1.3	.9	.1	.8
3d quarter	−1.0	.7	1.7	.8	.0	.8
4th quarter	3.0	5.6	2.6	.7	.1	.6
1960:						
1st quarter	10.6	10.9	.3	.4	.1	.3
2d quarter	5.3	5.4	.1	.3	.3	.0
3d quarter	.6	2.4	1.8	.3	.4	.1
4th quarter	−3.0	−1.9	1.1	.4	.3	.1
Average: 1948–60	----------	----------	2.23	----------	----------	.41

Source: Department of Commerce, Office of Business Economics. Total 1st estimate figures are taken from the 1st issue of the *Survey of Current Business* to show figures for the given quarter, usually the 2d month after the end of the quarter. Farm 1st estimate figures are taken from the "Annual Review" section of the February editions of the "Survey" which state all 4 quarters of the previous year. 1st quarter farm 1st estimates as stated in the table are therefore 10 months late, 2d quarter 6, 3d quarter 4, and 4th quarter 2 months late.

Latest revision figures for both total and farm inventories are taken for the years 1948 through 1955 from table I–3 of *U.S. Income and Output, 1959*, and for the years 1955 through 1960 from the national income and product tables in the July 1961 issue of the "Survey."

The difference figures are the absolute numerical difference between the preceding 2 columns.

The case made above might appear to be a damning indictment of estimates of changes in business inventories, which is the most important type of data we are attempting to evaluate. Failure to point out the difficulties we have discussed would represent a dereliction of duty. As we have indicated, nevertheless, current reports on change in business inventories surely are not meaningless. We know this because the change in business inventories is consistent with the movement of other business indicator series. We can rationalize that some minimum reliability can be attached to estimates of the change in business inventories because, we may believe, the errors which occur in the published figures on inventory changes tend to be in the same direction from month to month, from quarter to quarter, or from year to year. The reason for this conclusion is that the errors which occur are principally related to biases rather than to statistical error (errors involved in points numbered 2 to 5 above rather than in number 1 on sampling variability). It is certainly possible that the methods employed in developing inventory figures tend to lead to biases in the same direction from one time to another. Furthermore, a "cumulation" tends to occur in total economic movements so that an increase in one time period tends to be followed by an increase in the following time period, and a decrease in one time period tends to be followed by a decrease in the following time period. Possibly the factors involved in such increases or decreases tend to represent the predominant forces which are measured when attention is directed at changes in inventory stocks.

If our arguments in the above paragraph are sound, it is comforting to find that, after all, inventory figures do mean something. It is disconcerting, however, to realize that present knowledge appears hopeless insofar as the development of quantitative measures of reliability is concerned. We can conclude, notwithstanding, that we do need to get a firmer "fix" on the amount of inventory change. In time, improvements in the data may lead to a better quantitative conception of measurable reliability.

Lag in Publication of Inventory Data

Lag in the availability of inventory data is approximately the same as it was when the Consultant Committee report was published in 1955. The one case of prompter reporting noted in table 4 is in the Census "Retail Trade Annual Report," where the lag has been cut down from 8 to 6 months.

It would appear that any significant improvements in the date of release of inventory figures is not feasible at the present time. This is largely because the record keeping in business concerns, at least for the type of inventory data now requested in most surveys, does not permit much earlier reporting. Possibly, a better adaptation of questionnaire forms to the types of records kept by businesses might make prompter reporting possible. This might be brought about by a better understanding of accounting records, in line with recommendation 2 above. For the present, a good illustration of lag in the availability of inventory data is provided by the fact that the Department of Commerce is now releasing sales data for some series with only a half-month lag, but without inclusion of any inventory data because inventory data cannot be made available that soon.

TABLE 4.—*Timelag of publication of inventory statistics (as of Aug. 15, 1961)*

Publishing agency	Frequency	Latest date covered	Date released	Lag when released (months)	Time since publication (to Aug. 15, 1961, in months)	Publication
All industries:						
Internal Revenue Service	Annual, 70 industries	1958–59	May 1960	10	[1] 25	*Selected Financial Data.*
Office of Business Economics	Quarterly	1st quarter, 1961	May 1961	2	5	*Survey of Current Business.*
Securities and Exchange Commission.	Annual, for all industries	Dec. 31, 1960	April 1961	4	8	Release: "Working Capital of U.S. Corporations."
Manufacturing:						
Census	Quinquennial	1958	April 1961	28	32	*1958 Census of Manufactures.*
Census	Annual	1959	(October 1961)	22	[2]	*Annual Survey of Manufactures.*
Federal Trade Commission-Securities and Exchange Commission.	Corporations quarterly	1st quarter, 1961	July 1961	4	5	*Quarterly Financial Report.*
Office of Business Economics	Monthly	June 1961	July 1961	1	2	"Industry Survey".
Wholesale trade:						
Census	Monthly, merchant wholesalers.	June 1961	Aug. 1–9, 1961	1	1½	*Monthly Wholesale Trade Report.*
Office of Business Economics	Monthly, all wholesalers	June 1961	Aug. 1–5, 1961	1	1½	"Trade and manufacturing press release."
Retail trade:						
Census	Annual	1960	June 1961	[3] 6	8	*Retail Trade Annual Report.*
Office of Business Economics	Monthly	June 1961	Aug. 1–5, 1961	1	1½	"Trade and manufacturing press release."
Federal Reserve System	Monthly, department stores	June 1961	July 28, 1961	1	1½	Monthly report: *Federal Reserve Bulletin.*

[1] The *Selected Financial Data* for the year 1959–60 was delayed because of low priority in budget considerations. It should, however, be published sometime in the fall of 1961. The Internal Revenue Service hopes to have the 1960–61 issue of *Selected Financial Data* published without undue delay in April or May of 1962.

[2] The *1959 Annual Survey of Manufactures* has been delayed until October 1961 because of the time required to incorporate the new benchmark statistics provided by the *1958 Census of Manufactures*. The 1960 *Annual Survey* should be out in November or December of 1961. The Census Bureau is striving for a lag of only 9 or 10 months with the 1961 *Annual Survey*.

[3] This lag of 6 months has been reduced from about 8 or 9 months in 1955.

Possibly, earlier answers could be given on the direction of movement of inventory stocks. The National Association of Purchasing Agents obtains such information by a mail questionnaire with only a half-month lag. (See table II–7.) The National Association of Purchasing Agents' experience indicates that little time would be saved by using a telephonic or telegraphic instead of a mail survey.

Reconciliation of Inventory Series

The diversity of inventory series presented in the following appendix is understandably confusing. In line with recommendation 5 of the Consultant Committee, discussed above, reconciliation between these series is badly needed. The quantitative differences between the series should be carefully developed, but such a venture is beyond the possible scope of the study we are presenting.

We do present below admittedly incomplete qualitative statements of the major differences between series where we believe the contrast is most needed. Detailed measurements by which the series are adjusted differ, adding to reconciliation difficulties, e.g., seasonal adjustments are sometimes made by different breakdowns.

Broad types of differences between the series can be classified as follows:

1. Industry classification.
2. Reporting unit.
3. Industry coverage.
4. Whether there is a blowup to a universe figure, and if so, the nature of the blowup.

Clearly, all necessary information is not available in all cases to provide complete quantitative reconciliations. In this respect two things can be done. One, which will be available for many items, represents a crude approximation of the differences even though careful measurements cannot be made. The other represents a summary figure which gives the discrepancy remaining after all available quantitative information on the differences has been applied. Although this procedure may not provide wholly satisfactory statements of the differences between published series, it will give the reader a basis for evaluating the differences. It will throw additional light on the reliability of the inventory data and at the same time make possible more intelligent judgments on the inventory series which can be most effectively employed for a given purpose. An illustration of the procedure here recommended is given by the Office of Business Economics table on page 194 of the 1959 U.S. Income and Product, comparing Security and Exchange Commission and Office of Business Economics estimates of personal saving.

Statements on Reconciliations Between Particular Sets of Inventory Data

1. All corporation inventories, Securities and Exchange Commission and Internal Revenue Service (see tables I–1 and I–6)

Benchmarks.—The Securities and Exchange Commission series is equal to the Internal Revenue Service figures with the following adjustments by the Securities and Exchange Commission:

(*a*) A blowup to adjust for those corporations which fail to submit balance sheets with their tax returns. This enlargement was 1 percent ($700 million) in 1958.

(*b*) An enlargement, principally in the aircraft industry, to account for the practice of applying U.S. Government "progress payments" (partial payments made after the completion of a portion of a contract) against goods in process, which thereby subtracts artificially from inventory. In 1958 this inventory adjustment came to $1.1 billion.

2. Federal Trade Commission-Securities and Exchange Commission quarterly series and the Internal Revenue Service Manufacturing Corporation Inventory (see tables II–4 and I–1)

Benchmarks.—The Federal Trade Commission-Securities and Exchange Commission series uses the Internal Revenue Service sample of U.S. corporation income tax forms filed by enterprises classified as "manufacturing corporations" as part of a composite frame from which its sample is drawn. The other part consists of all applications for a Federal social security employer's identification number filed by manufacturing corporations.

Sampling and compilation procedures.—The Federal Trade Commission-Securities and Exchange Commission series uses a consolidated report which covers all subsidiaries and affiliates of the sampled corporation regardless of whether they are engaged in manufacturing or not. The Internal Revenue Service report covers only the corporation as it reports on its income tax returns and makes no adjustment for varying corporate structures. Although the FTC-SEC procedure blurs the industry classifications considerably, it is more consistent and eliminates, to the fullest extent possible, the multiple counting of intercorporate transfers included in the IRS statistics based on unconsolidated or partly consolidated reports from multicorporate enterprises.

Adjustments.—(*a*) An enlargement, principally in the aircraft industry, is made in the FTC–SEC series to account for the practice of applying U.S. Government "progress payments" (partial payments made after the completion of a portion of a contract) against goods in process, which thereby subtracts artificially from inventory. In 1958 an addition to allow for this came to $1.1 billion.

(*b*) The FTC–SEC series separates the Western Electric estimates from American Telephone & Telegraph Co. and classifies them as "manufacturing," while the IRS, which receives a consolidated report from all of American Telephone & Telegraph Co., classifies the entire corporation as a "utility."

(*c*) The accounting methods used by corporations in reporting to the SEC and to the FTC are in general based on conventional commercial accounting procedures, while methods used in reporting to the IRS are strictly defined in the tax code. These two accounting systems do not always coincide, which may account for a certain amount of the variation between the two series.

3. Inventory change (related to implied, unpublished GNP nonfarm stocks), National Income Division, Office of Business Economics, and Manufacturing and trade Inventories, Business Structures Division, Office of Business Economics (see tables I–2 and II–3)

Scope.—These series do not gage the same thing, since the National Income Division covers all industries, while the Business Structures Division series are concerned with manufacturing and trade. A reconciliation could be made, however, between the unpublished manufacturing component of the National Income Division series and the manufacturing series of the Business Structures Division.

Benchmarks.—For a number of years both series were based on the Internal Revenue Service's "Statistics of Income" although the National Income Division formerly used Census of Business data as well. The Business Structures manufacturing series was last revised to produce consistency with the 1954 "Statistics of Income" and is now being converted to a benchmark based on the annual survey of manufactures of the Census Bureau. The National Income Division continues to base its series on the IRS figures.

Adjustments.—(*a*) Seasonal adjustment: The two series do not use the same seasonal adjustment. The National Income seasonal adjustments are derived separately for seven component parts: manufacturing, wholesale, retail, each separately for durable and nondurable groups, and all other nonfarm inventories. Business Structures seasonal adjustments are derived in greater detail. Unsatisfactory seasonal adjustment for retail automobile inventories is said to account for an important part of the difference between the series.

(*b*) Inventory valuation adjustment: The National Income Division makes this adjustment to allow for varying prices in which stocks are expressed. The purpose is to develop figures which represent inventory stocks in current prices. The Business Structures Division expresses inventories in book values as reported by the companies, perhaps most frequently reflecting the lower of cost or market price.

Presentation.—Current movement of both series is based on monthly surveys conducted by the Census Bureau. The National Income Division figures are presented quarterly, Business Structures Division figures, monthly.

4. Manufacturing: Census Bureau and the Office of Business Economics Industry Survey (*see tables II–1 and II–3*)

The Census Bureau annual series on manufacturing inventories is published approximately every fifth year in the Census of Manufactures and in the intervening years in the Annual Survey of Manufactures.

The Census of Manufactures is itself a benchmark, being a census covering all manufacturing establishments. The census is conducted on an "establishment" basis rather than on the "company" basis of the Internal Revenue Service tax return series or the "consolidated corporation" basis of the Securities and Exchange Commission-Federal Trade Commission series. The principal advantage of the establishment principle over the other bases is that it provides sharper separation of the industry classifications. The annual survey is based on the Census of Manufactures with current movements being traced by a large probability sample; it is also on an establishment basis.

Since 1947 the Department of Commerce Industry Survey has used the "company" based benchmark levels of the Internal Revenue Service "Statistics of Income." Manufacturing inventory estimates of the Industry Survey have consistently been higher than those of the census and annual survey partly because, under the company reporting principle, the Industry Survey includes the inventories of trade and mining establishments of manufacturing companies. Under the Census establishment basis such inventories are excluded from manufacturing figures.

The last Office of Business Economics benchmark revision was to the Internal Revenue Service figures of 1954, but the Industry Survey

is now in the process of changing over to a Census Bureau benchmark using a "divisional" basis of reporting. Under this new procedure horizontally integrated companies submit a separate report for each division engaged in a different industry classification. This "divisional" principle should improve the industrial classification of the Industry Survey. It will thus become more consistent with these census and annual survey than with the Internal Revenue Service series. Manufacturing sales branches will continue to be included in the Industry Survey under the divisional basis, although segregation may be possible in a few large corporations which have separate sales divisions.

5. Wholesale trade: Census Bureau and Business Structures Division, Office of Business Economics (see tables III–1 and III–2)

Scope.—The monthly Census Bureau series is limited to merchant wholesalers of commodities other than farm product raw materials (SIC–505). The Office of Business Economics series is blown up to cover all merchant wholesalers, plus agents and brokers, assemblers of farm products, and wholesalers' administrative offices and auxiliary units.

Benchmarks.—The Census monthly survey of merchant wholesalers uses lists of wholesalers compiled from the latest (1961 figures, 1958 census; 1956–60 figures, 1954 census) Census of Business with Bureau of Old-Age and Survivors Insurance lists of merchant wholesalers entering business since the latest Census of Business. A probability sample is selected from these lists, and the responses from this sample are blown up to represent the universe. The Office of Business Economics takes the results of the Census survey of merchant wholesalers and, using ratios derived from the 1954 Census of Business, expands them to account for nonmerchant wholesalers (other than manufacturers' sales branch inventories which are included in manufacturing inventories; the blowup is approximately 16 percent).

Adjustments.—Office of Business Economics monthly figure for all wholesalers are adjusted for seasonal variation; the Census merchant wholesalers' figures are not.

6. Federal Reserve department store inventories and Census' annual retail trade report (see tables IV–3 and IV–1)

Scope.—The Federal Reserve series covers only department stores as defined in "Standard Industrial Classification 531," as presented in the various editions of the SIC manual since its first edition in 1945. Department stores represent but 1 of the 17 classifications of retail stores shown in the Census Bureau's "Annual Retail Trade Report."

Benchmarks.—The Federal Reserve series uses benchmark levels provided in the quinquennial Census of Retail Trade. Since no inventory data are collected in the Census of Retail Trade, the benchmark adjustment is made by applying sample stock-sales ratios to the Census retail sales series. The annual retail trade survey is grounded on its own sample which consists of about 36,000 organizations controlling and operating about 125,000 retail stores.

The relationship between the Federal Reserve department store series and the annual retail trade survey is only indirect; sample lists in the annual retail trade survey depend on the Census of Retail Trade, while the Federal Reserve series is benchmarked on that census.

7. Annual retail trade report (Census) and Office of Business Economics monthly retail survey (see tables IV–1 and IV–2)

Scope.—The annual report presents inventory stock figures for 17 types of retail trade stores, while the monthly survey provides three subdivisions each of durable and nondurable stores.

Benchmarks.—The quinquennial Census of Retail Trade is a benchmark for the "Annual Retail Trade Report" only in that is is the source of the lists of establishments from which the sample for the annual report is selected. The Office of Business Economics monthly series has been based on the 1952 annual report with no revisions to later reports until this year. Revised monthly estimates, which are expected to appear shortly, will be based on the 1960 annual report. The monthly sample lists will also be updated. A statement of sampling variability may then be expected. The revised monthly figures and those in the annual report may be nearly reconciled after the indicated revision in the monthly retail series.

STATISTICAL APPENDIX

TABLE I-1.—*Inventory stock as shown by reports of the Internal Revenue Service, by major industry*

[In millions of dollars]

	1958				1957				1956			
	Corporations [1]	Sole proprietorships [2]	Partnerships [3]	All enterprises [4]	Corporations [5]	Sole proprietorships [6]	Partnerships [7]	All enterprises [8]	Corporations [9]	Sole proprietorships [10]	Partnerships [11]	All enterprises [12]
All industrial groups	80,047	10,049	6,012	96,109	80,560	8,854	6,293	95,707	78,744	8,125	5,933	91,501
Agriculture, forestry, and fisheries	[13] 395	1,096	395	1,886	[13] 318	([14])	[15] 387	705	304	([14])	([14])	304
Mining	828	6	20	853	923	3	34	959	757	1	16	774
Construction	1,303	512	188	2,003	1,040	422	273	1,735	929	313	390	1,632
Manufacturing	49,643	343	729	50,714	50,358	292	678	51,329	49,788	317	706	49,612
Transportation, communication, and utilities	2,710	11	5	2,726	3,004	11	10	3,025	3,050	4	7	2,961
Trade, wholesale and retail	24,230	7,768	4,526	36,525	24,021	7,827	4,758	36,606	23,124	7,142	4,692	34,958
Services	837	294	140	1,271	772	278	140	1,190	718	324	118	1,159
Nature of business not allocable	21	19	9	49	31	21	14	66	14	25	3	42
Finance, insurance, and real estate	[16] 81	([14])	([14])	81	94	([14])	([14])	94	59	([14])	([14])	59

	1955—Corporations [17]	1954—Corporations [18]	1953		1950—Corporations [21]	1948—Corporations [22]	1945—Corporations [23]	1939		1938—Corporations [26]	1929—Corporations [27]	1928—Corporations [28]
			Corporations [19]	Partnerships [20]				Corporations [24]	Partnership [25]			
All industrial groups	70,920	62,914	65,519	4,675	54,496	48,293	26,067	17,718	1,222	16,582	21,911	20,751
Agriculture, forestry, and fisheries	284	278	299	158	322	266	168	138	58	146	198	189
Mining	631	640	761	24	643	551	306	321	1	342	694	516
Construction	693	886	664	217	614	475	159	121	17	116	305	263
Manufacturing	44,422	39,872	42,992	722	33,008	30,355	17,256	10,993	189	10,192	12,614	12,011
Transportation, communications, and utilities	2,623	2,468	2,381	7	1,909	2,059	1,115	715	2	692	' 1,119	1,000
Trade, wholesale and retail	21,578	18,138	17,828	3,321	17,394	14,016	6,582	5,157	832	4,808	5,862	5,907
Services	630	574	551	103	570	546	419	218	23	205	191	178
Nature of business not allocable	12	9	9	4	16	15	14	14	79	29	7	13
Finance, insurance, and real estate	47	48	31	119	20	11	46	42	21	53	921	675

Footnotes on following pages.

[1] All corporation figures in this table are taken from the respective editions of *Statistics of Income—Corporation Income Tax Returns*, published annually since 1936 by the Internal Revenue Service (1958–59 figures, pp. 32–38). All figures in this table were compiled from income tax returns either for the stated calendar year or for noncalendar accounting periods ending July of that year through the following June. Thus the 1958 end-of-year (i.e., end of the accounting period) inventory stock figures represents an aggregate of corporation inventories stated as of dates varying from July 1958 to June 1959. Because of intercorporate transfers, this variation in reporting date may produce a certain amount of double counting or omission.

Corporation statistics are taken from the balance sheets which are submitted with the income tax returns of from 85 to 90 percent of all corporations representing more than 95 percent of all compiled receipts. Part of the remainder represents corporations which have liquidated during the year and therefore report assets of zero. IRS makes no adjustment for active corporations which fail to submit balance sheets. (Securities and Exchange Commission makes an adjustment based on proportion of total compiled receipts of corporations not submitting balance sheets.) Although in 1955 the nomenclature of the tables was changed from "Corporations which submitted balance sheets" to "All active corporations," there has been no change in the size of the universe, the method of sampling, or the manner of reporting.

Excluded from the tabulations are tentative returns and amended returns not associated with original returns, returns from exempt organizations and unincorporated businesses which elect to be taxed as corporations.

In addition to the figures shown here, a further breakdown is available according to 61 industry groups. These groups follow the classifications in the *Standard Industrial Classification Manual* current at the particular time. Because the manual is occasionally revised (last revision, 1957) statistics for any given industry are not necessarily comparable from year to year. IRS does not provide "bridge" data, but information regarding changes in the SIC code can be found in the appendixes to the quinquennial *Census of Business*, Census Bureau, U.S. Department of Commerce.

Difficulty in the industrial classification may also arise because of the structure of many corporations. Horizontally integrated corporations which report on a consolidated basis are classified wholly under principal industrial activity even though they may operate extensive concerns in other industries. For instance, Western Electric, the manufacturing subsidiary of A.T. & T., is classified with its parent corporation in the communications group. Mergers, disposals, spinoffs, divisions, etc., may affect the comparability of figures for any industry from year to year.

In addition, IRS data may not be strictly comparable from year to to year because of changes in the tax laws, bases for filing returns, and the processing of data for compilation purposes.

Earlier figures for 83 industry groups are available in the *Selected Financial Data* which comes out about 10 months late (1959–60 issue was delayed, but IRS hopes to have the 1960–61 issue out on time, about April 1962). *Selected Financial Data* figures are not, however, as complete as those in *Statistics of Income*, which appears about 18 months late, because the latter includes (1) inventories in the finance and banking group, (2) late returns, and (3) the full sample.

Since 1955 inventory figures have been divided into three categories based on the inventory accounting procedure used: (1) last in, first out; (2) other than last in, first out; and (3) not stated.

[2] Source: Treasury Department, Internal Revenue Service, *Selected Financial Data*, 1958–59, table 1. A probability sample, allowing for delinquent filing of returns, was selected of all individual income tax returns (form 1040) filed during the calendar year 1959. Returns were stratified by presence or absence of business income, size of adjusted gross income, and taxpayment status. In 1959 there were an estimated 10,207,188 individual returns with business or farm income reported on schedule C or F, or the taxpayers' own schedules.

Although returns usually show profit and loss, inventory may not be reported separately, even though used in determining the amount of net profit or loss. In addition a great number of sole proprietors (independent salesmen for corporations, for instance) have no inventory to report. Inventory data in 1959 were reported from only 1,900,000 of the 8,800,000 sole proprietorships, but no enlargements were made for underreporting. Figures represent end-of-the-year levels of inventory.

The following table shows for 1958, by industry group, the percent of returns from sole proprietorships reporting inventories:

Industry	Total number of businesses	Percent reporting inventory
All industries	8,799,711	21.1
Agriculture, forestry, and fisheries	3,489,154	5.9
Mining	35,413	4.4
Construction	604,910	15.6
Manufacturing	179,967	41.9
Transportation, communications, and utilities	290,225	1.8
Trade	1,880,131	69.4
Services	1,825,988	13.0
Not allocable	57,617	8.6

[3] Source: U.S. Treasury Department, Internal Revenue Service, *Selected Financial Data*, 1958–59, table 2. The sampling procedures for partnerships were similar to those used for sole proprietorships, with partnerships being stratified into "small," "medium," and "large" (large receiving a 1/1 sampling ratio). Inventories were similarly underreported, particularly among the small partnerships, and no enlargements were made. The following table shows, by industry group, the percent of partnerships which reported inventories:

Industry	Estimated number	Percent of returns reporting inventories
All industries	953,840	44.8
Agriculture, forestry, and fisheries	144,915	12.9
Mining	18,075	5.5
Construction	60,945	29.4
Manufacturing	50,745	72.1
Transportation, communications, and utilities	17,198	7.1
Trade	317,656	85.2
Services	162,881	26.4
Not allocable	12,465	14.2

[4] Summation of 3 preceding columns. This column represents the only "full stock" figures, covering inventories of all business enterprises, in the table. However, because of the underreporting of sole proprietorship and partnership inventories (see notes 2 and 3, above), the actual quantities are probably somewhat higher and therefore closer to the Census of Business figures for all manufacturing and trade enterprises.

[5] Source: *Corporation Income Tax Returns*, 1957–58, pp. 31–39. See note 1.

[6] Source: U.S. Treasury Department, Internal Revenue Service, *Selected Financial Data*, 1957–58, table 1. Data in this column were estimated through a probability sample of all individual income tax returns filed on form 1040. These were stratified into 4 adjusted gross income size classes and were sampled at the following rates:

Adjusted gross income:	*Sampling rate (percent)*
Under $10,000	0.3
$10,000, under $50,000	3.0
$50,000, under $150,000	30.0
$150,000 or more	100.0

Individual returns showing business activity were classified as "proprietorships."

No enlargement was made for failure to report inventories because of the impossibility of differentiating between sole proprietors who failed to report inventories and those who had none to report. The following table shows, by industry group, the percent of business returns of individuals reporting inventories:

Industry	Total number of businesses	Percent reporting inventories
All industries	5,200,000	32.7
Mining	28,126	1.0
Construction	584,126	14.5
Manufacturing	161,521	41.5
Transportation, communications, and utilities	297,116	1.5
Trade	1,866,563	71.4
Services	1,812,041	13.6

[7] Source: U.S. Treasury Department, Internal Revenue Service, *Selected Financial Data*, 1957–58, table 2. Data in this column were estimated through a probability sample of all partnership income tax returns which for sampling purposes were stratified into 3 adjusted gross income size classes. No enlargement was made for inventory underreporting because of the impossibility of differentiating between partnerships which failed to report inventories and those which had none to report. The following table shows the sampling rate and the percent of returns reporting inventories by gross income size classes:

Sample groups (based on size of gross receipts or total income)	Number	Sampling rate (percent)	Percent reporting inventories
Under $200,000	911,591	1	32
$200,000, under $500,000	48,630	5	73
$500,000 or more	22,221	100	75

The following tables show, by industry group, the percent of partnerships reporting inventories:

Industry	Total number of partnerships	Percent reporting inventories
All industries (excluding forestry, agriculture, and fishery)	821,717	45.9
Mining	15,383	7.1
Construction	65,945	34.0
Manufacturing	51,870	64.5
Transportation, communications, and utilities	16,873	5.0
Trade	331,074	83.9
Services	155,230	25.0

[8] Summation of 3 preceding columns. Total figure excludes sole proprietorships engaged in agriculture, forestry, and fishing, and sole proprietorships and partnerships not reporting inventory.

[9] See note 1. Source: "Corporation Income Tax Returns, 1956–57," pp. 25–34.

[10] Source: U.S. Treasury Department, Internal Revenue Service, *Business Indicators*, 1956–57, table 1. Data in this column were estimated through a probability sample of all personal income tax returns stratified on the basis of the size of adjusted gross income. Sampling rates for these income groups were as follows:

	Percent
Under $10,000	0.3
$10,000, under $50,000	3.0
$50,000, under $150,000	30.0
$150,000 or more	100.0

Of the 5,057,072 sole proprietorships submitting returns, only 1,703,500, or 33.7 percent reported inventories. No enlargement was made for underreporting because of the impossibility of determining the number of sole proprietors who failed to report inventories as compared to those who had none to report. These figures represent the first inventory data on sole proprietorships published by the Internal Revenue Service since the *Statistics of Income* for 1945.

[11] Source: U.S. Treasury Department, Internal Revenue Service, *Business Indicators*, 1956–57, table 2. These figures represent the first statistics of partnership inventories published by the Internal Revenue Service since 1953.

[12] Summation of 3 preceding columns.

[13] Includes growing crops reported as assets by agricultural concerns.

[14] Figure not available.

[15] Figure not published, but supplied by Internal Revenue Service for the purposes of this report.

[16] Excludes amounts reported as inventories on nonconsolidated returns by investment and holding companies (other than operating holding companies), security and commodity brokers, dealers, and exchanges, and real estate subdividers, developers, and operative builders. Inventories reported by insurance carriers other than life or mutual are also excluded.

[17] See note 1. "Corporation Income Tax Returns, 1955," pp. 31-40. For the years 1954 and 1955, Corporation Income Tax Returns contained tabulations showing the manufacturing and trade corporation inventories by the final month of the annual accounting period (fiscal year). (Receipts, income or deficit, and assets are reported annually on this basis.)

[18] See note 1. Source: *Statistics of Income for 1954*, "Corporations," pp. 44–51.

[19] See note 1. *Statistics of Income for 1953*, pt. 2, "Corporation Income Tax Returns," pp. 49–55. In 1953, returns with apparently complete balance sheet data numbered 640,073, or 92 percent of all returns filed by active corporations. Manufacturing corporations led with 95 percent of their returns showing balance sheets, while construction, trade, and finance showed 90 percent or more with inventory data.

[20] *Statistics of income for 1953*, "Partnership Returns," pp. 34–38. Prior to these 1953 statistics, the only data available on partnership inventories were for tax years 1947 (Treasury Department press release S–2645, Apr. 6, 1951), 1945 (Treasury Department press release S–2253, Feb. 16, 1950), and 1939 (Supplement to *Statistics of Income for 1939*, pt. 1).

The figures in this column were compiled only for those partnerships which submitted balance sheets. No enlargement has been made for underreporting because of the impossibility of differentiating between partnerships which failed to report inventories and those which had none to report. The following table stated the percent of returns with balance sheets by number of returns and value of receipts:

Industry	Returns with balance sheets as percent of all returns	Value of receipts of returns with balance sheets as percent of receipts of all returns
All industrial groups	39.8	71.1
Agriculture, forestry, and fishery	11.3	30.2
Mining	27.1	57.1
Construction	38.5	67.7
Manufacturing	59.1	87.5
Transportation, communications, and utilities	36.7	67.4
Trade	47.8	73.3
Finance, insurance, and real estate	44.7	69.1
Services	39.6	62.6
Business not allocable	25.4	63.9

A probability sample of partnership returns was selected and stratified into small (1 percent sampling rate), medium (5 percent), and large (100 percent). The total sample covered 31,360 partnerships.

[21] See note 1. Source: *Statistics of Income for 1950*, pt. 2, pp. 114–129.

[22] See note 1. Source: *Statistics of Income for 1948*, pt. 2, pp. 130–145.

[23] See note 1. Source: *Statistics of Income for 1945*, pt. 2, pp. 152–183.

[24] See note 1. Source: *Statistics of Income for 1939*, pt. 2, pp. 112–139.

[25] See note 1. Source: Supplement to *Statistics of Income for 1939*, pt. 1, pp. 52–59. This publication represents the earliest IRS data compiled from partnership returns (form 1065). The data in this column are the sum of figures presented in 2 tables: (1) Returns with ordinary net income, and (2) returns with no ordinary net income.

[26] See note 1. Source: *Statistics of Income for 1938*, pt 2, pp. 118–145.

[27] See note 1. Source: *Statistics of Income for 1929*, p. 332.

[28] See note 1. Source: *Statistics of Income for 1928*, p. 380.

TABLE I–2.—*Total business inventory change as computed by the Office of Business Economics, by farm and nonfarm at annual rates*

	Millions			Billions of 1954 dollars			Inventory ratio [1]
	Inventory change current dollars, nonfarm	Inventory change current dollars, farm	Inventory change current dollars, total	Inventory change constant dollars, nonfarm	Inventory change constant dollars, farm	Inventory change constant dollars, total	
1929	1,836	−162	1,674	3.2	−0.3	3.0	1.63
1930	−83	−300	−383	−.3	−.4	−.7	.42
1931	−1,608	324	−1,284	−3.5	1.7	−1.8	1.66
1932	−2,590	34	−2,556	−6.3	.7	−5.6	4.19
1933	−1,370	−259	−1,629	−3.5	−.7	−4.2	2.83
1934	195	−1,320	−1,125	.3	−3.1	−2.8	1.70
1935	376	536	912	.9	1.7	2.6	1.27
1936	2,066	1,112	954	4.3	−2.0	2.3	1.17
1937	1,726	523	2,249	3.4	1.8	5.2	2.54
1938	−1,046	103	−943	−2.3	.4	−1.9	1.09
	Billions						
1939:							
1st quarter	0.6	0.1	0.7				
2d quarter	−1.0	.1	−.9				
3d quarter	1.3	0	1.3				
4th quarter	.3	0	.3				
Year	.316	.056	.372	.6	.4	1.0	.41
1940:							
1st quarter	1.7	.2	1.9				
2d quarter	1.1	.2	1.3				
3d quarter	2.9	.3	3.2				
4th quarter	2.0	.4	2.4				
Year	1.902	.270	2.172	3.8	.6	4.4	2.21
1941:							
1st quarter	2.5	.4	2.9				
2d quarter	4.9	.4	5.3				
3d quarter	3.6	.4	4.0				
4th quarter	5.3	.4	5.7				
Year	4.049	.452	4.501	7.6	1.0	8.6	3.71
1942:							
1st quarter	4.6	.6	5.2				
2d quarter	2.6	1.1	3.7				
3d quarter	−3.6	1.5	−2.1				
4th quarter	−1.0	1.5	.5				
Year	.652	1.159	1.811	1.6	2.0	3.6	1.15
1943:							
1st quarter	−4.2	.5	−3.7				
2d quarter	−.1	−.4	−.5				
3d quarter	.6	−.5	.1				
4th quarter	1.5	−.5	1.0				
Year	−.577	−.176	−.753	−.5	0	−.5	.39
1944:							
1st quarter	.9	−.4	.5				
2d quarter	−.1	−.5	−.6				
3d quarter	−.5	−.4	−.9				
4th quarter	−2.6	−.5	−3.1				
Year	−.575	−.445	−1.020	−1.1	−.6	−1.7	.48
1945:							
1st quarter	−1.1	−.5	−1.6				
2d quarter	.5	−.5	0				
3d quarter	−1.3	−.5	−1.8				
4th quarter	−.5	−.3	−.8				
Year	−.595	−.462	−1.057	−1.6	−.8	−2.4	.49
1946:							
1st quarter	6.0	−.1	5.9				3.24
2d quarter	8.7	.1	8.8				4.46
3d quarter	5.9	.2	6.1				2.89
4th quarter	4.8	−.1	4.7				2.17
Year	6.350	.029	6.379	9.1	−.1	9.0	3.12
1947:							
1st quarter	1.5	−1.1	.4	1.4	−.8	.6	1.18
2d quarter	1.5	−2.5	−1.0	1.8	−2.3	−.5	.43
3d quarter	−.3	−2.4	−2.7	−.3	−2.2	−2.5	1.13
4th quarter	2.4	−1.0	1.4	2.9	−.9	2.0	.57
Year	1.298	−1.760	−.462	1.4	−1.5	−.1	.21

See footnote at end of table, p. 143.

TABLE I–2.—*Total business inventory change as computed by the Office of Business Economics, by farm ond nonfarm at annual rates*—Continued

	Billions			Billions of 1954 dollars			Inventory ratio [1]
	Inventory change current dollars, nonfarm	Inventory change current dollars, farm	Inventory change current dollars, total	Inventory change constant dollars, nonfarm	Inventory change constant dollars, farm	Inventory change constant dollars, total	
1948:							
1st quarter	2.3	1.0	3.3	1.9	0.8	2.7	1.34
2d quarter	2.9	2.2	5.1	3.1	1.8	4.9	2.02
3d quarter	3.9	2.2	6.1	4.1	1.7	5.8	2.37
4th quarter	2.8	1.5	4.3	3.0	1.1	4.1	1.64
Year	2.976	1.732	4.708	3.0	1.4	4.4	1.85
1949:							
1st quarter	−4.1	4.1	0	.4	−.8	−.4	0
2d quarter	−.6	−4.7	−5.3	−4.6	−1.4	−6.0	2.03
3d quarter	−4.7	3.0	−1.7	−.8	−1.2	−2.0	.65
4th quarter	−2.2	−3.1	−5.3	−5.4	−.6	−6.0	2.02
Year	−2.209	−.863	−3.072	−2.6	−1.0	−3.6	1.19
1950:							
1st quarter	2.2	.3	2.5	2.4	.3	2.7	.95
2d quarter	4.2	.7	4.9	4.8	.6	5.4	1.82
3d quarter	3.8	1.1	4.9	1.1	1.1	5.2	1.70
4th quarter	13.8	1.2	15.0	14.5	1.0	15.5	5.18
Year	6.000	.815	6.815	6.5	.7	7.2	2.45
1951:							
1st quarter	9.3	1.2	10.5	9.2	.8	10.0	3.42
2d quarter	14.0	1.2	15.2	13.7	.8	14.5	4.88
3d quarter	9.1	1.1	10.2	9.2	.6	9.8	3.15
4th quarter	3.8	1.1	4.9	3.9	.6	4.5	1.47
Year	9.057	1.176	10.233	9.0	.7	9.7	3.20
1952:							
1st quarter	4.0	1.1	5.1	4.0	.6	4.6	1.52
2d quarter	−3.3	1.1	−2.2	−3.3	.6	−2.7	.64
3d quarter	3.4	.9	4.3	3.3	.5	3.8	1.25
4th quarter	4.7	.6	5.3	4.7	.2	4.9	1.50
Year	2.146	.921	3.067	2.2	.4	2.6	.90
1953:							
1st quarter	3.0	−.5	2.5	3.2	−.6	2.6	.69
2d quarter	4.0	−.9	3.1	4.1	−.9	3.2	.85
3d quarter	1.5	−.8	.7	1.5	−.8	.7	.19
4th quarter	−4.3	−.3	−4.6	−4.3	−.3	−4.6	1.26
Year	1.068	−.621	.447	1.1	−.6	.5	.11
1954:							
1st quarter	−2.8	.2	−2.6	−2.6	.1	−2.5	.72
2d quarter	−3.2	.5	−2.7	−3.4	−.5	−2.9	.75
3d quarter	−2.8	.7	−2.1	−2.7	.7	−2.0	.58
4th quarter	.2	.6	.8	.1	.7	.8	.22
Year	−2.129	.490	−1.639	−2.1	.5	−1.6	.44
1955:							
1st quarter	3.8	.6	4.4	3.9	.8	4.7	1.16
2d quarter	5.7	.4	6.1	5.8	.7	6.5	1.58
3d quarter	5.5	.2	5.7	5.4	.6	6.0	1.43
4th quarter	6.7	0	6.7	6.6	.5	7.1	1.67
Year	5.486	.297	5.783	5.4	.7	6.1	1.48
1956:							
1st quarter	6.6	−.3	6.3	6.4	−.6	5.8	1.55
2d quarter	5.2	−.7	4.5	5.0	−.8	4.2	1.20
3d quarter	4.4	−.5	3.9	4.3	−.4	3.9	.94
4th quarter	4.1	−.1	4.0	3.9	.1	4.0	.94
Year	5.075	−.415	4.660	4.9	−.4	4.5	1.12
1957:							
1st quarter	2.0	.3	2.3	1.8	.7	2.5	.52
2d quarter	2.0	.7	2.7	1.7	1.1	2.8	.61
3d quarter	1.5	.9	2.4	1.3	1.0	2.3	.54
4th quarter	−2.3	1.1	−1.2	−2.0	.9	−1.1	.27
Year	.801	.762	1.563	.7	1.0	1.7	.35
1958:							
1st quarter	−6.5	1.0	−5.5	−5.5	.9	−4.6	1.25
2d quarter	−5.0	1.0	−4.0	−4.3	.9	−3.4	.91
3d quarter	−2.5	.9	−1.6	−2.1	.8	−1.3	.36
4th quarter	2.6	.7	3.3	2.4	.7	3.1	.72
Year	−2.864	.913	1.951	−2.4	.8	−1.6	.44

See footnote at end of table, p. 143.

TABLE I–2.—*Total business inventory change as computed by the Office of Business Economics, by farm and nonfarm at annual rates*—Continued

	Billions			Billions of 1954 dollars			
	Inventory change current dollars, nonfarm	Inventory change current dollars, farm	Inventory change current dollars, total	Inventory change constant dollars, nonfarm	Inventory change constant dollars, farm	Inventory change constant dollars, total	Inventory ratio [1]
1959:							
1st quarter	6.9	0.2	7.1	6.1	0.1	6.2	1.53
2d quarter	11.6	.1	11.7	.2	−.1	10.1	2.45
3d quarter	.7	0	.7	.9	−.1	.8	.15
4th quarter	5.5	.1	5.6	5.1	0	5.1	1.60
Year	6.161	.092	6.253	5.6	0	5.6	1.31
1960:							
1st quarter	10.8	.1	10.9	9.9	.1	10.0	2.23
2d quarter	5.1	.3	5.4	4.7	.2	4.9	1.07
3d quarter	2.0	.4	2.4	2.0	.3	2.3	.48
4th quarter	−2.2	.3	−1.9	−1.3	.2	−1.1	.38
Year	3.958	.258	4.216	3.8	.2	4.0	.84
1961: 1st quarter			−4.5			−3.8	

[1] (Change in inventories) divided by (GNP minus change in inventories).

Source: U.S. Department of Commerce, Office of Business Economics, National Income Division. These figures are presented in a supplement to the *Survey of Current Business* about once in 5 years. The most recent is U.S. Income and Output, 1959. Current figures for the most recent 5 quarters are found on p. S–1 of each issue of the Survey, and a 4- or 5-year roundup is presented each year in the July issue. Recent figures are, however, subject to substantial revision (see further pp. 127–129 of this paper).

Nonfarm business inventory stock benchmarks, upon which changes are superimposed, are derived from the Internal Revenue Service's figures which are compiled from all business income tax returns. Prior to the midfifties some use was made of other benchmark figures, principally as supplied by the Bureau of the Census. Quarterly changes in the book value of nonfarm inventory stocks are derived from data reported in the Monthly Industry Survey, the Monthly Survey of Merchant Wholesale Stocks, and the Retail Trade Survey, all conducted by the Bureau of the Census, plus data received from the Federal Reserve bank on department store stocks. For nonfarm inventories outside of manufacturing and trade, estimates are based principally on data supplied by the Securities and Exchange Commission, but this information is always a quarter late. Since the aggregates involved are relatively small, the influence on the estimate of total inventory change is not great.

Inventory valuation adjustments are then added to each inventory stock figure to adjust for the varying prices in which the stock is expressed. The method employed depends on the costing procedure used by companies in adding to and subtracting from its inventory stock. The purpose is to develop figures which represent inventory stocks in current prices. In the actual work, shortcut estimating procedures using rather aggregative data are employed. See *National Income*, 1954, pp. 135–138.

Only seasonally adjusted figures are shown in the table. These adjustments were derived separately for 7 component parts: Manufacturing wholesale trade, retail trade, each separately for durable goods and nondurable goods groups, and all other nonfarm inventory change.

Annual data on farm business inventories represent the difference between physical quantities of crops and livestock on farms at the beginning and end of the year times the average price during the year of each of the crop and livestock components. These estimates are taken from data supplied by the Agricultural Marketing Service of the Department of Agriculture. Prior to 1956 valuation for each year was set at year-end prices. Any farm products warehoused publicly or privately away from the farm are not included in farm inventory figures. Only incomplete quarterly changes in farm inventories are available, especially for cattle and other livestock. A smooth curve fitted through the annual data makes it possible to provide a steadying influence in developing the current estimates. Even so, substantial revisions of the livestock component frequently occur as more detailed data become available. Valuation adjustment is unnecessary for farm inventories since the starting figures are physical stocks.

Information essential in developing the deflated figures shown in cols. 4 through 6 is developed in the process employed in obtaining the inventory valuation adjustment noted above. See *National Income*, 1954, p. 136.

For a fuller description of the methods and procedures used in the compilation of this table, see the last two income supplements: *U.S. Income and Output* (1959), pp. 85 and 98; *National Income*, 1954, pp. 85 and 135–138.

TABLE I–3.—*Goods output part of GNP*

[Billions of dollars, seasonally adjusted at annual rates

Quarter	Total	Final sales	Inventory change	Durable goods			Nondurable goods		
				Total	Final sales	Inventory change	Total	Final sales	Inventory change
1947:									
1st quarter	139.0	138.6	0.4	45.3	43.4	1.9	93.7	95.1	−1.5
2d quarter	141.6	142.6	−1.0	46.8	45.3	1.6	94.7	97.3	−2.6
3d quarter	144.5	147.2	−2.7	50.4	47.2	3.2	94.0	100.0	−6.0
4th quarter	150.1	148.7	1.4	48.3	48.2	.1	101.8	101.5	1.2
1948:									
1st quarter	152.7	149.4	3.3	47.8	47.4	.4	104.9	102.0	2.9
2d quarter	156.4	151.3	5.1	48.7	48.2	.5	107.6	103.1	4.6
3d quarter	159.7	153.6	6.1	50.4	49.5	1.0	109.2	104.1	5.1
4th quarter	159.4	155.0	4.3	51.5	50.4	1.1	107.8	104.6	3.2
1949:									
1st quarter	153.2	153.2	0	48.9	48.4	.5	104.3	104.8	−.5
2d quarter	149.3	154.6	−5.3	46.6	50.9	−4.3	102.7	103.7	−1.0
3d quarter	149.3	151.0	−1.7	50.6	50.6	−.1	98.7	100.4	−1.6
4th quarter	145.4	150.7	−5.3	45.2	49.8	−4.6	100.2	100.9	−.7
1950:									
1st quarter	150.7	148.2	2.5	48.8	49.4	−.7	102.0	98.8	3.2
2d quarter	156.5	151.6	4.9	56.2	52.6	3.6	100.2	99.0	1.2
3d quarter	170.1	165.1	4.9	66.5	64.0	2.5	103.6	101.2	2.5
4th quarter	177.2	162.2	15.0	71.7	60.9	10.8	105.5	101.3	4.2
1951:									
1st quarter	186.3	175.8	10.5	70.8	65.8	5.0	115.5	110.0	5.5
2d quarter	190.4	175.1	15.2	74.9	64.3	10.6	115.5	110.8	4.7
3d quarter	194.3	184.0	10.2	77.3	68.5	8.8	117.0	115.5	1.4
4th quarter	196.3	191.4	4.9	74.8	71.4	3.4	121.5	120.0	1.5
1952:									
1st quarter	195.8	190.7	5.1	75.3	72.2	3.1	120.6	118.6	2.0
2d quarter	193.3	195.5	−2.2	74.1	75.9	−1.8	119.2	119.5	−.3
3d quarter	197.3	193.0	4.3	71.7	72.1	.5	125.6	121.8	3.8
4th quarter	206.8	201.5	5.3	81.5	78.6	2.8	125.3	122.8	2.5
1953:									
1st quarter	208.8	206.3	2.5	82.2	78.8	3.4	126.6	127.4	−.8
2d quarter	210.6	207.4	3.1	81.8	79.7	2.1	128.8	127.8	1.0
3d quarter	207.6	206.9	.7	82.4	80.1	2.4	125.2	126.9	−1.7
4th quarter	200.3	204.9	−4.6	72.7	77.0	−4.3	127.6	127.9	−.4
1954:									
1st quarter	198.5	201.2	−2.6	72.3	75.8	−3.5	126.2	125.3	.9
2d quarter	195.0	197.7	−2.7	70.4	74.3	−3.9	124.6	123.4	1.2
3d quarter	195.2	197.3	−2.1	70.0	72.6	−2.5	125.2	124.8	.4
4th quarter	200.7	199.9	.8	73.4	73.5	−.1	127.3	126.4	.9
1955:									
1st quarter	208.4	204.0	4.4	79.7	77.8	1.9	128.7	126.2	2.5
2d quarter	214.0	207.9	6.1	83.6	79.4	4.2	130.5	128.5	1.9
3d quarter	221.1	215.4	5.7	86.1	83.7	2.4	135.0	131.7	3.3
4th quarter	225.0	218.3	6.7	87.8	84.1	3.7	137.2	134.2	3.0
1956:									
1st quarter	225.0	218.8	6.2	90.1	85.1	5.1	134.9	133.7	1.2
2d quarter	225.9	221.5	4.4	88.1	85.7	2.4	137.8	135.8	2.0
3d quarter	226.9	223.0	4.0	87.7	86.8	.8	139.3	136.1	3.1
4th quarter	232.6	228.7	4.0	92.4	89.3	3.0	140.3	139.3	1.0
1957:									
1st quarter	238.7	236.4	2.3	94.8	93.4	1.4	143.9	143.0	.9
2d quarter	239.1	236.4	2.7	96.5	94.2	2.3	142.6	142.2	.4
3d quarter	241.3	238.8	2.5	97.1	94.7	2.4	144.2	144.1	.1
4th quarter	233.7	234.9	−1.2	89.5	91.4	−1.9	144.2	143.5	.7
1958:									
1st quarter	224.4	229.9	−5.5	78.3	85.0	−6.7	146.1	144.9	1.2
2d quarter	225.5	229.5	−4.0	78.3	82.3	−4.0	147.1	147.2	.0
3d quarter	230.2	231.9	−1.6	79.7	81.8	−2.0	150.5	150.1	.4
4th quarter	237.5	234.3	3.3	85.4	84.0	1.4	152.1	150.2	1.9
1959:									
1st quarter	245.4	238.3	7.1	93.5	88.1	5.4	151.9	150.2	1.7
2d quarter	256.2	244.6	11.7	101.1	92.4	8.8	155.1	152.2	2.9
3d quarter	247.8	247.1	.7	91.6	93.6	−2.0	156.2	153.5	2.7
4th quarter	251.7	246.1	5.6	93.4	90.9	2.4	158.3	151.1	3.2
1960:									
1st quarter	261.8	250.9	10.9	102.5	93.1	9.4	159.3	157.8	1.5
2d quarter	262.3	256.9	5.4	100.2	96.3	3.9	162.1	160.6	1.5
3d quarter	257.2	254.8	2.4	94.6	94.2	.4	162.6	160.6	2.0
4th quarter	252.8	254.6	−1.9	89.5	93.4	−3.8	163.2	161.3	2.0

Source: *Survey of Current Business, July, 1961* p. 34. For description, see table I–2. Since these data are broken down from the larger totals, presumably they are less accurate. Data in constant dollars are also published for the divisions shown in this table.

TABLE I–4.—*Change in nonfarm book value of inventories as a percent of GNP*

[Dollar amounts in billions at annual rates]

	Inventory valuation adjustment	Nonfarm inventory change	Change in book value of inventories	Percent change in book value is of GNP
1947:				
1st quarter	−$11.9	$1.5	$13.4	5.9
2d quarter	−5.4	1.5	6.9	3.0
3d quarter	−5.4	−.3	5.1	2.2
4th quarter	−6.8	2.4	9.2	3.8
1948:				
1st quarter	−3.5	2.3	5.8	2.3
2d quarter	−3.7	2.9	6.6	2.6
3d quarter	−3.4	3.9	7.3	2.8
4th quarter	.3	2.8	2.5	.9
1949:				
1st quarter	2.0	.6	−1.4	−.5
2d quarter	3.6	−4.1	−7.7	−3.0
3d quarter	3.5	−.6	−4.1	−1.6
4th quarter	.2	−4.7	−4.9	−1.9
1950:				
1st quarter	−.7	2.2	2.9	1.1
2d quarter	−3.9	4.2	8.1	3.0
3d quarter	−9.0	3.8	12.8	4.4
4th quarter	−10.6	13.8	24.4	8.0
1951:				
1st quarter	−10.6	9.3	19.9	6.3
2d quarter	−1.3	14.0	15.3	4.7
3d quarter	4.0	9.1	5.1	1.5
4th quarter	1.8	3.8	2.0	.6
1952:				
1st quarter	1.4	4.0	2.6	.7
2d quarter	1.3	−3.3	−4.6	−1.3
3d quarter	.9	3.4	2.5	.7
4th quarter	1.1	4.7	3.6	1.0
1953:				
1st quarter	−.5	3.0	3.5	.9
2d quarter	−1.7	4.0	5.7	1.5
3d quarter	−2.5	1.5	4.0	1.0
4th quarter	.1	−4.3	4.2	1.0
1954:				
1st quarter	0	−2.8	−2.8	−.7
2d quarter	.1	−3.2	−3.2	−.8
3d quarter	−.8	−2.8	−2.0	−.5
4th quarter	−.8	.2	1.0	.2
1955:				
1st quarter	−.9	3.8	4.7	1.1
2d quarter	−1.2	5.7	6.9	1.6
3d quarter	−2.5	5.5	8.0	1.8
4th quarter	−3.1	6.7	9.8	2.2
1956:				
1st quarter	−3.4	6.6	10.0	2.4
2d quarter	−4.3	5.2	9.5	2.3
3d quarter	−1.5	4.4	5.9	1.4
4th quarter	−3.6	4.1	7.7	1.8
1957:				
1st quarter	−2.8	2.0	4.8	1.1
2d quarter	−1.9	2.0	3.9	.9
3d quarter	−1.4	1.5	2.9	.6
4th quarter	−1.3	−2.3	−1.0	−.2
1958:				
1st quarter	−.3	−6.5	−6.2	−1.4
2d quarter	.2	−5.0	−5.2	−1.2
3d quarter	−.2	−2.5	−2.3	−.5
4th quarter	−1.0	2.6	3.6	.8
1959:				
1st quarter	−1.0	6.9	7.9	1.7
2d quarter	−1.7	11.6	13.3	2.7
3d quarter	−.6	.7	1.3	.3
4th quarter	.8	5.5	4.7	1.0
1960:				
1st quarter	−1.0	10.8	11.8	2.4
2d quarter	−.3	5.1	5.4	1.1
3d quarter	1.1	2.0	.9	.2
4th quarter	.1	−2.2	−2.3	−.5

Source: Office of Business Economics data. Tables I–4 and I–5 are presented to show that the change in book value of inventories frequently is greater than the commonly published figures on inventory change.

TABLE I–5.—*Change in nonfarm durable goods book value of inventories as a percent of GNP*

[Dollar amounts in billions at annual rates]

	Inventory valuation adjustment	Nonfarm inventory change	Change in book value of inventories	Percent change in book value is of GNP
1955:				
1st quarter	−$1.0	$1.9	$2.9	0.8
2d quarter	−1.4	4.2	5.6	1.4
3d quarter	−3.3	2.4	5.7	1.4
4th quarter	−3.2	3.7	6.9	1.7
1956:				
1st quarter	−2.7	5.1	7.8	1.9
2d quarter	−2.6	2.4	5.0	1.2
3d quarter	−1.5	.8	2.3	.5
4th quarter	−2.6	3.0	5.6	1.3
1957:				
1st quarter	−1.7	1.4	3.1	.7
2d quarter	−.9	2.3	3.2	.7
3d quarter	−.9	2.4	3.3	.7
4th quarter	−.6	−1.9	−1.3	−.3
1958:				
1st quarter	0	−6.7	−6.7	−1.5
2d quarter	−.1	−4.0	−3.9	−.9
3d quarter	−.6	−2.0	−1.4	−.3
4th quarter	−1.3	1.4	2.7	.6
1959:				
1st quarter	−1.4	5.4	6.8	1.4
2d quarter	−1.3	8.8	10.1	2.1
3d quarter	−.2	−2.0	−1.8	−.4
4th quarter	.1	2.4	2.3	.5
1960:				
1st quarter	−.6	9.4	10.0	2.0
2d quarter	−.2	3.9	4.1	.8
3d quarter	1.3	.4	−.9	−.2
4th quarter	.6	−3.8	−4.4	−.9

Source: Office of Business Economics data.

TABLE I–6.—*Inventory book values of all corporations as computed by Securities and Exchange Commission*

1960	91. 3	1956	80. 4	1952	65. 8
1959	88. 2	1955	70. 0	1951	65. 3
1958	81. 9	1954	65. 3	1950	55. 1
1957	82. 2	1953	67. 2	1949	45. 3

Source: Securities and Exchange Commission: Press releases, "Working Capital of U.S. Corporations," dated Apr. 27, 1954, Apr. 22, 1957, Apr. 17, 1958, Apr. 14, 1960, and Apr. 7, 1961. All U.S. corporations excluding banks, savings and loan associations, and insurance companies. Year-end data through 1958 are based on "Statistics of Income," Internal Revenue Service, covering virtually all corporations in the United States. SEC makes the following adjustments to the Internal Revenue figures:

1. A blowup to adjust for those corporations which fail to submit balance sheets with their tax returns. This enlargement was 1 percent ($700,000,000) in 1958.

2. An enlargement, principally in the aircraft industry, to account for the practice of applying U.S. Government "progress payments" (partial payments made after the completion of a portion of a contract) against goods in process, which thereby subtracts artificially from inventory. In 1958 this adjustment came to $1,100,000,000.

Statistics of Income data may not be strictly comparable from year to year because of changes in the tax laws, bases for filing returns, and processing the data for compilation purposes. Year-end estimates after 1958 are extrapolated data compiled from many different sources, including data on corporations registered with the Securities and Exchange Commission, but with use of the 1958 IRS figures as benchmarks.

TABLE I–7.—*Net change in business inventories, 1946–60*

[Office of Business Economics data in millions of dollars]

	Manufacturing	Wholesale	Retail	Farm	Other	Total
1946	2,901	815	2,048	29	586	6,379
1947	450	−21	603	−1,760	266	−462
1948	1,271	566	1,229	1,732	−90	4,706
1949	−1,580	4	−358	−863	−275	−3,072
1950	2,164	1,356	2,131	815	349	6,815
1951	7,872	308	39	1,176	838	10,233
1952	1,863	323	−36	921	−4	3,067
1953	1,172	100	405	−621	609	447
1954	2,582	282	144	490	27	1,639
1955	2,626	1,115	2,092	297	−347	5,783
1956	3,757	434	183	−415	701	4,660
1957	−322	−183	779	762	527	1,563
1958	−2,447	−109	−294	913	−14	−1,951
1959	3,659	1,310	1,005	92	187	6,253
1960	1,589	764	1,403	258	202	4,216

Source: U.S. Income and Output table V–8; for 1946–57 of the 1959 edition, p. 193; and Survey of Current Business, July 1961. The data are developed from the information shown in tables I–2, II–3, III–2, and IV–2. Quarterly data are not published because the information available is less satisfactory for the shorter period.

TABLE II–1.—*Manufacturing stock by stage of manufacture* [1]

[In billions of dollars as shown by the census]

Year	Beginning of year			End of year			
	Total	Finished products	Materials supplies work in process	Total	Finished products	Materials supplies	Work in process
1958 [2]				49.65	16.57	18.05	15.03
1957 [3]				51.05	17.18	18.45	15.43
1956 [4]				49.97	16.23	18.85	14.90
1955 [4]				43.71	14.07	16.68	12.98
1954 [5]				40.34	13.54	14.92	11.88
1953 [3]				42.85	13.79	16.20	12.85
1952 [6]				39.85	12.51	27.34	
1051 [6]				38.33	12.28	26.05	
1950 [7]	25.98	9.26	16.72	30.88	9.74	21.14	
1947 [8]	22.43	6.16	16.27	26.13	7.81	18.32	
1939 [9]	8.92	3.96	4.97	9.63	3.90	5.73	
1937 [9]	8.47	3.52	4.94	9.86	4.31	5.55	

[1] Source: U.S. Department of Commerce, Bureau of the Census, *Census of Manufactures* and *Annual Survey of Manufactures.*

The figures for the years 1937, 1939, 1947, 1954, and 1958 are derived from the Census of Manufactures of the respective years. Although the census has been conducted since 1809, inventory statistics were first included in 1937. There were no censuses during World War II and subsequent to the census of 1947 legislation was enacted to provide for the present system of a census of manufactures every 5 years, with annual sample surveys for interim years. Such annual surveys of manufactures have been taken each noncensus year since 1949.

All definitions in the censuses since 1947 and in the annual surveys are taken from the editions of the *Standard Industrial Classification Manual* (SIC) current at the particular time. This manual has occasionally been revised (latest revision 1957) with the result that some groups are not historically comparable. "Bridge" tabulations, showing how each of the earlier SIC industry classifications was distributed in terms of the current and vice versa, are published in an appendix of the census of each year.

The census and the annual survey are both conducted on an establishment basis. That is, a company operating establishments at more than 1 location is required to submit a report for each location; also, companies engaged in distinctly different lines of activity at 1 location are required to submit separate reports if the plant records permit such a separation and if the activities are substantial in size.

The annual survey is blown up from a probability sample selected from a composite frame of (1) all establishments included in the most recent census, and (2) all manufacturers that have received BOASI identification numbers since the last census. Complete coverage is given all establishments with 100 or more employees, except in the apparel and printing and publishing industries (250 employees). The remainder, with fewer employees, are grouped by industry and a random sample is selected using assigned probabilities. In total about 50,000 of about 280,000 manufacturing establishments were included in the sample employed in the 1957 survey.

In the 1947 census and in the annual surveys covering the years 1949–52, inventory data were collected according to only 2 major categories: (1) finished products and (2) work-in-process, materials, supplies, and other inventories. In the 1953 survey and subsequently the latter category was divided into (1) work-in-process and (2) materials, supplies, fuel, and other inventories. An item treated as a finished goods by an establishment in 1 industry may be reported as a raw material by another establishment in a different industry. For example, cold-rolled steel sheet would be a finished product in the inventories of a steel mill but would be reported as raw materials by a stamping plant. Such differences are present in the inventory figures by stage of fabrication shown for industry groups and all manufacturing, which are merely aggregates of figures reported by establishments in specified industries.

Respondents are asked to report their inventories at approximate current costs if feasible; otherwise "at book values." Since different methods of inventory valuation are used (LIFO, FIFO, etc.) the meaning of the value of inventories aggregate for all establishments in an industry is not entirely clear.

Inventory detail is available up to 4-digit SIC classifications. Printing and publishing (SIC 27) are omitted from 1937 to 1955, inclusive.

[2] *1958 Census of Manufactures.* These figures had not been published as of August 1961.
[3] *1957 Annual Survey of Manufactures,* p. 130.
[4] *1956 Annual Survey of Manufactures,* p. 123.
[5] *1954 Census of Manufactures,* vol. I, ch. V.
[6] *1952 Annual Survey of Manufactures,* p. 105.
[7] *1950 Annual Survey of Manufactures,* pp. 106–107.
[8] *1947 Census of Manufactures.*
[9] *1939 Census of Manufactures,* vol. I, ch. VIII, p. 354. These are the earliest inventory figures collected by Census.

TABLE II-2.—*Manufacturers' inventory stocks, by industry, 1939–46*

[As reported by the Office of Business Economics, data in billions of dollars, adjusted for seasonal variation, stated as an annual monthly average]

	1939	1940	1941	1942	1943	1944	1945	1946
All manufacturing, total	10.8	12.1	14.7	18.5	19.6	20.0	19.1	21.2
Purchased materials	3.8	4.4	5.8	7.8	8.2	8.3	8.1	9.4
Goods in process	2.1	2.5	3.7	5.1	6.1	6.4	5.9	5.8
Finished goods	5.0	5.2	5.2	5.7	5.1	5.3	5.0	6.1
Durable goods, total	5.0	5.6	7.3	9.5	10.7	10.8	9.8	10.3
Purchased materials	1.6	1.8	2.6	3.5	3.8	3.7	3.3	3.8
Goods in process	1.3	1.7	2.6	3.8	4.8	5.0	4.4	4.1
Finished goods	2.1	2.2	2.2	2.4	2.1	2.1	2.1	2.4
Nondurable industries, total	5.9	6.4	7.3	8.9	8.7	9.1	9.2	10.9
Purchased materials	2.2	2.5	3.5	4.3	4.4	4.7	4.8	5.5
Goods in process	.8	.8	1.1	1.3	1.3	1.3	1.5	1.7
Finished goods	2.9	3.1	3.0	3.3	3.0	3.2	2.9	3.6

	January	February	March	April	May	June	July	August	September	October	November	December
1947												
All manufacturing, total	25.3	25.8	26.3	26.9	27.4	27.6	27.8	28.2	28.2	28.7	28.7	28.9
Purchased materials	11.2	11.4	11.6	11.9	12.1	12.2	12.0	12.0	11.9	11.8	12.0	12.3
Goods in process	6.6	6.7	6.8	7.0	7.1	7.1	7.1	7.3	7.3	7.3	7.5	7.4
Finished goods	7.5	7.7	7.9	8.0	8.2	8.3	8.7	8.9	9.0	9.3	9.2	9.2
Durable-goods industries, total	12.5	12.8	13.0	13.3	13.6	13.8	14.0	14.2	14.2	14.3	14.3	14.3
Purchased materials	4.6	4.8	4.9	5.0	5.1	5.2	5.2	5.3	5.1	5.1	5.0	5.1
Goods in process	4.8	4.9	4.9	5.0	5.1	5.1	5.1	5.2	5.2	5.2	5.3	5.2
Finished goods	3.1	3.1	3.2	3.3	3.4	3.5	3.7	3.7	3.9	4.0	4.0	4.0
Non-durable-goods industries, total	12.8	13.0	13.3	13.6	13.8	13.8	13.8	14.0	14.0	14.1	14.4	14.6
Purchased materials	6.6	6.6	6.7	6.9	7.0	7.0	6.8	6.7	6.8	6.7	7.0	7.2
Goods in process	1.8	1.8	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2
Finished goods	4.4	4.6	4.7	4.7	4.8	4.8	5.0	5.2	5.1	5.3	5.2	5.2

See footnote at end of table, p.156.

TABLE II–2.—*Manufacturers inventory stocks by stage of fabrication* [1]—Continued

	January	February	March	April	May	June	July	August	September	October	November	December
1948												
All manufacturing, total	29.0	29.2	29.5	29.6	30.0	30.3	30.7	31.0	31.3	31.5	31.7	31.7
Purchased materials	12.3	12.3	12.5	12.6	12.7	12.9	13.0	13.0	12.9	12.9	12.9	12.9
Goods in process	7.3	7.3	7.3	7.2	7.4	7.3	7.4	7.6	7.6	7.7	7.9	7.6
Finished goods	9.4	9.6	9.7	9.8	9.9	10.1	10.3	10.4	10.8	10.9	10.9	11.2
Durable-goods industries: Total	14.3	14.3	14.4	14.5	14.5	14.7	14.9	15.2	15.4	15.5	15.7	15.7
Purchased materials	5.2	5.2	5.2	5.3	5.2	5.4	5.5	5.6	5.6	5.6	5.6	5.6
Goods in process	5.1	5.0	5.0	5.0	5.1	5.1	5.2	5.3	5.3	5.4	5.5	5.4
Finished goods	4.0	4.1	4.2	4.2	4.2	4.2	4.2	4.3	4.5	4.5	4.6	4.7
Non-durable-goods industries: Total	14.7	14.9	15.1	15.1	15.5	15.6	15.8	15.8	15.9	16.0	16.0	16.0
Purchased materials	7.1	7.1	7.3	7.3	7.5	7.5	7.5	7.4	7.3	7.3	7.3	7.3
Goods in process	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.2
Finished goods	5.4	5.5	5.5	5.6	5.7	5.9	6.1	6.1	6.3	6.4	6.3	6.5
1949												
All manufacturing, total	32.0	32.1	31.8	31.5	31.2	30.6	30.2	29.8	29.3	29.0	28.7	28.9
Purchased materials	13.1	12.9	12.5	12.3	12.1	11.8	11.4	11.4	11.2	11.1	11.0	11.1
Goods in process	7.5	7.6	7.5	7.4	7.5	7.2	7.3	7.1	7.0	6.8	6.8	6.8
Finished goods	11.4	11.6	11.8	11.8	11.6	11.6	11.5	11.3	11.1	11.1	10.9	11.0
Durable-goods industries: Total	16.1	16.2	16.1	16.0	15.7	15.3	15.1	14.8	14.5	14.1	13.9	14.0
Purchased materials	5.9	5.9	5.7	5.6	5.4	5.2	5.0	5.0	4.9	4.7	4.5	4.6
Goods in process	5.3	5.4	5.3	5.3	5.3	5.1	5.1	4.9	4.8	4.7	4.7	4.7
Finished goods	4.9	4.9	5.1	5.1	5.0	5.0	5.0	4.9	4.8	4.7	4.7	4.7
Nondurable-goods industries: Total	15.9	15.9	15.7	15.5	15.5	15.3	15.1	15.0	14.8	14.9	14.8	14.9
Purchased materials	7.2	7.0	6.8	6.7	6.7	6.6	6.4	6.4	6.3	6.4	6.5	6.5
Goods in process	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1
Finished goods	6.5	6.7	6.7	6.7	6.6	6.6	6.5	6.4	6.3	6.4	6.2	6.3

1950												
All manufacturing, total	29.0	29.0	29.2	29.3	29.5	29.7	29.8	30.1	31.0	31.9	33.4	34.3
Purchased materials	11.1	11.1	11.1	11.1	11.2	11.3	11.6	12.0	12.6	13.1	13.8	14.5
Goods in process	6.9	6.9	7.0	7.1	7.2	7.3	7.5	7.6	7.8	8.0	8.4	8.5
Finished goods	11.0	11.0	11.1	11.1	11.1	11.1	10.7	10.5	10.6	10.8	11.2	11.3
Durable-goods industries: Total	14.0	14.0	14.1	14.2	14.3	14.5	14.6	14.8	15.1	15.5	16.3	16.8
Purchased materials	4.6	4.7	4.6	4.7	4.7	4.9	5.0	5.2	5.4	5.5	5.8	6.1
Goods in process	4.7	4.7	4.8	4.9	5.0	5.0	5.1	5.2	5.4	5.5	5.8	6.0
Finished goods	4.7	4.6	4.7	4.6	4.6	4.6	4.5	4.4	4.3	4.5	4.7	4.7
Non-durable-goods industries: Total	15.0	15.0	15.1	15.1	15.2	15.2	15.2	15.3	15.9	16.4	17.1	17.5
Purchased materials	6.5	6.4	6.5	6.4	6.5	6.4	6.6	6.8	7.2	7.6	8.0	8.4
Goods in process	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.5	2.6	2.5
Finished goods	6.3	6.4	6.4	6.5	6.5	6.5	6.2	6.1	6.3	6.3	6.5	6.6
1951												
All manufacturing, total	35.3	35.9	36.9	38.2	39.1	39.9	40.8	41.6	41.9	42.3	42.6	42.8
Purchased materials	15.1	15.3	15.8	16.3	16.4	16.5	16.6	16.7	16.4	16.6	16.6	16.5
Goods in process	8.8	9.0	9.3	9.7	10.0	10.1	10.1	10.2	10.5	10.7	11.1	11.3
Finished goods	11.4	11.6	11.8	12.2	12.7	13.3	14.1	14.7	15.0	15.0	14.9	15.0
Durable-goods industries: Total	17.3	17.7	18.1	18.7	19.4	20.1	20.7	21.4	21.8	22.2	22.5	22.8
Purchased materials	6.2	6.3	6.4	6.6	6.7	7.0	7.1	7.2	7.2	7.4	7.4	7.4
Goods in process	6.3	6.5	6.7	7.0	7.3	7.4	7.5	7.7	7.9	8.1	8.4	8.6
Finished goods	4.8	4.9	5.0	5.1	5.4	5.7	6.1	6.5	6.7	6.7	6.7	6.8
Nondurable-goods industries: Total	18.0	18.2	18.8	19.5	19.7	19.8	20.1	20.2	20.1	20.1	20.1	20.0
Purchased materials	8.9	9.0	9.4	9.7	9.7	9.5	9.5	9.5	9.2	9.2	9.2	9.1
Goods in process	2.5	2.5	2.6	2.7	2.7	2.7	2.6	2.5	2.6	2.6	2.7	2.7
Finished goods	6.6	6.7	6.8	7.1	7.3	7.6	8.0	8.2	8.3	8.3	8.2	8.2

See footnote at end of table, p. 156.

TABLE II–2.—*Manufacturers inventory stocks by stage of fabrication* [1]—Continued

	January	February	March	April	May	June	July	August	September	October	November	December
1952												
All manufacturing, total	43.5	43.8	43.9	43.9	43.7	43.3	42.9	43.1	43.2	43.3	43.5	43.8
Purchased materials	16.7	16.6	16.5	16.4	16.4	16.1	15.8	15.7	15.6	15.6	15.8	15.9
Goods in process	11.6	11.9	12.0	12.1	12.2	12.1	12.1	12.3	12.5	12.6	12.6	12.9
Finished goods	15.2	15.3	15.4	15.4	15.1	15.1	15.0	15.1	15.1	15.1	15.1	15.0
Durable-goods industries: Total	23.3	23.6	23.7	23.9	24.0	23.7	23.3	23.5	23.7	23.9	24.0	24.4
Purchased materials	7.7	7.6	7.5	7.5	7.5	7.3	7.1	7.1	7.1	7.2	7.3	7.3
Goods in process	8.8	9.1	9.3	9.4	9.6	9.5	9.5	9.6	9.8	9.8	9.8	10.2
Finished goods	6.9	6.9	6.9	7.0	6.9	6.9	6.7	6.8	6.8	6.9	6.9	6.9
Nondurable-goods industries: Total	20.2	20.2	20.2	20.0	19.7	19.6	19.6	19.6	19.5	19.4	19.5	19.4
Purchased materials	9.1	9.0	9.0	8.9	8.9	8.8	8.7	8.6	8.5	8.4	8.5	8.6
Goods in process	2.8	2.8	2.7	2.7	2.6	2.6	2.6	2.7	2.7	2.8	2.8	2.7
Finished goods	8.3	8.4	8.5	8.4	8.2	8.2	8.3	8.3	8.3	8.2	8.2	8.1
1953												
All manufacturing industries	43.9	44.0	44.2	44.6	45.0	45.4	45.5	46.1	46.0	45.9	45.8	45.4
Purchased materials	15.8	15.7	15.7	15.8	16.1	16.1	16.1	16.3	16.1	15.9	15.8	15.6
Goods in process	13.0	13.2	13.4	13.6	13.6	13.7	13.7	13.8	13.6	13.4	13.4	13.4
Finished goods	15.2	15.2	15.2	15.3	15.4	15.6	15.7	16.0	16.3	16.6	16.6	16.5
Durable-goods industries	24.6	24.7	25.0	25.2	25.6	25.9	26.1	26.5	26.5	26.4	26.4	26.2
Purchased materials	7.3	7.2	7.3	7.4	7.6	7.7	7.7	7.9	7.8	7.7	7.6	7.4
Goods in process	10.2	10.4	10.6	10.7	10.7	10.8	10.9	11.0	10.8	10.7	10.7	10.7
Finished goods	7.1	7.1	7.1	7.2	7.3	7.4	7.5	7.6	7.9	8.1	8.1	8.1
Non-durable-goods industries	19.4	19.3	19.3	19.3	19.4	19.5	19.5	19.6	19.6	19.4	19.3	19.2
Purchased materials	8.5	8.4	8.4	8.4	8.5	8.4	8.4	8.3	8.3	8.2	8.2	8.1
Goods in process	2.8	2.8	2.8	2.8	2.9	2.9	2.8	2.8	2.7	2.7	2.7	2.7
Finished goods	8.2	8.1	8.1	8.1	8.1	8.2	8.2	8.4	8.5	8.5	8.5	8.4
1954												
All manufacturing industries	45.2	44.9	44.5	44.1	43.8	43.6	43.1	42.9	42.7	43.0	43.2	43.0
Purchased materials	15.6	15.3	15.0	15.1	15.1	15.2	15.1	14.8	14.7	14.5	14.6	14.4
Goods in process	13.2	13.1	12.9	12.7	12.5	12.3	12.0	12.1	12.0	12.2	12.5	12.4
Finished goods	16.5	16.6	16.6	16.3	16.2	16.2	16.1	16.0	16.0	16.2	16.1	16.2

Durable-goods industries	26.0	25.7	25.5	25.0	24.7	24.4	24.0	23.9	23.7	23.9	24.0	24.1
Purchased materials	7.4	7.3	7.1	7.1	7.1	7.1	7.0	6.9	6.8	6.7	6.6	6.5
Goods in process	10.6	10.4	10.3	10.0	9.9	9.7	9.5	9.5	9.4	9.6	9.8	9.8
Finished goods	8.1	8.1	8.1	7.8	7.7	7.6	7.5	7.5	7.5	7.6	7.6	7.7
Non-durable-goods industries	19.2	19.2	19.0	19.1	19.1	19.2	19.2	19.0	18.9	19.1	19.1	18.9
Purchased materials	8.2	8.0	7.9	7.9	8.0	8.0	8.0	8.0	7.8	7.9	8.0	7.9
Goods in process	2.6	2.6	2.6	2.7	2.6	2.6	2.6	2.6	2.5	2.6	2.7	2.6
Finished goods	8.4	8.6	8.6	8.5	8.5	8.6	8.6	8.5	8.5	8.6	8.5	8.4
1955												
All manufacturing industries	43.2	43.1	43.2	43.2	43.5	43.7	44.1	44.8	44.9	45.8	45.9	46.4
Purchased materials	14.5	14.4	14.4	14.4	14.6	14.6	14.8	15.1	15.2	15.5	15.5	15.5
Goods in process	12.4	12.4	12.5	12.5	12.6	12.7	12.9	13.2	13.2	13.6	13.8	13.9
Finished goods	16.2	16.3	16.3	16.3	16.3	16.4	16.4	16.5	16.5	16.7	16.7	17.0
Durable-goods industries	24.1	24.1	24.2	24.2	24.3	24.4	24.7	25.2	25.4	26.1	26.2	26.7
Purchased materials	6.6	6.6	6.6	6.6	6.6	6.6	6.8	7.0	7.2	7.4	7.3	7.4
Goods in process	9.8	9.8	9.9	9.8	9.9	10.0	10.1	10.3	10.4	10.7	10.9	11.1
Finished goods	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.9	7.9	8.0	8.0	8.2
Non-durable-goods industries	19.1	19.1	19.0	19.1	19.2	19.3	19.3	19.5	19.5	19.7	19.7	19.7
Purchased materials	7.9	7.8	7.8	7.8	7.9	8.0	8.0	8.1	8.0	8.2	8.2	8.1
Goods in process	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.8
Finished goods	8.5	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.7	8.7	8.7	8.8
1956												
All manufacturing industries	46.8	47.6	48.0	48.6	49.3	49.6	50.0	50.4	50.8	51.8	52.2	52.3
Purchased materials	15.7	15.9	16.1	16.2	16.4	16.4	16.6	16.6	16.7	17.1	17.2	17.2
Goods in process	14.0	14.2	14.4	14.7	14.9	14.9	15.0	15.1	15.2	15.6	15.9	15.7
Finished goods	17.1	17.5	17.6	17.8	18.0	18.3	18.5	18.7	18.9	19.1	19.1	19.4
Durable-goods industries	26.9	27.4	27.9	28.3	28.7	28.8	29.0	29.1	29.5	30.2	30.6	30.7
Purchased materials	7.5	7.7	7.8	8.0	8.1	8.1	8.2	8.2	8.2	8.5	8.6	8.7
Goods in process	11.2	11.4	11.6	11.8	12.1	12.0	12.1	12.2	12.3	12.6	12.9	12.8
Finished goods	8.2	8.4	8.4	8.4	8.5	8.7	8.7	8.8	8.9	9.1	9.1	9.2
Non-durable-goods industries	19.1	20.1	20.1	20.4	20.6	20.9	21.0	21.3	21.4	21.5	21.6	21.6
Purchased materials	8.2	8.2	8.2	8.2	8.3	8.3	8.3	8.4	8.4	8.6	8.6	8.5
Goods in process	2.8	2.8	2.8	2.8	2.8	2.9	2.9	2.9	2.9	3.0	2.9	3.0
Finished goods	8.9	9.1	9 2	9.4	9.4	9.6	9.8	9.9	10.0	10.0	10.1	10.1

See footnote at end of table, p. 156.

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TABLE II–2.—*Manufacturers inventory stocks by stage of fabrication* [1]—Continued

	January	February	March	April	May	June	July	August	September	October	November	December
1957												
All manufacturing industries	52.4	52.9	53.3	53.7	53.9	53.8	54.1	54.2	54.2	54.1	53.9	53.5
Purchased materials	17.2	17.4	17.5	17.3	17.3	17.3	17.4	17.4	17.4	17.6	17.5	17.1
Goods in process	15.8	15.9	16.0	16.4	16.4	16.3	16.4	16.5	16.4	16.2	16.1	15.8
Finished goods	19.4	19.6	19.9	20.0	20.2	20.2	20.3	20.3	20.3	20.3	20.2	20.6
Durable goods industries	30.6	31.0	31.2	31.5	31.6	31.4	31.7	31.7	31.8	31.8	31.5	31.1
Purchased materials	8.6	8.7	8.7	8.6	8.5	8.4	8.4	8.4	8.5	8.6	8.6	8.3
Goods in process	12.8	12.9	13.0	13.4	13.4	13.3	13.5	13.6	13.4	13.2	13.1	12.7
Finished	9.2	9.3	9.4	9.4	9.6	9.7	9.8	9.8	9.8	9.9	9.8	10.1
Non-durable-goods industries	21.8	22.0	22.1	22.2	22.3	22.4	22.4	22.5	22.3	22.3	22.4	22.4
Purchased materials	8.6	8.7	8.7	8.7	8.9	9.0	9.0	9.0	8.9	8.9	8.9	8.8
Goods in process	3.0	3.0	3.0	3.0	2.9	3.0	2.9	3.0	2.9	3.0	3.0	3.1
Finished goods	10.2	10.3	10.4	10.6	10.5	10.5	10.5	10.5	10.5	10.4	10.4	10.5
1958												
All manufacturing industries	52.9	52.4	52.0	51.5	51.0	50.2	49.8	49.4	49.3	49.3	49.3	49.2
Purchased materials	17.1	17.1	16.9	16.7	16.6	16.4	16.2	16.2	16.1	16.4	16.2	16.1
Goods in process	15.4	15.1	14.8	14.7	14.5	14.4	14.3	14.2	14.2	14.2	14.2	14.3
Finished goods	20.4	20.3	20.2	20.1	19.8	19.5	19.3	19.0	18.9	18.8	18.8	18.8
Durable goods	30.6	30.3	29.9	29.4	29.0	28.5	28.3	28.1	28.0	27.9	27.9	27.8
Purchased materials	8.3	8.3	8.1	8.0	7.8	7.6	7.5	7.4	7.5	7.7	7.6	7.5
Goods in process	12.4	12.1	11.9	11.8	11.6	11.4	11.3	11.3	11.3	11.3	11.3	11.3
Finished goods	9.9	9.9	9.8	9.7	9.6	9.5	9.5	9.5	9.2	9.0	9.0	9.0
Non-durable-goods industries	22.3	22.2	22.1	22.1	21.9	21.7	21.5	21.4	21.2	21.4	21.4	21.4
Purchased materials	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.7	8.6	8.7	8.6	8.6
Goods in process	3.0	3.0	2.9	2.9	2.9	2.9	2.9	3.0	2.9	2.9	3.0	3.0
Finished goods	10.5	10.4	10.4	10.4	10.2	10.0	9.$	9.7	9.7	9.8	9.9	9.8

1959												
All manufacturing industries	49.5	49.9	50.5	51.1	51.6	52.1	52.2	52.1	51.9	51.5	51.6	52.4
Purchased materials	16.3	16.5	16.7	17.0	17.4	17.9	17.9	17.7	17.3	17.0	17.0	17.2
Goods in process	14.4	14.4	14.5	14.7	14.8	14.9	15.0	15.0	15.0	14.9	14.9	15.1
Finished goods	18.8	19.1	19.2	19.3	19.4	19.3	19.3	19.4	19.6	19.6	19.7	20.1
Durable goods industries	28.1	28.4	28.9	29.4	29.7	30.2	30.3	30.1	29.8	29.2	29.3	30.1
Purchased materials	7.7	7.8	8.1	8.3	8.5	8.9	8.9	8.7	8.3	8.0	8.1	8.3
Goods in process	11.4	11.4	11.5	11.7	11.8	11.9	11.9	11.9	12.0	11.8	11.8	12.1
Finished goods	9.0	9.2	9.3	9.3	9.4	9.5	9.5	9.5	9.5	9.4	9.4	9.7
Nondurable goods industries	21.4	21.5	21.5	21.7	21.9	21.9	21.9	22.0	22.1	22.3	22.3	22.3
Purchased materials	8.6	8.6	8.6	8.7	8.8	9.0	9.0	9.0	8.9	9.0	8.9	8.9
Goods in process	3.0	3.0	3.0	3.0	3.0	3.0	3.1	3.1	3.1	3.1	3.1	3.0
Finished goods	9.8	9.9	9.9	10.0	10.0	9.9	9.8	9.9	10.1	10.2	10.3	10.4
1960												
All manufacturing industries	53.3	53.9	54.3	54.6	55.0	55.1	54.9	55.0	54.7	54.4	54.0	53.7
Purchased materials	17.6	17.8	17.8	17.9	17.9	17.8	17.7	17.6	17.3	17.1	16.8	16.8
Goods in process	15.3	15.5	15.7	15.7	15.8	15.9	15.8	15.8	15.5	15.4	15.3	15.1
Finished goods	20.4	20.6	20.8	21.0	21.2	21.3	21.4	21.6	21.9	21.9	21.9	21.8
Durable goods industries	30.8	31.3	31.8	31.9	32.1	32.2	32.0	32.1	31.8	31.4	31.1	30.9
Purchased materials	8.6	8.7	8.8	8.8	8.8	8.7	8.6	8.6	8.4	8.3	8.1	8.0
Goods in process	12.3	12.5	12.7	12.7	12.7	12.8	12.6	12.6	12.4	12.2	12.1	12.1
Finished goods	9.9	10.1	10.4	10.5	10.6	10.7	10.8	10.9	11.0	10.9	10.9	10.8
Nondurable goods industries	22.5	22.6	22.6	22.7	22.9	22.9	22.9	22.9	22.9	23.0	22.9	22.9
Purchased materials	9.0	9.1	9.1	9.1	9.1	9.1	9.1	9.0	8.9	8.9	8.8	8.7
Goods in process	3.0	3.0	3.0	3.0	3.1	3.1	3.2	3.2	3.1	3.1	3.1	3.1
Finished goods	10.5	10.5	10.5	10.6	10.6	10.6	10.6	10.7	10.9	11.0	11.0	11.1

See footnote at end of table, p. 156.

TABLE II–2.—*Manufacturers inventory stocks by stage of fabrication*[1]—Continued

	January	February	March	April	May	June	July	August	September	October	November	December
1961												
All manufacturing industries	53.7	53.6	53.3	53.4								
Purchased materials	16.8	16.7	16.7	16.7								
Goods in process	15.1	15.1	14.9	15.0								
Finished goods	21.8	21.8	21.7	21.7								
Durable-goods industries	30.8	30.7	30.3	30.2								
Purchased materials	8.0	8.0	7.9	7.8								
Goods in process	12.1	12.1	11.9	11.9								
Finished goods	10.7	10.6	10.5	10.5								
Nondurable-goods industries	22.9	22.9	23.0	23.2								
Purchased materials	8.7	8.7	8.8	8.9								
Goods in process	3.1	3.0	3.0	3.1								
Finished goods	11.1	11.2	11.2	11.2								

[1] Book value as of end of period.

Source: Department of Commerce, Office of Business Economics: *Survey of Current Business.* These series have been linked to a benchmark based on the Internal Revenue Service's 1954 *Statistics of Income* for corporate and noncorporate business, but in 1961 are being revised to reflect the *Annual Survey of Manufactures of the Bureau of the Census.*

Current inventory stock estimates have been made on the basis of reports received in the monthly industry survey program, under which information on inventories sales, and new orders is collected from a sample of roughly 50 percent of manufacturing companies, although for inventories the representation in some industries is smaller. The monthly industry survey, which since March 1957 has been conducted by the Bureau of the Census, reflects efforts which have recently been made to obtain "divisional" reports from large, multi-industry firms in order to produce, in time, more detailed industry statistics.

The inventory data presented represent book values of stocks on hand at the end of the month. All inventories owned by a company are covered, including those in warehouses, manufacturers' sales branches, etc., as well as in factories. In general, inventories are valued at the lower of cost or market price. It is currently estimated that about 15 percent of manufacturers' inventories are valued on a last-in, first-out (Lifo) basis.

The present series supersedes earlier series which were blown up to the annual level of IRS corporate figures and biennial noncorporate figures for the years preceding 1954 back to 1945.

For a detailed description of the procedures used in compiling this and previous series, see the following issues of the *Survey of Current Business*: August 1957, p. 31; June 1955, p. 21; May 1955, p. 20; January 1954, p. 17; December 1953, p. 21; October 1952, p. 14; October 1951, p. 15; October 1950, p. 16; October 1949, pp. 12–14; May 1948, p. 8.

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	All manufacturing industries				Durable goods industries			
	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
1939	10.81	5.10	--------	5.63	4.98	1.94	--------	4.38
1940	12.10	5.85	--------	10.44	5.70	2.47	--------	8.97
1941	14.73	8.17	--------	29.38	7.41	3.80	--------	26.39
1942	18.55	10.43	--------	62.68	9.62	5.16	--------	59.17
1943	19.43	12.82	--------	72.03	10.71	6.87	--------	68.34
1944	19.97	13.79	--------	60.73	10.81	7.34	--------	57.39
1945	19.03	12.88	--------	36.53	9.83	6.28	--------	29.91
1946	21.24	12.63	--------	29.89	10.31	4.99	--------	26.29
1947—January	25.28	14.92	--------	33.94	12.47	6.29	--------	29.28
February	25.81	15.04	--------	33.87	12.77	6.29	--------	29.25
March	26.33	15.44	--------	33.94	13.06	6.34	--------	29.06
April	26.95	15.55	--------	33.14	13.32	6.67	--------	28.21
May	27.39	15.80	--------	32.07	13.62	6.68	--------	27.38
June	27.64	15.76	--------	31.84	13.87	6.54	--------	27.02
July	27.81	15.76	--------	31.50	14.00	6.60	--------	26.77
August	28.17	15.70	--------	30.87	14.18	6.52	--------	26.28
September	28.19	16.27	--------	30.98	14.19	6.85	--------	26.22
October	28.37	16.88	--------	30.52	14.33	7.17	--------	25.75
November	28.72	16.84	--------	30.62	14.34	7.08	--------	25.71
December	28.87	17.18	--------	30.30	14.30	7.38	--------	25.51
1948—January	29.02	17.17	16.89	30.37	14.27	7.22	7.08	25.69
February	29.16	17.40	16.91	29.84	14.29	7.41	7.08	25.27
March	29.48	17.35	17.37	29.86	14.39	7.50	7.49	25.21
April	29.64	17.63	17.58	29.43	14.46	7.37	7.62	25.03
May	29.99	17.38	16.59	28.50	14.53	7.33	6.92	24.40
June	30.27	17.69	18.36	29.22	14.69	7.44	8.18	25.06
July	30.67	17.54	17.46	29.79	14.92	7.52	7.62	25.85
August	30.98	17.87	17.59	29.80	15.16	7.65	7.57	26.17
September	31.26	18.04	17.65	29.43	15.35	7.85	7.57	25.93
October	31.51	17.80	16.99	28.54	15.50	7.79	7.31	25.36
November	31.66	17.86	17.51	27.95	15.71	7.94	7.68	24.83
December	31.69	17.75	16.96	26.95	15.74	8.11	7.47	24.15
1949—January	31.91	16.92	15.53	26.04	16.01	7.56	6.33	23.33
February	32.08	16.97	16.09	25.14	16.23	7.45	6.91	22.73
March	31.85	17.05	16.18	24.14	16.16	7.43	6.73	21.87
April	31.51	16.83	15.50	22.53	15.97	7.31	6.22	20.46
May	31.17	16.29	15.34	21.34	15.70	7.04	6.14	19.32
June	30.63	16.34	15.38	20.42	15.35	7.06	6.24	18.41
July	30.19	15.85	15.00	20.23	15.11	6.89	5.87	18.10
August	29.82	16.64	16.35	20.02	14.80	7.25	6.67	17.74
September	29.34	16.81	16.84	20.22	14.47	7.31	6.99	17.58
October	29.02	15.66	15.87	20.38	14.16	6.25	6.62	17.88
November	28.74	15.87	16.40	20.61	13.89	6.65	7.15	18.04
December	28.86	15.62	16.10	20.79	13.97	6.53	7.04	18.42
1950—January	28.96	16.20	16.64	21.78	13.95	7.15	7.47	19.27
February	29.02	16.45	17.05	22.17	14.05	7.08	7.51	19.51
March	29.19	17.27	17.62	22.52	14.13	7.56	8.08	20.02
April	29.30	17.40	17.77	22.66	14.20	7.73	8.20	20.26
May	29.52	18.53	19.87	23.12	14.34	8.45	9.43	20.45
June	29.75	19.08	20.51	24.73	14.57	8.89	10.09	21.70
July	29.81	30.34	23.55	28.85	14.65	9.22	11.44	24.98
August	30.12	21.68	26.44	33.73	14.77	10.09	14.26	29.48
September	31.02	20.72	23.20	36.56	15.13	9.66	12.04	32.14
October	31.95	20.99	22.87	38.20	15.53	9.88	11.85	33.86
November	33.38	20.88	22.12	39.00	16.29	9.74	11.02	34.56
December	34.31	22.08	24.14	41.13	16.78	10.32	12.17	36.55
1951—January	35.30	22.67	29.21	48.02	17.31	10.35	15.92	42.58
February	35.94	22.20	26.35	52.16	17.71	10.12	13.76	46.20
March	36.87	22.90	26.56	56.32	18.10	10.76	14.36	50.23
April	38.17	22.29	24.67	58.71	18.70	10.50	13.14	52.93
May	39.08	22.81	25.10	60.10	19.38	10.63	13.18	54.59
June	39.94	22.23	23.77	62.39	20.08	10.42	12.60	57.35
July	40.78	21.84	23.37	65.05	20.70	10.08	12.13	60.43
August	41.58	22.21	23.11	65.36	21.38	10.35	11.69	61.35
September	41.91	21.82	21.85	65.59	21.84	10.07	10.50	61.88
October	42.30	22.45	23.99	66.28	22.19	10.48	12.25	62.91
November	42.58	22.60	23.59	66.85	22.51	10.66	11.71	63.46
December	42.82	21.74	22.43	67.55	22.81	10.12	10.70	64.14

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	All manufacturing industries				Durable goods industries			
	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
1952—January	43.53	22.15	23.07	68.75	23.32	10.43	11.41	65.45
February	43.77	22.39	22.87	69.07	23.57	10.57	10.98	65.75
March	43.93	22.17	23.45	70.96	23.76	10.49	12.03	67.81
April	43.89	22.56	23.96	72.17	23.87	10.64	12.15	69.23
May	43.73	22.35	22.34	71.44	24.00	10.68	10.52	68.35
June	43.33	21.72	23.94	74.77	23.70	10.08	12.17	71.37
July	42.93	21.36	23.36	77.59	23.30	9.59	11.41	74.03
August	43.13	22.31	22.92	77.96	23.55	10.62	11.32	74.58
September	43.15	23.88	24.24	78.36	23.65	11.71	12.23	75.11
October	43.30	24.43	24.32	77.29	23.89	11.84	11.72	74.12
November	43.46	24.13	23.10	76.26	23.98	12.12	11.31	73.14
December	43.80	24.46	24.87	76.34	24.41	12.26	12.45	73.18
1953—January	44.24	24.42	24.68	77.52	24.62	12.36	12.62	74.35
February	44.28	24.57	24.40	77.19	24.79	12.59	12.49	74.06
March	44.47	24.79	24.27	76.81	25.13	12.63	12.04	73.58
April	44.71	25.04	24.09	75.87	25.46	12.81	11.91	72.66
May	45.17	24.69	24.30	75.00	25.88	12.55	12.24	71.67
June	45.45	24.75	23.89	74.75	26.08	12.55	11.74	71.24
July	45.53	25.86	23.92	73.80	26.16	13.39	11.62	70.47
August	45.62	24.62	21.95	70.78	26.24	12.44	10.02	67.89
September	45.56	24.68	21.91	67.74	26.19	12.42	9.64	64.86
October	45.34	24.29	21.80	64.24	26.12	12.13	9.62	61.57
November	45.43	23.31	21.14	61.78	26.13	11.49	9.42	59.18
December	45.74	23.09	20.68	59.50	26.27	11.23	8.93	57.06
1954—January	45.50	23.57	21.10	58.09	26.06	11.57	9.10	55.57
February	45.14	23.37	21.87	56.49	25.85	11.32	9.84	53.96
March	44.71	23.45	21.74	54.66	25.63	11.26	9.53	52.14
April	44.16	23.73	21.88	52.79	25.19	11.32	9.45	50.23
May	43.84	23.08	21.56	51.12	24.96	11.08	9.51	48.34
June	43.71	23.40	22.00	49.93	24.61	11.16	9.74	46.94
July	43.17	23.92	22.13	49.08	24.05	11.52	9.82	46.16
August	42.56	23.42	22.68	47.68	23.65	11.09	10.26	44.90
September	42.30	23.27	23.30	47.79	23.45	10.92	10.94	45.00
October	42.60	22.70	23.37	47.79	23.62	10.47	11.10	45.16
November	42.91	23.91	23.62	47.79	23.77	11.28	10.86	44.07
December	43.31	24.41	24.59	46.90	24.13	11.79	11.78	44.08
1955—January	43.15	24.97	25.27	47.79	24.08	12.14	12.40	44.28
February	43.14	24.96	25.41	48.18	24.08	12.15	12.51	45.10
March	43.22	25.72	26.81	49.24	24.20	12.65	13.54	46.09
April	43.25	25.66	25.54	48.92	24.16	12.59	12.49	45.93
May	43.55	26.31	26.73	49.08	24.32	13.09	13.56	46.01
June	43.73	26.44	26.88	50.02	24.43	13.12	13.45	46.62
July	44.08	26.88	27.18	51.47	24.74	13.54	13.76	47.77
August	44.77	26.56	28.39	52.29	25.23	13.20	15.11	48.66
September	44.86	27.14	28.16	53.14	25.38	13.57	14.53	49.66
October	45.79	26.71	27.91	53.90	26.09	13.36	14.51	50.45
November	45.92	27.37	28.94	54.73	26.23	13.84	15.29	51.18
December	46.36	27.41	28.98	56.86	26.66	13.74	15.25	53.37
1956—January	46.80	27.59	28.12	58.28	26.91	13.83	14.45	54.73
February	47.56	27.69	28.12	58.73	27.45	13.82	14.37	55.24
March	47.98	26.85	27.35	59.00	27.87	13.25	13.77	55.65
April	48.65	27.52	28.29	59.57	28.28	13.72	14.47	56.36
May	49.32	27.58	28.62	59.72	28.74	13.57	14.65	56.53
June	49.63	27.35	27.73	60.58	28.76	13.59	14.09	57.33
July	50.04	26.83	27.70	62.38	29.00	13.02	14.09	59.06
August	50.38	27.59	31.08	64.06	29.12	13.72	17.34	60.83
September	50.84	27.15	26.77	63.62	29.45	13.45	13.04	60.49
October	51.75	28.70	28.77	62.78	30.23	14.39	14.31	59.65
November	52.21	28.48	29.97	63.44	30.65	14.29	15.78	60.32
December	52.30	28.85	29.01	64.21	30.66	14.53	14.54	61.02
1957—January	52.43	29.96	28.93	64.05	30.68	14.94	14.18	61.03
February	52.92	29.53	28.65	63.72	30.96	14.81	14.10	60.76
March	53.34	28.43	28.07	63.19	31.19	14.20	13.85	60.34
April	53.66	28.68	27.94	61.86	31.46	14.25	13.23	58.92
May	53.91	28.62	28.43	61.07	31.57	14.30	14.12	58.04
June	53.85	28.14	27.06	60.33	31.44	14.21	13.25	57.16
July	54.09	29.03	27.28	59.29	31.70	14.57	13.01	56.15
August	54.20	28.64	27.33	57.79	31.74	14.30	13.16	54.80
September	54.17	28.22	26.57	55.99	31.82	14.13	12.52	53.18
October	54.10	28.06	26.23	53.19	31.75	13.93	12.15	50.58
November	53.87	27.22	26.03	51.98	31.51	13.55	12.36	49.39
December	53.52	26.69	25.06	50.70	31.15	13.09	11.40	48.13

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	All manufacturing industries				Durable goods industries			
1958—January	52.91	26.35	24.37	49.10	30.63	12.65	10.71	46.56
February	52.45	25.54	24.11	47.84	30.27	12.04	10.69	45.37
March	52.01	24.93	24.76	47.50	29.86	11.67	11.49	45.06
April	51.49	24.95	24.50	46.51	29.42	11.53	10.83	44.02
May	50.90	25.21	25.00	46.12	28.98	11.64	11.42	43.54
June	50.25	25.75	25.79	46.35	28.53	12.09	12.25	43.89
July	49.78	26.28	26.45	46.75	28.31	12.26	12.51	44.04
August	49.43	26.39	26.10	46.70	28.07	12.39	12.18	43.96
September	49.30	26.81	27.05	46.23	28.05	12.72	12.86	43.58
October	49.34	27.16	27.90	46.08	27.93	12.94	13.53	43.39
November	49.30	27.47	27.80	46.72	27.88	13.30	13.57	43.93
December	49.18	28.14	28.37	46.80	27.82	13.61	13.67	44.01
1959—January	49.49	28.14	28.50	47.68	28.11	13.54	13.90	44.84
February	49.92	28.48	29.70	49.10	28.41	13.87	14.92	46.10
March	50.45	29.13	30.23	50.38	28.93	14.40	15.32	47.24
April	51.05	30.27	31.21	50.49	29.36	15.17	15.80	47.29
May	51.60	30.74	30.54	50.09	29.73	15.52	15.24	46.70
June	52.14	31.25	31.40	50.40	30.23	15.77	16.13	46.98
July	52.24	30.86	30.83	50.61	30.35	15.38	15.49	47.18
August	52.12	29.27	29.02	50.57	30.15	14.01	13.97	47.25
September	51.89	29.82	30.55	51.07	29.82	14.11	14.75	47.85
October	51.52	29.38	30.45	51.48	29.25	14.05	15.10	48.30
November	51.63	28.97	29.22	51.51	29.35	13.48	13.72	48.30
December	52.43	30.75	30.73	51.49	30.09	14.98	14.76	48.13
1960—January	53.31	31.11	29.83	50.85	30.76	15.45	14.19	47.46
February	53.90	31.58	30.59	50.21	31.26	15.67	14.80	46.91
March	54.34	30.84	30.29	49.49	31.77	15.17	14.64	46.28
April	54.66	31.03	30.35	48.38	31.92	15.00	14.47	45.23
May	54.95	30.99	30.47	47.75	32.07	15.06	14.68	44.59
June	55.10	30.78	30.11	47.68	32.23	14.88	14.34	44.50
July	54.90	30.44	29.19	47.69	32.05	14.73	13.84	44.62
August	54.98	30.15	30.01	47.50	32.08	14.42	14.41	44.64
September	54.71	30.09	30.40	47.45	31.84	14.41	14.62	44.68
October	54.38	29.60	29.21	46.44	31.43	14.08	13.74	43.77
November	54.01	29.25	29.02	45.80	31.07	13.81	12.60	43.23
December	53.74	29.14	28.70	45.37	30.86	13.62	13.22	42.85
1961—January	53.67	28.67	28.50	45.27	30.76	13.17	12.88	42.60
February	53.60	29.03	29.11	45.52	30.65	13.32	13.36	42.79
March	53.31	29.55	29.85	45.59	30.30	13.69	13.82	42.72
April	53.38	30.12	30.44	45.83	30.15	14.14	14.38	42.84
	Primary metal				Fabricated metal			
1948—January	1.97	1.29	1.34	4.30	1.49	0.88	0.81	3.53
February	2.00	1.31	1.31	4.33	1.46	.88	.87	3.43
March	2.03	1.37	1.42	4.44	1.47	.86	.89	3.41
April	2.01	1.35	1.28	4.38	1.49	.92	1.10	3.51
May	2.07	1.34	1.21	4.21	1.48	.84	.72	3.37
June	2.10	1.40	1.59	4.29	1.52	.81	.91	3.43
July	2.14	1.40	1.47	4.51	1.58	.83	.83	3.55
August	2.19	1.43	1.47	4.53	1.60	.81	.82	3.64
September	2.25	1.48	1.55	4.49	1.63	.85	.79	3.59
October	2.26	1.52	1.49	4.45	1.68	.82	.80	3.59
November	2.30	1.59	1.83	4.61	1.75	.85	.78	3.47
December	2.29	1.67	1.69	4.64	1.77	.88	.79	3.35

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Primary metal				Fabricated metal			
	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
1949—January	2.31	1.51	1.41	4.58	1.75	0.81	0.70	3.36
February	2.35	1.51	1.42	4.48	1.78	.80	.68	3.20
March	2.41	1.49	1.23	4.23	1.78	.80	.71	3.09
April	2.43	1.33	.97	3.86	1.75	.79	.66	2.94
May	2.45	1.19	.96	3.56	1.69	.74	.47	2.66
June	2.40	1.23	1.08	3.33	1.67	.75	.68	2.55
July	2.35	1.17	.83	3.15	1.65	.76	.63	2.53
August	2.29	1.24	1.17	3.11	1.62	.75	.68	2.47
September	2.20	1.32	.94	2.73	1.60	.77	.79	2.51
October	2.14	.56	.98	3.18	1.54	.75	.72	2.49
November	2.12	.95	1.37	3.54	1.50	.75	.75	2.43
December	2.14	1.23	1.44	3.71	1.52	.70	.69	2.38
1950—January	2.13	1.26	1.28	3.76	1.52	.75	.76	2.52
February	2.10	1.31	1.38	3.84	1.56	.79	.81	2.47
March	2.14	1.32	1.44	4.00	1.59	.85	.86	2.46
April	2.13	1.40	1.48	4.07	1.62	.83	.93	2.49
May	2.12	1.52	1.62	4.05	1.64	.94	1.07	2.56
June	2.16	1.61	1.91	4.22	1.70	.99	1.12	2.68
July	2.21	1.67	1.84	4.59	1.69	1.01	1.24	3.05
August	2.22	1.76	2.39	5.26	1.70	1.14	1.46	3.50
September	2.26	1.76	2.11	5.57	1.71	1.06	1.16	3.71
October	2.29	1.77	1.91	5.77	1.74	1.07	1.24	3.83
November	2.35	1.80	1.88	5.75	1.81	1.10	1.35	3.93
December	2.36	1.89	2.29	6.10	1.84	1.12	1.37	4.10
1951—January	2.36	1.90	2.12	6.36	1.90	1.15	1.65	4.90
February	2.38	1.79	2.08	6.66	1.94	1.17	1.78	5.34
March	2.37	1.91	2.28	7.17	1.97	1.20	1.46	5.60
April	2.38	1.91	2.15	7.48	2.05	1.18	1.29	5.74
May	2.41	1.97	2.18	7.60	2.14	1.19	1.25	5.74
June	2.43	1.99	2.10	7.52	2.20	1.13	1.24	5.84
July	2.49	1.97	2.10	7.90	2.23	1.13	1.00	5.87
August	2.53	1.99	2.10	8.02	2.33	1.09	.98	5.76
September	2.58	1.88	1.81	7.83	2.38	1.06	1.05	5.83
October	2.63	1.95	2.25	8.14	2.41	1.13	1.23	5.81
November	2.61	1.98	1.75	7.87	2.41	1.18	1.32	5.76
December	2.69	1.86	1.63	7.62	2.45	1.05	1.17	5.78
1952—January	2.84	1.82	1.88	7.71	2.35	1.14	1.16	6.04
February	2.92	1.88	1.71	7.55	2.45	1.10	1.04	5.90
March	2.98	1.81	1.64	7.45	2.51	1.09	1.02	5.84
April	3.00	1.75	1.93	7.70	2.51	1.14	1.18	6.03
May	3.03	1.69	1.59	7.53	2.49	1.14	1.10	5.95
June	3.06	.88	1.21	7.78	2.36	1.09	1.15	6.00
July	2.98	.95	1.33	8.28	2.24	1.15	1.11	6.13
August	2.99	1.80	1.79	8.28	2.31	1.09	1.20	6.18
September	2.98	2.00	1.94	8.10	2.34	1.16	1.24	6.37
October	3.00	2.03	1.99	8.02	2.35	1.18	1.20	6.22
November	3.06	1.97	1.84	7.83	2.39	1.13	1.17	6.06
December	3.01	2.04	1.80	7.56	2.43	1.20	1.13	5.87
1953—January	3.14	1.99	1.95	7.58	2.42	1.24	1.30	6.01
February	3.05	1.99	1.84	7.46	2.48	1.28	1.22	5.91
March	3.02	2.01	2.00	7.43	2.53	1.28	1.22	5.94
April	3.04	2.06	1.88	7.24	2.60	1.31	1.27	5.96
May	3.14	2.03	1.91	7.11	2.70	1.24	1.16	5.76
June	3.17	2.08	2.08	7.07	2.76	1.30	1.11	5.48
July	3.31	2.46	2.16	7.11	2.75	1.37	1.35	5.55
August	3.45	2.04	1.82	6.97	2.70	1.28	1.01	5.26
September	3.55	1.90	1.25	6.20	2.62	1.31	1.16	5.06
October	3.57	1.90	1.29	5.47	2.61	1.21	.89	4.65
November	3.57	1.80	1.46	5.11	2.60	1.21	1.06	4.48
December	3.51	1.71	1.36	4.77	2.63	1.18	1.10	4.50
1954—January	3.42	1.70	1.23	4.34	2.63	1.23	.89	4.24
February	3.32	1.66	1.43	4.13	2.67	1.23	1.03	4.02
March	3.21	1.64	1.47	3.92	2.66	1.25	1.11	3.97
April	3.09	1.64	1.31	3.57	2.61	1.24	.97	3.74
May	3.06	1.60	1.37	3.30	2.64	1.19	1.06	3.52
June	2.99	1.68	1.52	3.05	2.65	1.25	1.40	3.60
July	3.07	1.91	1.48	2.92	2.53	1.25	.98	3.40
August	3.08	1.62	1.51	2.89	2.41	1.23	1.19	3.34
September	3.07	1.62	1.75	2.87	2.37	1.20	1.09	3.19
October	3.11	1.59	1.73	2.92	2.33	1.18	1.16	3.09
November	3.15	1.72	1.91	3.06	2.34	1.23	1.35	3.14
December	3.25	1.80	2.07	3.38	2.38	1.24	1.28	3.27

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Primary metal				Fabricated metal			
1955—January	3.19	1.89	2.12	3.71	2.43	1.21	1.46	3.57
February	3.20	1.95	2.27	4.17	2.45	1.23	1.18	3.54
March	3.22	2.06	2.58	4.82	2.41	1.32	1.37	3.70
April	3.20	2.07	2.55	5.08	2.43	1.32	1.27	3.64
May	3.19	2.10	2.37	5.35	2.47	1.35	1.39	3.66
June	3.15	2.15	2.43	5.34	2.49	1.36	1.61	3.81
July	3.19	2.59	2.56	5.72	2.57	1.33	1.40	3.87
August	3.25	2.29	2.47	5.94	2.69	1.39	1.50	3.98
September	3.24	2.32	2.64	5.99	2.75	1.42	1.43	3.98
October	3.36	2.29	2.40	5.94	2.78	1.37	1.45	3.98
November	3.41	2.43	2.60	6.23	2.77	1.46	1.51	3.96
December	3.42	2.50	2.60	6.46	2.80	1.49	1.51	4.08
1956—January	3.44	2.48	2.42	6.52	2.79	1.47	1.40	4.07
February	3.48	2.51	2.67	6.85	2.92	1.47	1.51	4.12
March	3.49	2.45	2.44	6.90	2.96	1.40	1.38	4.17
April	3.50	2.41	2.31	6.59	3.00	1.43	1.95	4.67
May	3.59	2.37	2.43	6.61	3.02	1.50	1.53	4.67
June	3.55	2.31	2.34	6.24	2.94	1.55	1.52	4.57
July	3.53	1.43	2.19	7.07	2.90	1.44	1.39	4.61
August	3.63	2.14	2.46	7.45	2.94	1.50	1.49	4.64
September	3.69	2.33	2.34	7.20	3.00	1.44	1.52	4.72
October	3.82	2.55	2.51	6.99	3.13	1.55	1.48	4.55
November	3.89	2.53	2.51	7.09	3.16	1.49	1.47	4.40
December	3.98	2.46	2.37	7.14	3.18	1.42	1.49	4.53
1957—January	3.96	2.59	2.35	7.02	3.17	1.59	1.47	4.49
February	4.07	2.45	2.40	7.14	3.28	1.57	1.55	4.51
March	4.10	2.39	2.33	7.15	3.21	1.51	1.40	4.50
April	4.11	2.36	2.20	6.77	3.22	1.63	1.50	4.36
May	4.19	2.26	2.14	6.60	3.15	1.56	1.69	4.41
June	4.21	2.29	2.31	6.33	3.08	1.49	1.49	4.28
July	4.25	2.45	2.24	6.20	3.15	1.61	1.52	4.31
August	4.33	2.36	2.08	6.00	3.15	1.52	1.37	4.15
September	4.34	2.18	2.20	5.84	3.12	1.55	1.50	4.09
October	4.36	2.22	2.08	5.53	3.14	1.54	1.46	3.92
November	4.28	2.16	1.69	5.19	3.10	1.43	1.24	3.63
December	4.27	2.07	1.51	4.80	3.09	1.43	1.21	3.48
958—January	4.27	1.96	1.56	4.47	3.08	1.40	1.24	3.34
February	4.30	1.73	1.37	4.26	3.04	1.35	1.18	3.20
March	4.34	1.64	1.37	4.04	2.92	1.33	1.18	3.10
April	4.36	1.66	1.54	3.76	2.93	1.30	1.23	3.04
May	4.28	1.66	1.67	3.74	2.85	1.43	1.32	3.05
June	4.17	1.85	1.95	3.56	2.84	1.40	1.50	3.03
July	4.12	1.92	2.04	3.69	2.81	1.45	1.50	3.10
August	4.11	1.98	2.06	3.80	2.78	1.48	1.52	3.11
September	4.04	2.07	2.33	3.87	2.84	1.59	1.58	3.09
October	4.01	2.18	2.41	3.91	2.93	1.57	1.60	3.07
November	4.06	2.11	2.26	4.17	2.90	1.55	1.60	3.05
December	4.11	2.26	2.21	4.35	2.90	1.59	1.46	3.06
1959—January	4.18	2.23	2.73	4.99	2.96	1.54	1.52	3.11
February	4.27	2.42	3.24	6.12	3.01	1.53	1.69	3.32
March	4.34	2.58	2.68	6.36	3.12	1.61	1.61	3.38
April	4.37	2.79	2.83	6.09	3.18	1.69	1.63	3.31
May	4.31	2.86	2.48	5.63	3.28	1.71	1.62	3.26
June	4.20	2.92	2.58	4.95	3.37	1.76	1.81	3.21
July	4.11	2.10	2.02	4.91	3.41	1.79	1.79	3.24
August	3.98	1.23	1.69	5.38	3.33	1.70	1.71	3.23
September	3.92	1.21	1.96	5.97	3.12	1.76	1.71	3.21
October	3.87	1.19	1.87	6.52	2.91	1.63	1.79	3.27
November	3.99	1.96	2.14	6.76	2.92	1.62	1.82	3.34
December	4.12	2.80	2.68	6.76	3.05	1.76	1.67	3.33
1960—January	4.20	2.73	2.23	6.39	3.13	1.70	1.61	3.31
February	4.32	2.69	2.20	6.18	3.23	1.72	1.61	3.27
March	4.45	2.54	1.72	5.27	3.33	1.69	1.64	3.20
April	4.63	2.31	1.81	4.64	3.32	1.69	1.71	3.20
May	4.70	2.24	1.96	4.38	3.35	1.75	1.70	3.18
June	4.80	2.01	1.78	4.03	3.34	1.76	1.68	3.08
July	4.75	2.11	1.89	3.92	3.33	1.73	1.59	3.10
August	4.71	1.98	1.84	3.74	3.34	1.70	1.74	3.10

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Primary metal				Febricated metal			
1960—September	4.64	1.92	1.85	3.67	3.27	1.65	1.54	3.00
October	4.57	1.79	1.64	3.50	3.18	1.53	1.48	2.94
November	4.52	1.79	1.75	3.47	3.13	1.57	1.56	2.86
December	4.50	1.75	1.77	3.41	3.12	1.58	1.46	2.73
1961—January	4.49	1.76	1.81	3.45	3.02	1.55	1.52	2.73
February	4.51	1.81	1.75	3.59	3.02	1.56	1.49	2.75
March	4.47	1.79	1.88	3.75	2.95	1.60	1.62	2.78
April	4.51	1.95	2.19	3.87	2.92	1.62	1.58	2.76
	Machinery				Transportation equipment			
1946	3.43	1.29	--------	8.98	2.05	0.81	--------	5.12
1947—January	4.28	1.73	--------	10.90	2.36	1.10	--------	5.92
February	4.36	1.72	--------	10.89	2.46	1.07	--------	6.03
March	4.47	1.74	--------	10.85	2.53	1.12	--------	6.10
April	4.60	1.76	--------	10.65	2.57	1.20	--------	6.00
May	4.71	1.82	--------	10.39	2.69	1.16	--------	5.99
June	4.81	1.81	--------	10.17	2.75	1.18	--------	6.17
July	4.89	1.81	--------	10.11	2.77	1.17	--------	6.15
August	4.95	1.84	--------	9.96	2.88	1.14	--------	6.02
September	4.97	1.88	--------	9.79	2.89	1.28	--------	6.02
October	5.02	1.97	--------	9.61	2.91	1.34	--------	6.03
November	5.03	1.96	--------	9.49	2.88	1.34	--------	6.20
December	5.05	1.99	--------	9.32	2.78	1.42	--------	6.16
1948—January	5.03	1.97	1.85	9.18	2.83	1.33	1.36	5.29
February	5.07	1.97	1.66	8.73	2.81	1.37	1.42	5.39
March	5.10	2.01	1.95	8.67	2.81	1.43	1.42	5.34
April	5.11	2.00	1.99	8.48	2.78	1.33	1.39	5.31
May	5.09	1.99	1.96	8.37	2.79	1.34	1.33	5.21
June	5.12	2.04	2.06	8.34	2.82	1.38	1.83	5.85
July	5.21	2.06	2.03	8.53	2.81	1.41	1.46	5.93
August	5.28	2.07	1.98	8.57	2.84	1.50	1.49	6.06
September	5.32	2.14	1.96	8.41	2.87	1.53	1.46	6.04
October	5.35	2.06	1.90	8.24	2.85	1.58	1.45	5.83
November	5.42	2.13	1.89	8.01	2.89	1.59	1.45	5.74
December	5.41	2.18	1.91	7.76	2.94	1.68	1.54	5.66
1949—January	5.47	1.97	1.52	7.42	3.04	1.61	1.11	5.19
February	5.54	1.90	1.80	7.18	3.07	1.58	1.41	5.08
March	5.50	1.97	1.77	6.97	3.03	1.51	1.40	4.86
April	5.40	1.91	1.58	6.50	2.94	1.65	1.46	4.57
May	5.26	1.93	1.71	6.22	2.90	1.53	1.52	4.44
June	5.14	1.84	1.69	6.08	2.86	1.58	1.27	4.22
July	5.07	1.74	1.62	6.13	2.79	1.66	1.46	4.10
August	4.99	1.86	1.67	6.02	2.72	1.74	1.50	3.95
September	4.87	1.89	1.89	6.04	2.67	1.62	1.65	4.04
October	4.78	1.78	1.70	5.94	2.57	1.48	1.51	3.97
November	4.72	1.82	1.58	5.64	2.47	1.39	1.55	4.17
December	4.89	1.74	1.71	5.67	2.57	1.29	1.18	4.09
1950—January	4.67	1.81	1.97	6.00	2.54	1.66	1.67	4.15
February	4.72	1.81	2.02	6.05	2.53	1.43	1.43	4.19
March	4.73	2.01	2.23	6.30	2.54	1.52	1.54	4.17
April	4.73	1.97	2.08	6.27	2.57	1.63	1.73	4.31
May	4.80	2.14	2.41	6.38	2.59	1.88	2.13	4.26
June	4.87	2.17	2.56	6.82	2.57	2.08	2.22	4.66
July	4.88	2.36	2.77	7.54	2.57	2.01	3.21	5.97
August	4.93	2.61	3.88	8.91	2.59	2.23	3.72	7.44
September	5.05	2.49	3.60	10.04	2.67	2.05	2.83	8.29
October	5.19	2.56	3.19	10.60	2.77	2.14	3.02	9.01
November	5.47	2.52	3.11	11.01	2.99	1.95	2.03	9.15
December	5.68	2.70	3.57	11.97	3.14	2.16	2.46	9.61

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Machinery				Transportation equipment			
1951—January	5.84	2.74	4.45	13.87	3.34	2.04	4.42	11.84
February	6.00	2.69	4.02	15.15	3.42	2.06	3.17	13.00
March	6.18	2.87	4.14	16.58	3.50	2.26	3.74	14.66
April	6.40	2.76	3.70	17.51	3.66	2.15	3.43	15.86
May	6.65	2.82	4.10	18.52	3.87	2.17	3.18	16.59
June	6.96	2.77	3.50	19.43	4.03	2.12	3.22	18.22
July	7.25	2.70	3.61	20.55	4.19	2.03	3.32	19.65
August	7.52	2.87	3.61	21.31	4.38	2.11	2.78	19.80
September	7.71	2.75	3.06	21.58	4.52	2.15	2.50	20.49
October	7.82	2.99	3.42	21.84	4.66	2.13	3.06	21.06
November	8.00	3.06	3.53	22.09	4.87	2.26	3.08	21.99
December	8.11	2.96	3.33	22.49	4.90	2.14	2.62	22.60
1952—January	8.30	3.06	3.10	22.71	5.20	2.20	2.87	23.07
February	8.39	3.09	3.32	22.86	5.25	2.20	2.58	23.40
March	8.45	3.04	3.78	23.77	5.27	2.31	3.46	24.80
April	8.55	3.08	3.10	23.71	5.25	2.35	3.67	25.95
May	8.62	3.13	2.93	23.31	5.34	2.40	2.58	25.88
June	8.53	3.20	3.48	23.82	5.24	2.50	3.73	27.78
July	8.43	3.17	3.35	24.26	5.21	1.90	3.13	29.08
August	8.42	3.14	3.19	24.39	5.39	2.10	2.64	29.34
September	8.49	3.30	3.15	24.16	5.41	2.71	3.27	30.12
October	8.49	3.34	3.30	23.94	5.57	2.75	2.73	29.84
November	8.55	3.36	3.03	23.46	5.49	3.15	2.84	29.79
December	8.62	3.46	3.35	23.35	5.73	3.00	3.84	30.65
1953—January	8.64	3.48	3.63	23.73	5.81	3.04	2.90	30.87
February	8.65	3.54	3.41	23.54	5.94	3.13	3.39	30.95
March	8.71	3.55	3.41	23.18	6.12	3.14	2.66	30.62
April	8.81	3.61	3.63	23.28	6.25	3.18	2.52	29.88
May	8.91	3.51	3.46	23.11	6.36	3.12	3.15	29.48
June	8.93	3.53	3.12	22.75	6.46	3.09	2.99	29.85
July	8.88	3.55	3.36	22.94	6.49	3.35	2.21	28.73
August	8.86	3.42	2.81	22.38	6.50	3.20	1.99	27.16
September	8.81	3.51	2.81	21.62	6.49	3.22	2.12	26.13
October	8.83	3.36	2.77	20.81	6.43	3.22	2.31	25.16
November	8.83	3.29	2.63	20.03	6.43	2.71	2.08	24.41
December	8.80	3.27	2.60	19.37	6.57	2.62	1.54	23.49
1954—January	8.71	3.28	2.57	18.90	6.51	2.86	2.22	23.19
February	8.71	3.26	2.87	18.46	6.35	2.76	2.18	22.47
March	8.68	3.30	2.36	17.30	6.31	2.64	2.25	22.18
April	8.57	3.27	2.57	16.65	6.15	2.69	2.29	21.69
May	8.52	3.16	2.49	15.91	5.98	2.66	2.22	21.08
June	8.39	3.17	2.59	15.30	5.89	2.64	1.79	20.45
July	8.20	3.21	2.64	15.08	5.66	2.68	2.35	20.09
August	8.09	3.15	2.66	14.62	5.55	2.60	2.39	19.32
September	7.96	3.21	3.04	14.45	5.58	2.35	2.45	19.78
October	7.93	3.06	3.05	14.26	5.85	2.08	2.58	20.34
November	7.96	3.19	3.09	13.96	5.91	2.62	1.89	19.47
December	7.92	3.24	2.97	13.71	6.05	2.90	2.83	19.33
1955—January	7.95	3.25	3.11	13.75	5.89	3.13	3.03	19.15
February	7.87	3.26	3.49	13.96	5.91	3.07	2.99	18.79
March	7.88	3.29	3.89	14.44	5.99	3.24	2.86	18.45
April	7.90	3.27	3.26	14.57	5.94	3.24	2.67	17.93
May	7.93	3.40	3.54	14.52	5.98	3.38	3.44	17.79
June	7.94	3.50	3.72	14.88	6.10	3.11	2.68	17.85
July	8.09	3.44	3.84	15.50	6.14	3.27	3.08	17.72
August	8.22	3.53	3.97	15.91	6.31	3.08	4.04	17.63
September	8.31	3.54	3.83	16.09	6.29	3.30	3.62	18.53
October	8.48	3.55	3.88	16.23	6.64	3.20	3.86	19.39
November	8.57	3.68	4.12	16.53	6.64	3.29	4.03	19.53
December	8.74	3.69	4.21	17.09	6.77	3.07	3.93	21.07

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Machinery				Transportation equipment			
1956—January	8.85	3.72	3.94	17.54	6.90	3.11	3.69	21.65
February	9.05	3.72	3.96	17.81	7.00	3.06	3.19	21.47
March	9.30	3.67	3.99	18.05	7.07	2.84	2.95	21.43
April	9.51	3.89	4.09	18.44	7.11	2.92	3.10	21.52
May	9.70	3.97	4.51	18.72	7.21	2.78	3.02	21.31
June	9.84	3.94	4.31	19.26	7.08	2.85	3.00	22.04
July	9.98	4.15	4.29	19.74	7.19	2.91	3.24	22.27
August	10.01	4.14	4.36	19.91	7.14	2.91	5.98	23.42
September	10.09	4.06	4.10	19.85	7.28	2.70	2.28	23.53
October	10.29	4.23	4.59	19.89	7.55	3.07	2.62	23.23
November	10.40	4.19	4.72	20.17	7.71	3.23	4.18	23.71
December	10.41	4.24	4.13	20.08	7.63	3.53	3.84	24.58
1957—January	10.44	4.34	4.25	20.21	7.63	3.57	3.28	24.43
February	10.45	4.29	4.27	20.23	7.74	3.62	3.10	23.92
March	10.48	4.16	4.21	20.20	7.83	3.41	3.24	23.51
April	10.51	4.24	3.85	19.93	8.02	3.24	2.97	22.95
May	10.62	4.35	4.32	19.64	7.98	3.28	3.20	22.64
June	10.60	4.26	4.10	19.70	7.92	3.24	2.54	22.06
July	10.62	4.45	4.07	19.63	8.04	3.25	2.40	21.12
August	10.61	4.28	4.12	19.40	8.04	3.45	2.88	20.42
September	10.66	4.31	3.95	18.92	8.05	3.41	2.30	19.65
October	10.58	4.27	3.94	18.31	7.98	3.30	2.08	18.42
November	10.52	4.18	3.65	17.73	7.98	3.26	2.35	18.58
December	10.37	3.95	3.42	17.12	7.80	3.15	2.93	18.75
1958—January	10.22	3.85	3.34	16.70	7.53	3.00	2.36	18.13
February	10.10	3.73	3.55	16.55	7.29	2.88	2.36	17.47
March	9.92	3.69	3.51	16.33	7.11	2.71	3.32	17.76
April	9.74	3.75	3.60	16.18	6.86	2.47	2.09	17.20
May	9.64	3.74	3.69	16.09	6.72	2.54	2.27	16.78
June	9.45	3.78	3.59	16.08	6.60	2.61	2.68	16.95
July	9.32	3.81	3.77	16.23	6.58	2.55	2.69	16.88
August	9.22	3.82	3.85	16.28	6.54	2.58	2.25	16.65
September	9.07	4.00	4.24	16.31	6.75	2.44	1.95	16.18
October	9.03	3.99	3.98	16.13	6.59	2.60	2.84	16.27
November	8.95	3.95	4.02	16.05	6.58	3.04	3.01	16.65
December	8.90	3.98	4.05	16.01	6.54	3.18	2.96	16.50
1959—January	9.01	4.02	3.94	16.08	6.59	3.17	3.04	16.29
February	9.09	4.13	4.20	16.19	6.67	3.17	3.04	15.96
March	9.22	4.23	4.84	16.79	6.85	3.21	3.44	16.08
April	9.35	4.42	4.63	16.85	7.03	3.39	3.66	16.23
May	9.48	4.51	4.63	16.93	7.17	3.46	3.50	16.00
June	9.73	4.57	4.92	17.53	7.39	3.56	3.84	16.37
July	9.80	4.78	4.89	17.84	7.40	3.67	3.63	16.05
August	9.83	4.65	4.62	17.83	7.33	3.58	3.19	15.74
September	9.74	4.66	5.07	18.04	7.31	3.64	3.16	15.69
October	9.81	4.67	4.98	18.02	6.89	3.78	3.66	15.74
November	9.73	4.72	4.67	17.78	6.93	2.51	2.30	15.65
December	9.92	4.70	4.85	17.79	7.18	2.95	2.81	15.73
1960—January	10.18	4.80	4.63	17.81	7.38	3.47	3.15	15.38
February	10.32	4.84	4.84	17.92	7.53	3.57	3.50	14.96
March	10.48	4.75	4.74	17.98	7.64	3.46	3.68	15.16
April	10.53	4.83	4.76	17.97	7.58	3.36	3.49	14.80
May	10.60	4.78	4.75	17.91	7.52	3.49	3.52	14.55
June	10.64	4.74	4.69	18.12	7.46	3.60	3.46	14.69
July	10.58	4.77	4.52	18.26	7.34	3.41	3.20	14.60
August	10.59	4.70	4.81	18.24	7.36	3.35	3.33	14.89
September	10.53	4.66	4.75	18.25	7.24	3.57	3.82	15.16
October	10.44	4.59	4.40	17.94	7.10	3.63	3.69	14.93
November	10.35	4.61	4.59	17.62	7.02	3.30	3.06	14.83
December	10.40	4.58	4.67	17.48	6.85	3.15	2.83	14.93
1961—January	10.32	4.65	4.54	17.38	6.92	2.77	2.66	14.70
February	10.28	4.65	4.59	17.36	6.86	2.83	3.07	14.70
March	10.25	4.71	4.76	17.42	6.69	3.02	3.02	14.39
April	10.21	4.85	4.74	17.33	6.60	3.15	3.28	14.38

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Lumber and furniture				Stone, clay, and glass			
1946	0.71	0.56	----------	--------	0.34	0.26	--------	----------
1947—January	.92	.68	----------	--------	.42	.32	--------	----------
February	.94	.68	----------	--------	.44	.33	--------	----------
March	.96	.69	----------	--------	.45	.33	--------	----------
April	.98	.71	----------	--------	.45	.34	--------	----------
May	.99	.74	----------	--------	.47	.33	--------	----------
June	1.01	.67	----------	--------	.47	.33	--------	----------
July	1.02	.71	----------	--------	.48	.32	--------	----------
August	1.01	.75	----------	--------	.48	.31	--------	----------
September	1.02	.75	----------	--------	.48	.33	--------	----------
October	1.05	.77	----------	--------	.51	.34	--------	----------
November	1.06	.83	----------	--------	.52	.32	--------	----------
December	1.12	.85	----------	--------	.51	.33	--------	----------
1948—January	1.00	.79	----------	--------	.52	.34	--------	----------
February	1.04	.78	----------	--------	.54	.35	--------	----------
March	1.07	.80	----------	--------	.53	.37	--------	----------
April	1.10	.75	----------	--------	.54	.35	--------	----------
May	1.11	.78	----------	--------	.55	.38	--------	----------
June	1.12	.79	----------	--------	.55	.36	--------	----------
July	1.16	.81	----------	--------	.56	.38	--------	----------
August	1.19	.83	----------	--------	.57	.38	--------	----------
September	1.19	.81	----------	--------	.58	.39	--------	----------
October	1.24	.80	----------	--------	.59	.40	--------	----------
November	1.23	.77	----------	--------	.60	.39	--------	----------
December	1.21	.70	----------	--------	.61	.37	--------	----------
1949—January	1.31	.67	----------	--------	.56	.36	--------	----------
February	1.32	.66	----------	--------	.62	.37	--------	----------
March	1.25	.69	----------	--------	.64	.36	--------	----------
April	1.26	.65	----------	--------	.62	.36	--------	----------
May	1.25	.67	----------	--------	.62	.37	--------	----------
June	1.16	.66	----------	--------	.62	.37	--------	----------
July	1.13	.65	----------	--------	.61	.36	--------	----------
August	1.11	.70	----------	--------	.60	.37	--------	----------
September	1.09	.74	----------	--------	.59	.37	--------	----------
October	1.12	.73	----------	--------	.58	.36	--------	----------
November	1.13	.77	----------	--------	.57	.38	--------	----------
December	1.11	.73	----------	--------	.57	.35	--------	----------
1950—January	1.13	.75	----------	--------	.57	.39	--------	----------
February	1.16	.78	----------	--------	.57	.39	--------	----------
March	1.15	.82	----------	--------	.57	.41	--------	----------
April	1.15	.84	----------	--------	.58	.42	--------	----------
May	1.19	.87	----------	--------	.58	.44	--------	----------
June	1.22	.91	----------	--------	.57	.46	--------	----------
July	1.25	.97	----------	--------	.58	.48	--------	----------
August	1.25	1.05	----------	--------	.58	.49	--------	----------
September	1.30	1.00	----------	--------	.59	.49	--------	----------
October	1.32	1.06	----------	--------	.62	.51	--------	----------
November	1.36	1.04	----------	--------	.63	.52	--------	----------
December	1.42	1.04	----------	--------	.66	.55	--------	----------
1951—January	1.47	1.11	----------	--------	.68	.53	--------	----------
February	1.48	1.02	----------	--------	.69	.52	--------	----------
March	1.50	1.07	----------	--------	.71	.55	--------	----------
April	1.57	1.05	----------	--------	.73	.55	--------	----------
May	1.63	1.04	----------	--------	.75	.56	--------	----------
June	1.67	1.01	----------	--------	.78	.55	--------	----------
July	1.66	.91	----------	--------	.80	.54	--------	----------
August	1.67	.95	----------	--------	.82	.52	--------	----------
September	1.66	.93	----------	--------	.83	.52	--------	----------
October	1.66	.97	----------	--------	.84	.52	--------	----------
November	1.63	.93	----------	--------	.85	.50	--------	----------
December	1.67	.85	----------	--------	.85	.48	--------	----------

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Lumber and furniture				Stone, clay, and glass			
	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
1952—January	1.63	0.91	-------	-------	0.85	0.50	-------	-------
February	1.59	.93	-------	-------	.84	.52	-------	-------
March	1.58	.91	-------	-------	.86	.49	-------	-------
April	1.60	.96	-------	-------	.86	.50	-------	-------
May	1.61	.96	-------	-------	.86	.50	-------	-------
June	1.61	1.00	-------	-------	.86	.50	-------	-------
July	1.58	1.00	-------	-------	.85	.50	-------	-------
August	1.59	1.05	-------	-------	.84	.53	-------	-------
September	1.61	1.06	-------	-------	.84	.53	-------	-------
October	1.62	1.07	-------	-------	.84	.54	-------	-------
November	1.64	1.04	-------	-------	.84	.54	-------	-------
December	1.67	1.08	-------	-------	.83	.53	-------	-------
1953—January	1.64	1.07	-------	-------	.86	.59	-------	-------
February	1.63	1.06	-------	-------	.88	.60	-------	-------
March	1.67	1.02	-------	-------	.89	.61	-------	-------
April	1.64	1.06	-------	-------	.90	.59	-------	-------
May	1.63	1.04	-------	-------	.90	.60	-------	-------
June	1.63	1.00	-------	-------	.91	.59	-------	-------
July	1.64	1.06	-------	-------	.90	.60	-------	-------
August	1.64	.97	-------	-------	.90	.59	-------	-------
September	1.62	.91	-------	-------	.89	.59	-------	-------
October	1.58	.89	-------	-------	.89	.59	-------	-------
November	1.58	.92	-------	-------	.89	.58	-------	-------
December	1.60	.92	-------	-------	.94	.57	-------	-------
1954—January	1.62	.98	-------	-------	.98	.56	-------	-------
February	1.59	.91	-------	-------	.99	.58	-------	-------
March	1.58	.93	-------	-------	.98	.56	-------	-------
April	1.56	.94	-------	-------	.98	.58	-------	-------
May	1.56	.92	-------	-------	.97	.60	-------	-------
June	1.56	.88	-------	-------	.94	.59	-------	-------
July	1.55	.91	-------	-------	.92	.61	-------	-------
August	1.54	.94	-------	-------	.89	.61	-------	-------
September	1.52	.96	-------	-------	.88	.63	-------	-------
October	1.51	1.01	-------	-------	.87	.62	-------	-------
November	1.52	.98	-------	-------	.88	.63	-------	-------
December	1.58	1.02	-------	-------	.92	.64	-------	-------
1955—January	1.61	1.02	-------	-------	.94	.67	-------	-------
February	1.65	1.02	-------	-------	.94	.65	-------	-------
March	1.69	1.06	-------	-------	.94	.69	-------	-------
April	1.69	1.03	-------	-------	.95	.69	-------	-------
May	1.71	1.09	-------	-------	.96	.74	-------	-------
June	1.69	1.20	-------	-------	.95	.74	-------	-------
July	1.69	1.15	-------	-------	.95	.74	-------	-------
August	1.68	1.10	-------	-------	.96	.73	-------	-------
September	1.70	1.14	-------	-------	.97	.75	-------	-------
October	1.72	1.16	-------	-------	.99	.73	-------	-------
November	1.72	1.14	-------	-------	1.00	.75	-------	-------
December	1.75	1.14	-------	-------	1.01	.76	-------	-------
1956—January	1.71	1.15	-------	-------	1.04	.76	-------	-------
February	1.73	1.16	-------	-------	1.06	.77	-------	-------
March	1.71	1.10	-------	-------	1.09	.73	-------	-------
April	1.78	1.16	-------	-------	1.12	.77	-------	-------
May	1.81	1.13	-------	-------	1.10	.74	-------	-------
June	1.87	1.11	-------	-------	1.13	.73	-------	-------
July	1.88	1.18	-------	-------	1.14	.75	-------	-------
August	1.88	1.15	-------	-------	1.14	.75	-------	-------
September	1.87	1.12	-------	-------	1.13	.73	-------	-------
October	1.89	1.07	-------	-------	1.15	.78	-------	-------
November	1.90	1.02	-------	-------	1.17	.74	-------	-------
December	1.87	1.01	-------	-------	1.17	.75	-------	-------
1957—January	1.84	1.04	-------	-------	1.16	.75	-------	-------
February	1.87	1.05	-------	-------	1.17	.77	-------	-------
March	1.91	.95	-------	-------	1.17	.75	-------	-------
April	1.89	.99	-------	-------	1.21	.71	-------	-------
May	1.87	.98	-------	-------	1.24	.75	-------	-------
June	1.85	1.08	-------	-------	1.25	.74	-------	-------
July	1.86	.96	-------	-------	1.24	.74	-------	-------
August	1.87	.93	-------	-------	1.21	.71	-------	-------
September	1.88	.94	-------	-------	1.25	.67	-------	-------
October	1.88	.93	-------	-------	1.27	.65	-------	-------
November	1.85	.85	-------	-------	1.27	.66	-------	-------
December	1.83	.85	-------	-------	1.27	.65	-------	-------

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Lumber and furniture				Stone, clay, and glass			
1958—January	1.77	0.85	--------	----------	1.24	0.63	--------	----------
February	1.80	.80	--------	----------	1.25	.58	--------	----------
March	1.79	.76	--------	----------	1.23	.59	--------	----------
April	1.78	.79	--------	----------	1.23	.61	--------	----------
May	1.77	.81	--------	----------	1.24	.62	--------	----------
June	1.78	.82	--------	----------	1.23	.65	--------	----------
July	1.77	.84	--------	----------	1.23	.68	--------	----------
August	1.74	.83	--------	----------	1.22	.66	--------	----------
September	1.73	.85	--------	----------	1.21	.70	--------	----------
October	1.72	.90	--------	----------	1.22	.65	--------	----------
November	1.73	.89	--------	----------	1.22	.67	--------	----------
December	1.74	.88	--------	----------	1.20	.66	--------	----------
1959—January	1.72	.88	--------	----------	1.21	.67	--------	----------
February	1.71	.89	--------	----------	1.21	.68	--------	----------
March	1.72	.92	--------	----------	1.22	.73	--------	----------
April	1.73	.99	--------	----------	1.24	.76	--------	----------
May	1.76	1.04	--------	----------	1.25	.77	--------	----------
June	1.76	1.04	--------	----------	1.28	.77	--------	----------
July	1.82	1.08	--------	----------	1.27	.81	--------	----------
August	1.84	.99	--------	----------	1.26	.75	--------	----------
September	1.87	.98	--------	----------	1.28	.72	--------	----------
October	1.86	.95	--------	----------	1.32	.70	--------	----------
November	1.86	.92	--------	----------	1.34	.66	--------	----------
December	1.87	.91	--------	----------	1.36	.74	--------	----------
1960—January	1.91	.87	--------	----------	1.37	.75	--------	----------
February	1.87	.92	--------	----------	1.38	.77	--------	----------
March	1.86	.88	--------	----------	1.42	.70	--------	----------
April	1.85	.93	--------	----------	1.42	.75	--------	----------
May	1.85	.94	--------	----------	1.43	.75	--------	----------
June	1.89	.91	--------	----------	1.44	.76	--------	----------
July	1.90	.87	--------	----------	1.44	.75	--------	----------
August	1.92	.87	--------	----------	1.44	.73	--------	----------
September	1.94	.81	--------	----------	1.46	.73	--------	----------
October	1.96	.78	--------	----------	1.46	.70	--------	----------
November	1.93	.79	--------	----------	1.43	.70	--------	----------
December	1.85	.80	--------	----------	1.44	.70	--------	----------
1961—January	1.85	.74	--------	----------	1.44	.69	--------	----------
February	1.85	.73	--------	----------	1.43	.70	--------	----------
March	1.84	.77	--------	----------	1.41	.73	--------	----------
April	1.83	.80	--------	----------	1.42	.69	--------	----------
	Other durables				Nondurable goods industries			
1939	--------	--------	--------	----------	5.84	3.16	--------	1.25
1940	--------	--------	--------	----------	6.40	3.38	--------	1.48
1941	--------	--------	--------	----------	7.33	4.37	--------	2.98
1942	--------	--------	--------	----------	8.93	5.26	--------	3.51
1943	--------	--------	--------	----------	8.72	5.96	--------	3.69
1944	--------	--------	--------	----------	9.16	6.45	--------	3.34
1945	--------	--------	--------	----------	9.20	6.61	--------	3.12
1946	--------	--------	--------	----------	10.93	7.65	--------	3.60
1947—January	--------	--------	--------	----------	12.81	8.63	--------	4.67
February	--------	--------	--------	----------	13.05	8.75	--------	4.62
March	--------	--------	--------	----------	13.28	9.11	--------	4.88
April	--------	--------	--------	----------	13.63	8.87	--------	4.93
May	--------	--------	--------	----------	13.78	9.12	--------	4.69
June	--------	--------	--------	----------	13.78	9.22	--------	4.82
July	--------	--------	--------	----------	13.81	9.16	--------	4.73
August	--------	--------	--------	----------	14.00	9.18	--------	4.60
September	--------	--------	--------	----------	14.00	9.43	--------	4.76
October	--------	--------	--------	----------	14.04	9.71	--------	4.77
November	--------	--------	--------	----------	14.38	9.76	--------	4.91
December	--------	--------	--------	----------	14.57	9.80	--------	4.79
1948—January	1.43	0.62	1.73	3.41	14.75	9.96	9.81	4.68
February	1.37	.75	1.82	3.40	14.87	9.99	9.83	4.57
March	1.38	.66	1.81	3.36	15.09	9.85	9.88	4.65
April	1.43	.67	1.86	3.34	15.19	10.25	9.96	4.41
May	1.44	.66	1.71	3.25	15.46	10.05	9.67	4.10
June	1.46	.67	1.80	3.15	15.58	10.25	10.18	4.16
July	1.47	.63	1.82	3.33	15.75	10.02	9.84	3.95
August	1.49	.64	1.81	3.38	15.82	10.22	10.02	3.63
September	1.51	.64	1.85	3.40	15.92	10.19	10.08	3.50
October	1.53	.62	1.68	3.25	16.01	10.01	9.68	3.19
November	1.52	.63	1.72	3.00	15.95	9.92	9.83	3.13
December	1.51	.62	1.55	2.75	15.96	9.65	9.49	2.80

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Other durables				Nondurable goods industries			
1949—January	1.57	0.64	1.59	2.78	15.90	9.36	9.20	2.70
February	1.55	.64	1.60	2.77	15.85	9.52	9.18	2.42
March	1.55	.61	1.63	2.72	15.69	9.61	9.44	2.27
April	1.56	.61	1.56	2.60	15.54	9.52	9.28	2.07
May	1.54	.61	1.49	2.45	15.46	9.25	9.19	2.02
June	1.51	.64	1.52	2.23	15.29	9.28	9.14	2.01
July	1.52	.55	1.32	2.18	15.08	8.96	9.13	2.13
August	1.47	.60	1.65	2.20	15.02	9.39	9.68	2.28
September	1.45	.60	1.74	2.28	14.87	9.50	9.84	2.64
October	1.43	.59	1.72	2.31	14.87	9.41	9.25	2.50
November	1.38	.59	1.90	2.27	14.85	9.22	9.25	2.57
December	1.38	.49	2.02	2.58	14.87	9.10	9.05	2.36
1950—January	1.40	.53	1.79	2.83	15.01	9.05	9.18	2.52
February	1.40	.56	1.88	2.97	14.97	9.37	9.53	2.66
March	1.41	.64	2.01	3.09	15.06	9.71	9.54	2.50
April	1.42	.63	1.98	3.13	15.10	9.67	9.57	2.39
May	1.44	.65	2.20	3.21	15.17	10.09	10.43	2.67
June	1.48	.67	2.28	3.33	15.18	10.19	10.42	3.03
July	1.48	.72	2.38	3.82	15.16	11.12	12.11	3.88
August	1.49	.80	2.81	4.38	15.36	11.59	12.18	4.25
September	1.56	.81	2.34	4.53	15.89	11.06	11.16	4.42
October	1.60	.78	2.49	4.65	16.43	11.11	11.02	4.34
November	1.69	.82	2.67	4.71	17.08	11.15	11.10	4.44
December	1.67	.87	2.48	4.77	17.53	11.75	11.98	4.58
1951—January	1.72	.87	3.28	5.62	18.00	12.32	13.29	5.44
February	1.82	.89	2.72	6.05	18.23	12.07	12.58	5.96
March	1.86	.89	2.74	6.23	18.77	12.14	12.19	6.09
April	1.91	.90	2.57	6.34	19.47	11.80	11.53	5.78
May	1.94	.88	2.47	6.14	19.69	12.18	11.92	5.51
June	2.01	.84	2.54	6.34	19.86	11.81	11.17	5.04
July	2.09	.81	2.10	6.46	20.08	11.76	11.24	4.62
August	2.15	.82	2.23	6.37	20.20	11.87	11.42	4.01
September	2.17	.79	2.09	6.25	20.07	11.75	11.35	3.70
October	2.16	.79	2.29	6.06	20.12	11.97	11.74	3.37
November	2.14	.74	2.02	5.75	20.07	11.94	11.88	3.40
December	2.14	.79	1.95	5.66	20.01	11.62	11.73	3.41
1952—January	2.17	0.81	2.40	5.93	20.21	11.72	11.66	3.30
February	2.14	.83	2.34	6.03	20.19	11.82	11.88	3.33
March	2.11	.84	2.13	5.95	20.18	11.69	11.42	3.15
April	2.10	.87	2.28	5.84	20.01	11.92	11.80	2.95
May	2.05	.86	2.32	5.69	19.73	11.67	11.81	3.09
June	2.04	.90	2.60	6.00	19.62	11.64	11.77	3.40
July	2.02	.92	2.49	6.28	19.63	11.77	11.95	3.57
August	2.01	.91	2.50	6.39	19.58	11.69	11.60	3.38
September	1.99	.95	2.63	6.37	19.50	12.17	12.01	3.25
October	2.02	.93	2.49	6.10	19.41	12.59	12.61	3.17
November	2.00	.93	2.44	5.99	19.48	12.01	11.79	3.12
December	2.13	.93	2.34	5.74	19.39	12.21	12.42	3.17
1953—January	2.13	.96	2.84	6.16	19.62	12.07	12.06	3.17
February	2.15	1.00	2.64	6.20	19.49	11.97	11.90	3.13
March	2.19	1.01	2.75	6.42	19.34	12.17	12.22	3.23
April	2.21	1.00	2.61	6.31	19.25	12.23	12.18	3.20
May	2.23	1.02	2.56	6.21	19.29	12.13	12.00	3.33
June	2.23	.97	2.44	6.09	19.37	12.19	12.15	3.51
July	2.20	1.00	2.54	6.14	19.36	12.47	12.30	3.33
August	2.20	.95	2.39	6.12	19.39	12.18	11.93	2.89
September	2.22	.97	2.31	5.85	19.36	12.26	12.27	2.88
October	2.22	.97	2.36	5.49	19.21	12.16	12.18	2.67
November	2.23	.98	2.19	5.16	19.30	11.81	11.73	2.60
December	2.23	.98	2.34	4.94	19.46	11.86	11.75	2.44
1954—January	2.19	.96	2.19	4.90	19.44	12.00	12.01	2.52
February	2.22	.92	2.34	4.87	19.29	12.06	12.03	2.53
March	2.22	.94	2.35	4.78	19.08	12.20	12.21	2.52
April	2.23	.96	2.31	4.58	18.97	12.41	12.43	2.56
May	2.24	.94	2.37	4.53	18.88	12.01	12.05	2.78
June	2.19	.95	2.45	4.54	19.10	12.24	12.25	2.99
July	2.12	.95	2.38	4.66	19.12	12.40	12.31	2.92
August	2.09	.95	2.52	4.73	18.91	12.33	12.42	2.78
September	2.06	.95	2.61	4.71	18.85	12.35	12.36	2.79
October	2.02	.92	2.57	4.55	18.98	12.24	12.27	2.63
November	2.01	.93	2.61	4.49	19.13	12.62	12.76	2.72
December	2.04	.96	2.63	4.35	19.18	12.62	12.81	2.82

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Other durables				Nondurable goods industries			
1955—January	2.07	0.98	2.69	4.65	19.08	12.83	12.86	2.97
February	2.05	.97	2.59	4.64	19.06	12.82	12.90	3.08
March	2.07	1.00	2.84	4.68	19.02	13.07	13.27	3.15
April	2.06	.97	2.73	4.72	19.09	13.07	13.05	2.99
May	2.09	1.05	2.82	4.69	19.22	13.21	13.17	3.07
June	2.10	1.06	3.01	4.75	19.30	13.32	13.44	3.39
July	2.11	1.03	2.89	4.96	19.34	13.33	13.42	3.71
August	2.12	1.07	3.13	5.20	19.54	13.36	13.28	3.63
September	2.11	1.09	3.02	5.08	19.49	13.57	13.63	3.48
October	2.13	1.06	2.92	4.92	19.69	13.36	13.41	3.45
November	2.13	1.10	3.04	4.93	19.69	13.54	13.65	3.56
December	2.17	1.08	3.02	4.68	19.70	13.67	13.73	3.49
1956—January	2.18	1.15	3.01	4.95	19.89	13.75	13.67	3.55
February	2.21	1.13	3.04	4.99	20.11	13.86	13.75	3.48
March	2.26	1.06	3.02	5.09	20.12	13.60	13.58	3.35
April	2.26	1.14	3.01	5.14	20.37	13.80	13.83	3.21
May	2.32	1.10	3.17	5.23	20.58	14.01	13.96	3.19
June	2.36	1.10	2.93	5.23	20.87	13.77	13.64	3.25
July	2.39	1.17	2.98	5.37	21.03	13.80	13.61	3.32
August	2.39	1.12	3.05	5.41	21.26	13.87	13.74	3.23
September	2.39	1.07	2.79	5.18	21.39	13.70	13.73	3.13
October	2.40	1.16	3.12	4.98	21.52	14.30	14.46	3.14
November	2.42	1.09	2.89	4.96	21.56	14.19	14.20	3.12
December	2.42	1.12	2.71	4.68	21.64	14.32	14.46	3.20
1957—January	2.43	1.05	2.84	4.88	21.80	15.02	14.75	----------
February	2.43	1.05	2.78	4.96	21.96	14.73	14.55	----------
March	2.48	1.03	2.68	4.99	22.15	14.23	14.21	----------
April	2.50	1.09	2.72	4.91	22.20	14.43	14.71	----------
May	2.52	1.12	2.77	4.75	22.34	14.32	14.32	----------
June	2.54	1.11	2.81	4.80	22.42	13.94	13.81	3.17
July	2.55	1.13	2.78	4.88	22.40	14.46	14.27	3.14
August	2.54	1.05	2.70	4.82	22.46	14.34	14.17	3.00
September	2.52	1.07	2.57	4.68	22.35	14.08	14.05	2.81
October	2.54	1.03	2.59	4.40	22.35	14.13	14.07	2.61
November	2.53	1.02	2.44	4.27	22.36	13.67	13.67	2.59
December	2.52	.98	2.32	3.98	22.37	13.60	13.66	2.57
1958—January	2.51	0.96	2.22	3.92	22.29	13.70	13.67	2.54
February	2.49	.97	2.24	3.90	22.18	13.50	13.42	2.46
March	2.54	.97	2.11	3.83	22.15	13.26	13.27	2.45
April	2.51	.96	2.37	3.84	22.06	13.41	13.67	2.49
May	2.49	.96	2.48	3.88	21.92	13.56	13.58	2.57
June	2.46	.98	2.53	4.06	21.72	13.66	13.54	2.67
July	2.47	1.02	2.51	4.13	21.41	14.03	13.94	2.71
August	2.46	1.03	2.50	4.13	21.36	14.00	13.92	2.74
September	2.39	1.08	2.76	4.13	21.25	14.08	14.19	2.66
October	2.44	1.06	2.70	4.02	21.41	14.22	14.37	2.69
November	2.44	1.08	2.69	4.02	21.42	14.17	14.22	2.79
December	2.42	1.07	3.00	4.08	21.36	14.52	14.69	2.79
1959—January	2.44	1.04	2.68	4.37	21.38	14.60	14.60	2.84
February	2.46	1.05	2.76	4.52	21.51	14.61	14.78	3.00
March	2.46	1.13	2.76	4.64	21.53	14.73	14.91	3.13
April	2.48	1.13	3.05	4.81	21.69	15.10	15.41	3.19
May	2.48	1.17	3.02	4.88	21.87	15.23	15.30	3.40
June	2.51	1.17	2.98	4.92	21.91	15.48	15.27	3.42
July	2.54	1.17	3.16	5.14	21.89	15.47	15.33	3.42
August	2.58	1.11	2.77	5.07	21.97	15.26	15.04	3.32
September	2.59	1.14	2.86	4.94	22.08	15.71	15.81	3.22
October	2.60	1.13	2.80	4.76	22.27	15.34	15.35	3.17
November	2.59	1.09	2.79	4.77	22.28	15.49	15.50	3.21
December	2.59	1.13	2.75	4.53	22.34	15.78	15.97	3.36
1960—January	2.60	1.13	3.44	4.58	22.55	15.66	15.67	3.39
February	2.62	1.16	2.66	4.58	22.64	15.90	15.79	3.30
March	2.59	1.15	2.86	4.67	22.57	15.67	15.66	3.21
April	2.60	1.14	2.70	4.62	22.73	16.02	15.88	3.15
May	2.62	1.12	2.74	4.57	22.88	15.92	15.79	3.17
June	2.67	1.10	2.74	4.58	22.87	15.89	15.77	3.18
July	2.71	1.08	2.64	4.74	22.85	15.72	15.35	3.07

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Other durables				Nondurable goods industries			
1960—August	2.72	1.10	2.68	4.66	22.90	15.72	15.61	2.86
September	2.77	1.08	2.67	4.60	22.87	15.67	15.78	2.77
October	2.71	1.07	2.51	4.47	22.95	15.52	15.47	2.66
November	2.71	1.05	2.65	4.45	22.93	15.44	15.42	2.57
December	2.72	1.06	2.50	4.29	22.85	15.51	15.48	2.52
1961—January	2.72	1.02	2.35	4.34	22.91	15.50	15.62	2.67
February	2.71	1.05	2.45	4.39	22.95	15.71	15.76	2.73
March	2.68	1.07	2.54	4.39	23.01	15.86	16.03	2.87
April	2.65	1.09	2.59	4.46	23.22	15.98	16.06	2.99
	Food and beverage				Tobacco			
1946	2.70	2.60	-------	-------	1.20	0.22	-------	-------
1947—January	3.33	3.07	-------	-------	1.23	.24	-------	-------
February	3.42	3.10	-------	-------	1.25	.25	-------	-------
March	3.50	3.30	-------	-------	1.27	.26	-------	-------
April	3.60	3.06	-------	-------	1.29	.23	-------	-------
May	3.67	3.12	-------	-------	1.29	.24	-------	-------
June	3.60	3.19	-------	-------	1.31	.24	-------	-------
July	3.59	3.15	-------	-------	1.31	.24	-------	-------
August	3.60	3.18	-------	-------	1.31	.24	-------	-------
September	3.63	3.23	-------	-------	1.28	.25	-------	-------
October	3.66	3.34	-------	-------	1.28	.23	-------	-------
November	3.70	3.31	-------	-------	1.31	.24	-------	-------
December	3.70	3.24	-------	-------	1.31	.24	-------	-------
1948—January	3.93	3.34	-------	-------	1.30	.24	-------	-------
February	3.85	3.31	-------	-------	1.29	.25	-------	-------
March	3.82	3.17	-------	-------	1.30	.24	-------	-------
April	3.76	3.35	-------	-------	1.34	.26	-------	-------
May	3.81	3.23	-------	-------	1.35	.25	-------	-------
June	3.86	3.34	-------	-------	1.38	.25	-------	-------
July	3.79	3.40	-------	-------	1.39	.26	-------	-------
August	3.75	3.39	-------	-------	1.45	.27	-------	-------
September	3.78	3.44	-------	-------	1.50	.25	-------	-------
October	3.79	3.37	-------	-------	1.53	.26	-------	-------
November	3.82	3.30	-------	-------	1.49	.27	-------	-------
December	3.85	3.26	-------	-------	1.47	.25	-------	-------
1949—January	3.75	3.16	-------	-------	1.48	.26	-------	-------
February	3.69	3.25	-------	-------	1.48	.26	-------	-------
March	3.69	3.28	-------	-------	1.47	.26	-------	-------
April	3.63	3.30	-------	-------	1.49	.27	-------	-------
May	3.59	3.21	-------	-------	1.49	.28	-------	-------
June	3.60	3.26	-------	-------	1.49	.26	-------	-------
July	3.55	3.12	-------	-------	1.44	.27	-------	-------
August	3.63	3.16	-------	-------	1.50	.26	-------	-------
September	3.61	3.15	-------	-------	1.52	.26	-------	-------
October	3.64	3.13	-------	-------	1.51	.27	-------	-------
November	3.61	3.06	-------	-------	1.48	.26	-------	-------
December	3.65	3.01	-------	-------	1.47	.26	-------	-------
1950—January	3.70	2.93	-------	-------	1.50	.27	-------	-------
February	3.64	3.08	-------	-------	1.49	.25	-------	-------
March	3.74	3.20	-------	-------	1.49	.26	-------	-------
April	3.76	3.19	-------	-------	1.50	.27	-------	-------
May	3.72	3.30	-------	-------	1.48	.26	-------	-------
June	3.65	3.33	-------	-------	1.47	.27	-------	-------
July	3.72	3.60	-------	-------	1.42	.30	-------	-------
August	3.86	3.70	-------	-------	1.52	.28	-------	-------
September	4.00	3.51	-------	-------	1.60	.27	-------	-------
October	4.00	3.46	-------	-------	1.62	.28	-------	-------
November	4.23	3.42	-------	-------	1.61	.28	-------	-------
December	4.40	3.73	-------	-------	1.60	.29	-------	-------

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Food and beverage				Tobacco			
1951—January	4.55	4.14			1.61	0.28		
February	4.52	3.94			1.62	.28		
March	4.67	3.83			1.64	.28		
April	4.95	3.67			1.65	.29		
May	4.92	3.83			1.65	.28		
June	4.93	3.69			1.66	.28		
July	4.99	3.68			1.64	.29		
August	5.04	3.76			1.67	.29		
September	5.00	3.86			1.67	.29		
October	4.99	3.93			1.72	.32		
November	4.98	3.93			1.77	.29		
December	4.92	3.83			1.76	.30		
1952—January	4.96	3.81			1.74	.30		
February	4.99	3.89			1.75	.28		
March	5.00	3.78			1.75	.32		
April	4.95	3.86			1.75	.31		
May	4.92	3.85			1 75	.31		
June	4.93	3.84			1.76	.32		
July	4.95	3.91			1.77	.31		
August	4.93	3.81			1.78	.33		
September	4.94	3.98			1.76	.32		
October	4.91	4.15			1.77	.31		
November	4.91	3.88			1.79	.34		
December	4.80	3.92			1.79	.33		
1953—January	4.95	3.84			1.95	.32		
February	4.79	3.73			1.92	.33		
March	4.58	3.92			1.88	.33		
April	4.47	3.87			1.84	.31		
May	4.39	3.80			1.79	.31		
June	4.36	3.82			1.74	.32		
July	4.48	3.93			1.71	.31		
August	4.62	3.87			1.75	.32		
September	4.67	3.96			1.82	.32		
October	4.75	3.94			1.88	.32		
November	4.85	3.84			1.85	.33		
December	4.78	3.88			1.91	.31		
1954—January	4.67	3.93			1.96	.31		
February	4.57	3.95			1.94	.31		
March	4.47	4.00			1.90	.32		
April	4.28	4.14			1.88	.31		
May	4.26	3.87			1.83	.32		
June	4.29	3.92			1.81	.31		
July	4.39	3.95			1.82	.32		
August	4.44	3.92			1.81	.32		
September	4.44	3.90			1.85	.32		
October	4.55	3.86			1.92	.31		
November	4.65	4.01			1.93	.31		
December	4.66	3.95			1.95	.30		
1955—January	4.45	3.99			1.89	.32		
February	4.43	3.96			1.89	.31		
March	4.47	4.00			1.87	.31		
April	4.49	4.03			1.89	.33		
May	4.50	4.03			1.87	.34		
June	4.51	4.12			1.91	.33		
July	4.50	4.10			1.87	.33		
August	4.49	4.02			1.86	.32		
September	4.48	4.07			1.84	.33		
October	4.57	3.96			1.85	.34		
November	4.52	3.98			1.85	.32		
December	4.49	4.03			1.84	.33		

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Food and beverage				Tobacco			
	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
1956—January	4.52	4.00	-------	-------	1.87	0.34	-------	-------
February	4.51	4.11	-------	-------	1.88	.34	-------	-------
March	4.51	4.03	-------	-------	1.90	.33	-------	-------
April	4.57	4.08	-------	-------	1.91	.34	-------	-------
May	4.61	4.19	-------	-------	1.88	.33	-------	-------
June	4.75	4.11	-------	-------	1.88	.32	-------	-------
July	4.73	4.08	-------	-------	1.86	.35	-------	-------
August	4.77	4.18	-------	-------	1.90	.33	-------	-------
September	4.83	4.11	-------	-------	1.87	.33	-------	-------
October	4.81	4.28	-------	-------	1.88	.35	-------	-------
November	4.81	4.24	-------	-------	1.90	.34	-------	-------
December	4.80	4.28	-------	-------	1.88	.37	-------	-------
1957—January	4.82	4.56	-------	-------	2.01	.36	-------	-------
February	4.87	4.45	-------	-------	2.03	.37	-------	-------
March	4.87	4.33	-------	-------	2.02	.35	-------	-------
April	4.88	4.32	-------	-------	2.05	.36	-------	-------
May	4.87	4.34	-------	-------	2.05	.35	-------	-------
June	4.88	4.18	-------	-------	2.06	.38	-------	-------
July	4.80	4.32	-------	-------	2.04	.38	-------	-------
August	4.81	4.36	-------	-------	2.03	.35	-------	-------
September	4.68	4.28	-------	-------	2.00	.38	-------	-------
October	4.73	4.33	-------	-------	1.98	.36	-------	-------
November	4.73	4.26	-------	-------	1.97	.35	-------	-------
December	4.69	4.34	-------	-------	1.92	.39	-------	-------
1958—January	4.63	4.41	-------	-------	1.81	.38	-------	-------
February	4.66	4.36	-------	-------	1.81	.36	-------	-------
March	4.69	4.33	-------	-------	1.89	.39	-------	-------
April	4.77	4.35	-------	-------	1.90	.37	-------	-------
May	4.76	4.42	-------	-------	1.88	.36	-------	-------
June	4.76	4.36	-------	-------	1.86	.38	-------	-------
July	4.71	4.37	-------	-------	1.84	.39	-------	-------
August	4.64	4.37	-------	-------	1.84	.37	-------	-------
September	4.60	4.31	-------	-------	1.84	.39	-------	-------
October	4.69	4.38	-------	-------	1.86	.39	-------	-------
November	4.68	4.44	-------	-------	1.86	.38	-------	-------
December	4.67	4.48	-------	-------	1.92	.41	-------	-------
1959—January	4.70	4.52	-------	-------	1.88	.43	-------	-------
February	4.75	4.48	-------	-------	1.89	.43	-------	-------
March	4.80	4.47	-------	-------	1.88	.42	-------	-------
April	4.87	4.51	-------	-------	1.87	.41	-------	-------
May	4.97	4.62	-------	-------	1.87	.39	-------	-------
June	4.93	4.61	-------	-------	1.82	.41	-------	-------
July	4.85	4.54	-------	-------	1.84	.38	-------	-------
August	4.83	4.51	-------	-------	1.87	.40	-------	-------
September	4.83	4.62	-------	-------	1.93	.41	-------	-------
October	4.81	4.61	-------	-------	1.96	.40	-------	-------
November	4.81	4.65	-------	-------	1.94	.44	-------	-------
December	4.79	4.70	-------	-------	1.98	.41	-------	-------
1960—January	4.81	4.78	-------	-------	1.98	.40	-------	-------
February	4.82	4.72	-------	-------	1.95	.43	-------	-------
March	4.82	4.71	-------	-------	1.95	.42	-------	-------
April	4.85	4.72	-------	-------	1.95	.39	-------	-------
May	5.00	4.63	-------	-------	1.96	.40	-------	-------
June	4.99	4.63	-------	-------	1.95	.40	-------	-------
July	4.94	4.63	-------	-------	1.94	.38	-------	-------
August	4.95	4.66	-------	-------	1.94	.41	-------	-------
September	4.98	4.69	-------	-------	2.00	.39	-------	-------
October	5.01	4.70	-------	-------	2.03	.39	-------	-------
November	4.96	4.66	-------	-------	2.02	.42	-------	-------
December	4.98	4.74	-------	-------	2.03	.39	-------	-------
1961—January	5.00	4.73	-------	-------	2.01	.41	-------	-------
February	5.01	4.87	-------	-------	1.98	.41	-------	-------
March	5.06	4.80	-------	-------	1.98	.42	-------	-------
April	5.14	4.80	-------	-------	1.98	.40	-------	-------

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Textile				Paper			
1946	1.61	0.90	-------	-------	0.50	0.37	-------	-------
1947—January	1.84	.97	-------	-------	.56	.46	-------	-------
February	1.85	.96	-------	-------	.58	.47	-------	-------
March	1.87	.98	-------	-------	.59	.44	-------	-------
April	1.91	.96	-------	-------	.61	.46	-------	-------
May	1.89	.96	-------	-------	.62	.48	-------	-------
June	1.89	.98	-------	-------	.63	.47	-------	-------
July	1.88	.98	-------	-------	.65	.47	-------	-------
August	1.86	1.02	-------	-------	.67	.48	-------	-------
September	1.84	1.01	-------	-------	.68	.52	-------	-------
October	1.82	1.02	-------	-------	.68	.54	-------	-------
November	1.92	1.06	-------	-------	.70	.48	-------	-------
December	1.97	1.08	-------	-------	.72	.51	-------	-------
1948—January	2.00	1.07	-------	-------	.71	.51	-------	-------
February	2.05	1.16	-------	-------	.72	.51	-------	-------
March	2.13	1.13	-------	-------	.73	.50	-------	-------
April	2.15	1.27	-------	-------	.74	.50	-------	-------
May	2.18	1.27	-------	-------	.75	.48	-------	-------
June	2.21	1.14	-------	-------	.76	.51	-------	-------
July	2.22	1.05	-------	-------	.79	.49	-------	-------
August	2.23	1.00	-------	-------	.79	.52	-------	-------
September	2.21	.97	-------	-------	.80	.54	-------	-------
October	2.20	.99	-------	-------	.80	.52	-------	-------
November	2.18	.94	-------	-------	.81	.50	-------	-------
December	2.20	.92	-------	-------	.81	.49	-------	-------
1949—January	2.21	.92	-------	-------	.80	.46	-------	-------
February	2.20	.95	-------	-------	.79	.45	-------	-------
March	2.19	.93	-------	-------	.79	.45	-------	-------
April	2.13	.95	-------	-------	.78	.42	-------	-------
May	2.10	.92	-------	-------	.79	.41	-------	-------
June	2.02	.89	-------	-------	.77	.43	-------	-------
July	1.97	.86	-------	-------	.74	.40	-------	-------
August	1.92	.87	-------	-------	.73	.46	-------	-------
September	1.86	.94	-------	-------	.70	.51	-------	-------
October	1.90	.98	-------	-------	.69	.50	-------	-------
November	1.96	.92	-------	-------	.67	.50	-------	-------
December	1.99	.93	-------	-------	.67	.48	-------	-------
1950—January	1.98	.97	-------	-------	.68	.48	-------	-------
February	2.02	.98	-------	-------	.68	.50	-------	-------
March	2.06	.97	-------	-------	.68	.54	-------	-------
April	2.07	.98	-------	-------	.69	.52	-------	-------
May	2.11	1.04	-------	-------	.70	.55	-------	-------
June	2.14	1.06	-------	-------	.70	.57	-------	-------
July	2.11	1.22	-------	-------	.70	.57	-------	-------
August	2.11	1.31	-------	-------	.70	.64	-------	-------
September	2.19	1.20	-------	-------	.72	.62	-------	-------
October	2.37	1.25	-------	-------	.74	.64	-------	-------
November	2.55	1.21	-------	-------	.75	.67	-------	-------
December	2.64	1.31	-------	-------	.78	.68	-------	-------
1951—January	2.81	1.32	-------	-------	.81	.68	-------	-------
February	2.91	1.38	-------	-------	.81	.69	-------	-------
March	3.08	1.32	-------	-------	.84	.73	-------	-------
April	3.25	1.28	-------	-------	.86	.74	-------	-------
May	3.35	1.38	-------	-------	.88	.76	-------	-------
June	3.37	1.30	-------	-------	.92	.74	-------	-------
July	3.37	1.20	-------	-------	.96	.69	-------	-------
August	3.31	1.17	-------	-------	.99	.72	-------	-------
September	3.20	1.14	-------	-------	.99	.67	-------	-------
October	3.15	1.12	-------	-------	1.01	.69	-------	-------
November	3.11	1.11	-------	-------	1.00	.68	-------	-------
December	3.05	1.16	-------	-------	1.02	.63	-------	-------

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Textile				Paper			
	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
1952—January	2.98	1.12	--------	----------	1.05	0.67	--------	----------
February	2.88	1.09	--------	----------	1.06	.66	--------	----------
March	2.82	1.12	--------	----------	1.06	.64	--------	----------
April	2.76	1.09	--------	----------	1.07	.65	--------	----------
May	2.70	1.10	--------	----------	1.05	.64	--------	----------
June	2.64	1.12	--------	----------	1.04	.63	--------	----------
July	2.61	1.12	--------	----------	1.03	.66	--------	----------
August	2.59	1.13	--------	----------	1.01	.65	--------	----------
September	2.59	1.12	--------	----------	1.00	.67	--------	----------
October	2.56	1.20	--------	----------	.99	.69	--------	----------
November	2.59	1.21	--------	----------	.97	.65	--------	----------
December	2.57	1.13	--------	----------	.98	.67	--------	----------
1953—January	2.48	1.14	--------	----------	.97	.69	--------	----------
February	2.55	1.13	--------	----------	.99	.69	--------	----------
March	2.58	1.13	--------	----------	1.00	.68	--------	----------
April	2.61	1.19	--------	----------	.99	.71	--------	----------
May	2.67	1.18	--------	----------	.99	.70	--------	----------
June	2.69	1.10	--------	----------	.99	.71	--------	----------
July	2.62	1.15	--------	----------	.98	.72	--------	----------
August	2.54	1.09	--------	----------	.98	.70	--------	----------
September	2.53	1.03	--------	----------	.97	.71	--------	----------
October	2.46	1.03	--------	----------	.96	.70	--------	----------
November	2.44	.96	--------	----------	.98	.69	--------	----------
December	2.42	.93	--------	----------	.99	.68	--------	----------
1954—January	2.43	.95	--------	----------	.99	.68	--------	----------
February	2.46	.98	--------	----------	1.01	.69	--------	----------
March	2.46	.98	--------	----------	1.03	.71	--------	----------
April	2.45	.99	--------	----------	1.03	.71	--------	----------
May	2.48	1.00	--------	----------	1.02	.70	--------	----------
June	2.48	1.00	--------	----------	1.03	.72	--------	----------
July	2.46	1.03	--------	----------	1.00	.72	--------	----------
August	2.39	1.03	--------	----------	.99	.72	--------	----------
September	2.40	1.05	--------	----------	.98	.73	--------	----------
October	2.34	1.04	--------	----------	.99	.72	--------	----------
November	2.37	1.06	--------	----------	1.00	.74	--------	----------
December	2.40	1.07	--------	----------	1.01	.75	--------	----------
1955—January	2.46	1.11	--------	----------	1.02	.76	--------	----------
February	2.42	1.10	--------	----------	1.03	.76	--------	----------
March	2.41	1.10	--------	----------	1.02	.79	--------	----------
April	2.45	1.12	--------	----------	1.03	.78	--------	----------
May	2.48	1.13	--------	----------	1.03	.81	--------	----------
June	2.47	1.12	--------	----------	1.05	.82	--------	----------
July	2.49	1.17	--------	----------	1.06	.82	--------	----------
August	2.63	1.13	--------	----------	1.06	.85	--------	----------
September	2.53	1.16	--------	----------	1.07	.87	--------	----------
October	2.47	1.14	--------	----------	1.10	.86	--------	----------
November	2.50	1.17	--------	----------	1.10	.88	--------	----------
December	2.52	1.17	--------	----------	1.10	.90	--------	----------
1956—January	2.54	1.21	--------	----------	1.14	.89	--------	----------
February	2.52	1.18	--------	----------	1.15	.92	--------	----------
March	2.46	1.15	--------	----------	1.17	.89	--------	----------
April	2.51	1.19	--------	----------	1.19	.91	--------	----------
May	2.54	1.17	--------	----------	1.21	.91	--------	----------
June	2.55	1.16	--------	----------	1.25	.89	--------	----------
July	2.58	1.15	--------	----------	1.29	.90	--------	----------
August	2.61	1.13	--------	----------	1.32	.89	--------	----------
September	2.65	1.13	--------	----------	1.32	.86	--------	----------
October	2.68	1.17	--------	----------	1.33	.90	--------	----------
November	2.67	1.11	--------	----------	1.34	.89	--------	----------
December	2.71	1.15	--------	----------	1.35	.87	--------	----------
1957—January	2.77	1.17	--------	----------	1.36	.94	--------	----------
February	2.69	1.25	--------	----------	1.40	.88	--------	----------
March	2.69	1.14	--------	----------	1.43	.86	--------	----------
April	2.63	1.07	--------	----------	1.44	.92	--------	----------
May	2.63	1.08	--------	----------	1.45	.91	--------	----------
June	2.61	1.06	--------	----------	1.44	.88	--------	----------
July	2.64	1.09	--------	----------	1.43	.90	--------	----------
August	2.65	1.07	--------	----------	1.43	.92	--------	----------
September	2.63	1.04	--------	----------	1.41	.93	--------	----------
October	2.63	1.03	--------	----------	1.42	.92	--------	----------
November	2.63	1.03	--------	----------	1.42	.86	--------	----------
December	2.68	1.00	--------	----------	1.44	.86	--------	----------

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Textile				Paper			
1958—January	2.69	0.99			1.44	0.89		
February	2.66	1.00			1.45	.88		
March	2.63	1.00			1.45	.89		
April	2.61	1.02			1.47	.87		
May	2.58	.99			1.46	.90		
June	2.57	1.03			1.46	.90		
July	2.55	1.06			1.41	.94		
August	2.52	1.08			1.42	.94		
September	2.49	1.03			1.41	.95		
October	2.49	1.04			1.42	.95		
November	2.46	1.10			1.42	.94		
December	2.44	1.08			1.44	.96		
1959—January	2.45	1.10			1.46	.94		
February	2.46	1.14			1.45	.98		
March	2.46	1.20			1.46	.99		
April	2.48	1.25			1.46	1.03		
May	2.49	1.31			1.48	1.03		
June	2.53	1.28			1.49	1.04		
July	2.53	1.26			1.46	1.06		
August	2.50	1.25			1.47	1.01		
September	2.52	1.22			1.49	1.03		
October	2.54	1.20			1.48	1.01		
November	2.54	1.21			1.50	.99		
December	2.53	1.26			1.51	1.06		
1960—January	2.58	1.26			1.53	1.01		
February	2.65	1.26			1.54	1.07		
March	2.67	1.20			1.54	1.05		
April	2.72	1.26			1.55	1.03		
May	2.71	1.29			1.58	1.04		
June	2.70	1.27			1.59	1.05		
July	2.69	1.23			1.61	1.08		
August	2.67	1.20			1.63	1.09		
September	2.64	1.20			1.64	1.09		
October	2.64	1.15			1.65	1.04		
November	2.66	1.13			1.65	1.05		
December	2.67	1.14			1.63	1.06		
1961—January	2.70	1.08			1.62	1.06		
February	2.73	1.10			1.63	1.08		
March	2.76	1.16			1.62	1.10		
April	2.76	1.20			1.64	1.14		
	Chemical				Petroleum and coal			
1946	1.57	0.91			1.29	0.86		
1947—January	1.89	1.07			1.48	1.00		
February	1.93	1.10			1.49	1.03		
March	1.97	1.12			1.52	1.08		
April	2.03	1.15			1.54	1.12		
May	2.08	1.12			1.56	1.19		
June	2.10	1.11			1.57	1.21		
July	2.12	1.14			1.61	1.25		
August	2.15	1.10			1.63	1.25		
September	2.15	1.19			1.64	1.32		
October	2.14	1.22			1.66	1.36		
November	2.19	1.18			1.68	1.40		
December	2.19	1.21			1.70	1.48		
1948—January	2.13	1.16			1.76	1.52		
February	2.16	1.16			1.81	1.56		
March	2.20	1.17			1.84	1.57		
April	2.18	1.23			1.88	1.58		
May	2.20	1.16			1.93	1.58		
June	2.17	1.24			1.97	1.63		
July	2.21	1.20			2.03	1.64		
August	2.20	1.23			2.08	1.68		
September	2.21	1.21			2.12	1.69		
October	2.21	1.18			2.18	1.68		
November	2.22	1.22			2.24	1.68		
December	2.21	1.23			2.27	1.69		

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Chemical				Petroleum and coal			
	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
1949—January	2.22	1.13	--------	----------	2.33	1.46	--------	----------
February	2.23	1.12	--------	----------	2.40	1.45	--------	----------
March	2.21	1.12	--------	----------	2.38	1.48	--------	----------
April	2.18	1.09	--------	----------	2.41	1.46	--------	----------
May	2.13	1.07	--------	----------	2.40	1.43	--------	----------
June	2.07	1.12	--------	----------	2.38	1.43	--------	----------
July	2.08	1.06	--------	----------	2.38	1.42	--------	----------
August	2.06	1.14	--------	----------	2.32	1.51	--------	----------
September	2.04	1.14	--------	----------	2.28	1.52	--------	----------
October	2.01	1.10	--------	----------	2.28	1.48	--------	----------
November	2.02	1.13	--------	----------	2.24	1.54	--------	----------
December	2.02	1.10	--------	----------	2.21	1.46	--------	----------
1950—January	1.99	1.13	--------	----------	2.21	1.39	--------	----------
February	2.00	1.15	--------	----------	2.18	1.42	--------	----------
March	1.99	1.25	--------	----------	2.10	1.51	--------	----------
April	2.00	1.21	--------	----------	2.05	1.50	--------	----------
May	2.04	1.29	--------	----------	2.03	1.57	--------	----------
June	2.05	1.35	--------	----------	2.01	1.63	--------	----------
July	2.05	1.39	--------	----------	2.01	1.68	--------	----------
August	2.06	1.56	--------	----------	1.97	1.73	--------	----------
September	2.12	1.48	--------	----------	2.00	1.72	--------	----------
October	2.20	1.51	--------	----------	2.04	1.66	--------	----------
November	2.31	1.54	--------	----------	2.05	1.76	--------	----------
December	2.41	1.59	--------	----------	2.05	1.78	--------	----------
1951—January	2.45	1.59	--------	----------	2.09	1.89	--------	----------
February	2.52	1.54	--------	----------	2.13	1.86	--------	----------
March	2.59	1.61	--------	----------	2.16	1.94	--------	----------
April	2.68	1.56	--------	----------	2.20	1.89	--------	----------
May	2.75	1.58	--------	----------	2.25	2.00	--------	----------
June	2.73	1.55	--------	----------	2.31	1.96	--------	----------
July	2.79	1.52	--------	----------	2.34	1.96	--------	----------
August	2.84	1.55	--------	----------	2.37	1.99	--------	----------
September	2.88	1.44	--------	----------	2.39	1.96	--------	----------
October	2.93	1.50	--------	----------	2.41	2.01	--------	----------
November	2.95	1.52	--------	----------	2.42	2.10	--------	----------
December	2.97	1.47	--------	----------	2.44	2.00	--------	----------
1952—January	2.98	1.47	--------	----------	2.42	1.97	--------	----------
February	3.00	1.51	--------	----------	2.42	2.03	--------	----------
March	3.02	1.46	--------	----------	2.46	1.98	--------	----------
April	3.01	1.50	--------	----------	2.46	2.91	--------	----------
May	3.01	1.46	--------	----------	2.36	1.91	--------	----------
June	2.97	1.45	--------	----------	2.41	1.98	--------	----------
July	2.94	1.50	--------	----------	2.43	1.99	--------	----------
August	2.95	1.49	--------	----------	2.44	1.94	--------	----------
September	2.93	1.57	--------	----------	2.49	2.02	--------	----------
October	2.93	1.60	--------	----------	2.49	2.05	--------	----------
November	2.94	1.51	--------	----------	2.53	2.03	--------	----------
December	2.94	1.57	--------	----------	2.53	2.10	--------	----------
1953—January	2.95	1.55	--------	----------	2.55	2.06	--------	----------
February	2.94	1.58	--------	----------	2.55	2.05	--------	----------
March	2.93	1.60	--------	----------	2.56	2.06	--------	----------
April	2.89	1.61	--------	----------	2.56	2.12	--------	----------
May	2.88	1.57	--------	----------	2.62	2.13	--------	----------
June	2.92	1.60	--------	----------	2.61	2.21	--------	----------
July	2.88	1.64	--------	----------	2.67	2.26	--------	----------
August	2.89	1.54	--------	----------	2.75	2.16	--------	----------
September	2.87	1.55	--------	----------	2.76	2.22	--------	----------
October	2.86	1.53	--------	----------	2.77	2.17	--------	----------
November	2.88	1.51	--------	----------	2.77	2.15	--------	----------
December	2.98	1.52	--------	----------	2.71	2.15	--------	----------
1954—January	2.95	1.52	--------	----------	2.74	2.21	--------	----------
February	2.93	1.55	--------	----------	2.64	2.20	--------	----------
March	2.90	1.57	--------	----------	2.63	2.25	--------	----------
April	2.87	1.58	--------	----------	2.66	2.28	--------	----------
May	2.82	1.54	--------	----------	2.73	2.28	--------	----------
June	2.86	1.58	--------	----------	2.74	2.31	--------	----------
July	2.84	1.59	--------	----------	2.76	2.32	--------	----------
August	2.79	1.59	--------	----------	2.77	2.32	--------	----------
September	2.76	1.62	--------	----------	2.78	2.32	--------	----------
October	2.84	1.59	--------	----------	2.78	2.32	--------	----------
November	2.90	1.67	--------	----------	2.74	2.39	--------	----------
December	2.99	1.68	--------	----------	2.64	2.39	--------	----------

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Chemical				Petroleum and coal			
1955—January	2.99	1.68			2.70	2.42		
February	3.00	1.69			2.73	2.45		
March	2.98	1.77			2.69	2.46		
April	2.94	1.77			2.71	2.45		
May	2.96	1.80			2.74	2.47		
June	2.94	1.82			2.75	2.52		
July	3.01	1.75			2.75	2.49		
August	3.04	1.81			2.76	2.56		
September	3.08	1.85			2.77	2.61		
October	3.14	1.80			2.81	2.57		
November	3.16	1.84			2.78	2.61		
December	3.21	1.85			2.79	2.62		
1956—January	3.21	1.88			2.80	2.65		
February	3.30	1.87			2.89	2.67		
March	3.32	1.82			2.88	2.68		
April	3.35	1.84			2.92	2.66		
May	3.39	1.95			2.96	2.69		
June	3.38	1.86			3.03	2.63		
July	3.47	1.89			3.10	2.65		
August	3.48	1.93			3.12	2.67		
September	3.50	1.88			3.17	2.63		
October	3.56	1.98			3.20	2.73		
November	3.58	1.94			3.19	2.76		
December	3.59	1.94			3.25	2.79		
1957—January	3.59	2.00			3.13	3.24		
February	3.64	1.93			3.20	2.96		
March	3.68	1.91			3.26	2.93		
April	3.73	1.89			3.27	3.03		
May	3.73	2.00			3.38	2.96		
June	3.69	1.89			3.49	2.78		
July	3.73	2.01			3.49	2.99		
August	3.74	2.01			3.52	2.92		
September	3.74	1.95			3.60	2.80		
October	3.73	2.00			3.62	2.90		
November	3.76	1.94			3.66	2.72		
December	3.82	1.89			3.64	2.65		
1958—January	3.82	1.84			3.62	2.77		
February	3.85	1.78			3.54	2.76		
March	3.88	1.75			3.51	2.60		
April	3.84	1.83			3.44	2.59		
May	3.80	1.88			3.38	2.66		
June	3.75	1.90			3.35	2.68		
July	3.72	1.98			3.31	2.81		
August	3.73	2.00			3.27	2.79		
September	3.75	2.07			3.27	2.86		
October	3.76	2.08			3.28	2.90		
November	3.77	2.02			3.32	2.82		
December	3.74	2.00			3.26	2.97		
1959—January	3.73	1.93			3.28	3.04		
February	3.73	1.93			3.31	3.04		
March	3.70	1.98			3.32	3.05		
April	3.70	2.09			3.37	3.08		
May	3.73	2.09			3.38	2.99		
June	3.77	2.13			3.37	3.10		
July	3.85	2.17			3.31	3.09		
August	3.91	2.16			3.33	3.07		
September	3.97	2.27			3.27	3.30		
October	4.04	2.22			3.30	3.04		
November	4.04	2.24			3.28	3.18		
December	4.03	2.38			3.32	3.11		
1960—January	4.03	2.26			3.41	3.08		
February	4.05	2.38			3.40	3.13		
March	4.06	2.30			3.33	3.16		
April	4.08	2.38			3.35	3.26		
May	4.08	2.35			3.34	3.18		
June	4.11	2.35			3.30	3.18		
July	4.14	2.30			3.29	3.19		
August	4.18	2.33			3.29	3.17		
September	4.16	2.30			3.26	3.20		
October	4.18	2.26			3.28	3.23		
November	4.18	2.22			3.30	3.19		
December	4.13	2.26			3.31	3.22		
1961—January	4.17	2.26			3.29	3.23		
February	4.19	2.30			3.32	3.18		
March	4.19	2.38			3.37	3.08		
April	4.26	2.40			3.37	3.25		

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variaton]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Rubber				Other nondurables			
1946	0.41	0.26			1.66	1.52		
1947—January	.49	.29			1.98	1.54		
February	.50	.31			2.02	1.55		
March	.52	.30			2.05	1.63		
April	.55	.29			2.11	1.61		
May	.56	.28			2.10	1.73		
June	.56	.26			2.11	1.75		
July	.56	.28			2.09	1.66		
August	.56	.27			2.21	1.64		
September	.55	.28			2.23	1.63		
October	.56	.29			2.23	1.71		
November	.55	.29			2.35	1.80		
December	.57	.27			2.42	1.77		
1948—January	.57	.27			2.36	1.85		
February	.58	.27			2.40	1.76		
March	.60	.27			2.48	1.79		
April	.59	.28			2.55	1.79		
May	.59	.28			2.64	1.80		
June	.60	.29			2.64	1.85		
July	.61	.31			2.70	1.68		
August	.62	.30			2.70	1.84		
September	.64	.28			2.66	1.83		
October	.64	.27			2.66	1.73		
November	.65	.27			2.55	1.75		
December	.65	.27			2.51	1.54		
1949—January	.63	.26			2.48	1.72		
February	.62	.26			2.44	1.77		
March	.62	.26			2.35	1.84		
April	.62	.25			2.30	1.78		
May	.62	.25			2.35	1.68		
June	.61	.26			2.35	1.64		
July	.60	.26			2.32	1.57		
August	.58	.28			2.28	1.72		
September	.57	.25			2.29	1.73		
October	.55	.25			2.28	1.72		
November	.56	.24			2.31	1.56		
December	.57	.24			2.31	1.62		
1950—January	.54	.23			2.41	1.65		
February	.56	.25			2.40	1.74		
March	.56	.29			2.44	1.70		
April	.55	.27			2.48	1.74		
May	.56	.30			2.54	1.76		
June	.56	.33			2.61	1.66		
July	.53	.42			2.62	1.94		
August	.50	.40			2.63	1.98		
September	.53	.37			2.74	1.90		
October	.55	.38			2.90	1.94		
November	.57	.39			3.02	1.89		
December	.55	.42			3.11	1.94		
1951—January	.57	.40			3.12	2.02		
February	.57	.40			3.16	1.99		
March	.57	.45			3.23	1.97		
April	.56	.41			3.32	1.96		
May	.59	.41			3.32	1.93		
June	.61	.41			3.34	1.88		
July	.63	.41			3.38	2.02		
August	.65	.41			3.33	1.99		
September	.67	.39			3.27	2.00		
October	.72	.42			3.19	1.98		
November	.72	.43			3.12	1.90		
December	.77	.36			3.09	1.87		

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Rubber				Other nondurables			
	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
1952—January	0.81	0.41			3.28	1.97		
February	.84	.41			3.26	1.95		
March	.85	.40			3.21	1.99		
April	.85	.41			3.17	2.08		
May	.84	.41			3.09	2.00		
June	.84	.41			3.03	1.89		
July	.87	.39			3.04	1.90		
August	.86	.40			3.02	1.95		
September	.85	.43			2.96	2.05		
October	.84	.43			2.93	2.16		
November	.82	.39			2.94	2.02		
December	.85	.42			2.94	2.06		
1953—January	.86	.44			2.93	2.04		
February	.85	.44			2.92	2.03		
March	.87	.44			2.94	2.01		
April	.89	.43			3.00	1.99		
May	.91	.43			3.05	2.03		
June	.91	.43			3.15	2.02		
July	.88	.44			3.14	2.02		
August	.85	.42			3.02	2.08		
September	.85	.41			2.89	2.06		
October	.82	.40			2.72	2.07		
November	.84	.36			2.71	1.97		
December	.84	.38			2.82	2.01		
1954—January	.84	.37			2.88	2.03		
February	.85	.37			2.90	2.02		
March	.85	.38			2.84	2.00		
April	.84	.39			2.97	2.02		
May	.84	.38			2.90	1.92		
June	.84	.39			3.05	2.03		
July	.78	.39			3.07	2.07		
August	.74	.37			2.99	2.07		
September	.77	.37			2.88	2.05		
October	.80	.36			2.76	2.03		
November	.81	.42			2.75	2.03		
December	.84	.43			2.68	2.06		
1955—January	.81	.45			2.76	2.11		
February	.82	.46			2.75	2.09		
March	.81	.47			2.76	2.17		
April	.83	.46			2.77	2.13		
May	.84	.47			2.81	2.17		
June	.88	.47			2.80	2.14		
July	.87	.48			2.80	2.21		
August	.89	.49			2.81	2.18		
September	.91	.49			2.82	2.18		
October	.92	.48			2.84	2.22		
November	.94	.51			2.84	2.22		
December	.96	.48			2.79	2.29		
1956—January	.99	.46			2.82	2.32		
February	1.01	.47			2.84	2.30		
March	1.01	.46			2.87	2.24		
April	1.02	.47			2.90	2.32		
May	1.02	.48			2.97	2.28		
June	1.01	.47			2.99	2.32		
July	1.01	.47			3.01	2.32		
August	1.05	.47			3.03	2.27		
September	1.04	.46			3.01	2.31		
October	1.04	.48			3.03	2.42		
November	1.04	.46			3.04	2.45		
December	1.04	.47			3.01	2.46		
1957—January	1.05	.50			3.07	2.25		
February	1.04	.50			3.09	2.40		
March	1.03	.48			3.17	2.23		
April	1.03	.49			3.18	2.34		
May	1.02	.48			3.22	2.21		
June	1.03	.46			3.21	2.30		
July	1.05	.51			3.22	2.26		
August	1.07	.51			3.23	2.20		
September	1.07	.48			3.21	2.22		
October	1.10	.49			3.14	2.11		
November	1.10	.43			3.10	2.09		
December	1.09	.43			3.08	2.04		

TABLE II–3.—*Manufacturing inventory stocks by industry breakdown*—Continued

[As reported by the Office of Business Economics in billions of dollars, adjusted for seasonal variation]

	Inventory	Sales	New orders	Unfilled orders	Inventory	Sales	New orders	Unfilled orders
	Rubber				Other nondurables			
1958—January	1.10	.045	----	----	3.07	1.98	----	----
February	1.09	.41	----	----	3.04	1.95	----	----
March	1.07	.40	----	----	3.04	1.92	----	----
April	1.05	.43	----	----	3.00	1.95	----	----
May	1.02	.43	----	----	3.04	1.94	----	----
June	.99	.45	----	----	3.01	1.97	----	----
July	.98	.48	----	----	2.95	2.01	----	----
August	1.02	.44	----	----	2.91	2.01	----	----
September	1.02	.46	----	----	2.87	2.01	----	----
October	1.02	.49	----	----	2.88	1.99	----	----
November	1.02	.47	----	----	2.90	2.01	----	----
December	.99	.52	----	----	2.89	2.10	----	----
1959—January	1.00	.51	----	----	2.89	2.13	----	----
February	1.02	.49	----	----	2.90	2.13	----	----
March	1.03	.51	----	----	2.89	2.13	----	----
April	1.02	.54	----	----	2.93	2.18	----	----
May	1.00	.52	----	----	2.95	2.28	----	----
June	1.01	.52	----	----	2.99	2.39	----	----
July	1.08	.52	----	----	2.98	2.45	----	----
August	1.11	.49	----	----	2.95	2.37	----	----
September	1.11	.54	----	----	2.98	2.31	----	----
October	1.12	.56	----	----	3.04	2.32	----	----
November	1.12	.48	----	----	3.04	2.30	----	----
December	1.14	.50	----	----	3.05	2.37	----	----
1960—January	1.14	.53	----	----	3.07	2.34	----	----
February	1.14	.57	----	----	3.07	2.35	----	----
March	1.16	.51	----	----	3.05	2.32	----	----
April	1.19	.53	----	----	3.04	2.45	----	----
May	1.18	.55	----	----	3.03	2.49	----	----
June	1.20	.52	----	----	3.02	2.48	----	----
July	1.23	.48	----	----	3.02	2.44	----	----
August	1.24	.48	----	----	2.99	2.40	----	----
September	1.20	.51	----	----	3.00	2.30	----	----
October	1.16	.49	----	----	3.01	2.25	----	----
November	1.14	.50	----	----	3.03	2.28	----	----
December	1.12	.47	----	----	3.02	2.22	----	----
1961—January	1.13	.45	----	----	2.99	2.28	----	----
February	1.13	.46	----	----	2.96	2.31	----	----
March	1.12	.49	----	----	2.93	2.42	----	----
April	1.13	.48	----	----	2.94	2.31	----	----

Source: Department of Commerce, Office of Business Economics, *Survey of Current Business*. See note on table II–2. The Industry Survey sample coverage in March 1961 averaged 50 percent in the preliminary report and 67 percent in the final report. However, there was great variation in coverage between industry groups, with motor vehicles and equipment close to 100 percent and the following groups about 12 percent in the preliminary report and about 25 percent in the final report: lumber, printing and publishing, and apparel.

"Other durable" figures for inventory and sales are not comparable with those for new and unfilled orders because the latter include (1) lumber and furniture, (2) stone, clay, and glass.

TABLE II–4.—*Inventory stocks of all manufacturing corporations*

[As reported by Federal Trade Commission-Securities and Exchange Commission, not seasonally adjusted, in billions of dollars]

	1st sample	2d sample		2d sample	3d sample
1947:			1954:		
1st quarter	24.73	----------	1st quarter	44.84	----------
2d quarter	25.22	----------	2d quarter	43.61	----------
3d quarter	25.52	----------	3d quarter	42.76	----------
4th quarter	26.47	----------	4th quarter	43.29	----------
1948:			1955:		
1st quarter	27.58	----------	1st quarter	43.40	----------
2d quarter	28.04	----------	2d quarter	43.61	----------
3d quarter	28.88	----------	3d quarter	44.20	----------
4th quarter	29.72	----------	4th quarter	46.95	----------
1949:			1956:		
1st quarter	29.44	----------	1st quarter	49.03	50.27
2d quarter	27.83	----------	2d quarter	50.63	51.91
3d quarter	26.21	----------	3d quarter	----------	52.72
4th quarter	26.43	----------	4th quarter	----------	54.79
1950:			1957:		
1st quarter	26.28	----------	1st quarter	----------	56.10
2d quarter	26.69	----------	2d quarter	----------	56.40
3d quarter	27.46	----------	3d quarter	----------	56.12
4th quarter	31.22	----------	4th quarter	----------	56.30
1951:			1958:		
1st quarter	33.09	36.75	1st quarter	----------	55.22
2d quarter	35.94	39.92	2d quarter	----------	53.13
3d quarter	37.33	41.63	3d quarter	----------	52.03
4th quarter	----------	43.40	4th quarter	----------	53.00
1952:			1959:		
1st quarter	----------	43.85	1st quarter	----------	54.59
2d quarter	----------	42.90	2d quarter	----------	55.80
3d quarter	----------	42.74	3d quarter	----------	55.84
4th quarter	----------	44.13	4th quarter	----------	57.92
1953:			1960:		
1st quarter	----------	44.14	1st quarter	----------	60.16
2d quarter	----------	44.61	2d quarter	----------	60.53
3d quarter	----------	44.92	3d quarter	----------	60.49
4th quarter	----------	44.97	4th quarter	----------	60.38
			1961:		
			1st quarter	----------	61.30

Source: Federal Trade Commission and Securities and Exchange Commission, *Quarterly Financial Report for Manufacturing Corporations*. The series has been prepared jointly by the Federal Trade Commission and the Securities and Exchange Commission on a quarterly basis since 1947. A probability sample is drawn from a composite frame composed of (1) the Internal Revenue Service's sample of U.S. corporation income tax forms 1120 filed by enterprises classified as "manufacturing corporations" (except newspapers), and (2) all applications for a Federal social security employer's identification number filed by manufacturing corporations. Proper screening techniques have been used to insure that the 2 parts of the frame are mutually exclusive.

One-eighth of the 1st sample segment (corporations with assets of less than $5,000,000) is replaced each quarter. The introduction each quarter of all corporate births, deaths, acquisitions, spinoffs, mergers, consolidations, etc., modifies the composition of the sample. 2 major changes have been made in the sample: (1) at the end of 1951 and (2) in the 2d quarter of 1956. There has been no revision of the data supplied by earlier samples, but overlap indicates the movement over the full period.

Corporations selected from this sample submit a consolidated report covering all subsidiaries and affiliates whether engaged in manufacturing or not. This practice tends to blur the industry classifications, but it eliminates the multiple counting of all interplant and other intracompany transfers included in establishment statistics and, to the fullest extent possible, eliminates the multiple counting of all intercorporate transfers included in statistics based on unconsolidated or partly consolidated reports from multicorporate enterprises.

Inventory figures, stated both as stock and as a percent of total assets, are available in classifications based on the (1) asset size of corporations and (2) 29 industry classifications.

No adjustment for seasonal variation is made to this series. The only adjustment in an enlargement, principally in the aircraft industry, to account for the practice of applying U.S. Government "progress payments" (partial payments made after the completion of portions of a contract) against goods in process, which thereby subtracts artificially from inventory. In 1958 this adjustment came to $1,100,000,000.

TABLE II–5.—*Manufacturers' stocks of home goods*

[As reported by the Federal Reserve, seasonally adjusted and stated as percent of the 1957 level]

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1952	86.3	87.8	85.3	82.5	79.6	72.2	64.2	61.9	60.1	56.9	58.9	61.9
1953	69.0	72.1	75.7	78.9	82.1	83.9	87.5	87.7	87.2	90.7	89.6	88.5
1954	86.4	85.8	83.9	81.2	79.0	79.7	78.8	77.9	79.1	78.9	81.3	82.0
1955	82.1	82.2	83.6	85.6	85.5	86.5	85.8	86.2	84.5	84.5	85.5	87.3
1956	90.7	94.2	97.6	100.8	102.0	101.7	102.4	102.2	103.1	103.9	101.7	101.4
1957	103.0	101.6	101.1	98.9	95.8	97.6	98.2	101.5	100.8	102.4	101.6	97.4
1958	95.4	93.4	91.3	88.5	85.3	83.9	84.6	82.5	81.4	78.6	81.5	82.0
1959	85.6	88.3	90.1	92.2	92.9	92.8	93.2	94.8	93.5	89.6	86.9	93.9
1960	100.0	104.4	103.6	103.4	104.2	107.6	106.0	107.6	105.2	100.8	97.5	96.8
1961	98.9	99.0	97.5	96.6	95.5	-------	-------	-------	-------	-------	-------	-------

Source: This index represents changes in the physical volume of stocks reported by manufacturers of major home goods held at warehouses and branches and wholesale distributors. It has been compiled by the Federal Reserve back to January 1952 on the basis of end-of-month figures. The index is published only in chart form in the Federal Reserve monthly chart book.

The total index is a weighted combination of 3 separate groups with the following relative importance: appliances (56), television sets (22), and furniture and carpets (22). Except for the furniture series, which is calculated from deflated value figures, the data used in the index are based on physical quantities.

The weights for the total index were developed on an experimental basis to reflect, largely, the relative importance of stocks held in 1955 by establishments engaged in the production of these goods at the manufacturer and wholesaler levels. Some consideration was also given to the relative importance of the manufacturing establishments holding these stocks in home goods production as a whole, because a major interest in the index lies in its indicative value for production developments. In addition, some extra weight was given to the appliance and TV groups because the data for those groups are more broadly reported than for furniture and carpets.

Apart from the deflation problem involved, the furniture series is from a sample representing quite a small percentage of the industry. This series has been subject to annual benchmark adjustments to deflated annual survey of manufactures data on inventories of finished products held by the household furniture industry. Also, the carpet series was based on woven wool carpets only and was derived from a comparison of shipments and production data. Since August 1960, the carpet series has not been available even on this basis, and the whole furniture and carpet group has been moved by the furniture sample alone.

The television series is based on the sum of manufacturers' and wholesalers' holdings as reported by the Electronic Industries Association. The appliance group is a combination of the following 14 series, derived from various trade association and Bureau of Census data, and weighted as indicated:

	Source
Manufacturers (35):	
Gas ranges (2)	Gas Appliance Manufacturers Association.
Electric ranges (2)	National Electrical Manufacturers Association.
Refrigerators (10)	Do.
Freezers (2)	Do.
Washing machines (5)	American Home Laundry Manufacturers Association.
Driers (2)	Do.
Gas water heaters (2)	GAMA.
Electric water heaters (2)	NEMA.
Furnaces, oil burners, and heating stoves (8).	Census CIR (FR combination).
Wholesalers (21):	
Electric ranges (2)	NEMA.
Refrigerators (8)	NEMA.
Freezers (2)	NEMA.
Washing machines (7)	American Home Laundry Manufacturers Association.
Driers (2)	Do.

TABLE II–6.—*Inventory and sales anticipations*

[Seasonally adjusted change in manufacturers' sales and inventories, stated in percent]

Quarters	Sales		Inventories	
	Anticipated	Actual	Anticipated	Actual
3d quarter, 1957–1st quarter, 1958	0.5	−10.5	−3.3	−4.0
1st quarter, 1958–3d quarter, 1958	4.5	3.5	−3.1	−5.2
3d quarter, 1958–1st quarter, 1959	3.3	7.9	.5	2.3
1st quarter, 1959–3d quarter, 1959	5.2	4.9	−.4	2.8
2d quarter, 1959–4th quarter, 1959	1.3	−3.4	−3.8	.6
3d quarter, 1959–1st quarter, 1960	4.0	4.0	−1.5	4.7
4th quarter, 1959–2d quarter, 1960	7.2	4.1	.6	5.1
1st quarter, 1960–3d quarter, 1960	2.6	−3.0	−2.1	.7
2d quarter, 1960–4th quarter, 1960	1.7	−5.2	−3.4	−2.5
3d quarter, 1960–1st quarter, 1961	2.0	−3.8	−3.2	−2.6
4th quarter, 1960–2d quarter, 1961	4.2	4.4	−2.7	−.7

Source: Office of Business Economics, Department of Commerce. The inventory figures refer to end of the quarters shown, while the sales refer to the quarterly totals, e.g., the inventory figures in the 1st line of the table refer to the end of 1st quarter of 1958 in contrast with the end of the 3d quarter of 1957. The 1st published report on the survey on which these figures are based will be found in the *Survey of Current Business, August 1961.*

TABLE II–7.—*National Association of Purchasing Agents business survey figures*

[Showing expected changes in direction of inventory stocks and related variables]

	Production			New orders			Inventories		
	H*	S*	L*	H	S	L	H	S	L
1947—January	------	------	------	------	------	------	17	58	25
February	------	------	------	------	------	------	25	54	21
March	------	------	------	------	------	------	22	57	21
April	------	------	------	------	------	------	17	50	33
May	------	------	------	------	------	------	11	45	44
June	------	------	------	------	------	------	10	49	41
July-August	------	------	------	------	------	------	14	47	39
September	------	------	------	------	------	------	14	52	34
October	------	------	------	------	------	------	17	59	24
November	------	------	------	------	------	------	23	57	20
December	------	------	------	------	------	------	22	55	23
1948—January	31	58	11	30	47	23	20	58	22
February	18	62	20	18	60	22	17	54	29
March	15	60	25	14	52	34	15	61	24
April	19	59	22	19	51	30	16	53	31
May	17	64	19	27	45	28	20	52	28
June	28	54	18	27	55	18	24	59	17
July [1]	------	------	------	------	------	------	------	------	------
August	24	64	12	26	57	17	21	52	27
September	27	57	16	19	52	29	18	52	30
October	24	65	11	23	57	20	14	59	27
November	17	66	17	17	55	28	18	55	27
December	11	57	32	10	40	50	15	42	43
1949—January	18	49	33	11	41	48	20	39	41
February	12	47	41	16	33	51	17	36	47
March	16	48	36	16	46	38	15	38	47
April	19	48	33	23	39	38	12	28	60
May	9	54	37	16	47	37	10	30	60
June	14	46	40	21	32	47	10	27	63
July	21	49	30	30	42	28	8	28	64
August	42	43	15	45	40	15	10	34	56
September	50	40	10	45	39	16	15	40	45
October	36	45	19	41	35	24	22	34	44
November	36	42	22	40	41	19	12	43	45
December	33	53	14	30	50	20	17	47	36
1950—January	42	45	13	41	43	16	21	51	28
February	36	49	15	34	52	14	18	57	25
March	40	48	12	36	45	19	21	58	21
April	55	36	9	55	35	10	19	58	23
May	52	44	4	54	38	8	28	59	13
June	55	41	4	57	38	5	35	50	15
July	57	35	8	68	27	5	40	46	14
August	72	24	4	80	16	4	47	32	21
September	65	29	6	59	31	10	35	39	26
October	45	45	10	33	52	15	30	38	32
November	36	58	6	35	48	17	30	43	27
December	30	58	12	31	57	12	27	43	30
1951—January	37	51	12	44	47	9	29	43	28
February	25	63	12	45	46	9	22	40	38
March	33	55	12	33	52	15	26	45	29
April	22	61	17	21	46	33	23	54	23
May	23	60	17	18	52	30	27	47	26
June	14	65	21	15	45	40	22	46	32
July [1]	------	------	------	------	------	------	------	------	------
August	22	49	29	20	38	42	28	36	36
September	26	60	14	29	48	23	20	50	30
October	22	65	13	23	58	19	21	42	37
November	21	63	16	28	47	25	21	53	26
December	22	56	22	17	47	36	18	48	34
1952—January	19	57	24	22	43	35	21	45	34
February	17	61	22	19	46	35	11	56	33
March	24	53	23	21	50	29	14	47	39
April	14	61	25	14	50	36	10	51	39
May	18	54	28	21	44	35	10	40	50
June	22	51	27	26	37	37	12	39	49
July-August	37	42	21	48	29	23	15	30	55
September	53	40	7	48	35	17	17	45	38
October	47	47	6	41	39	20	15	46	39
November	39	56	4	34	54	12	16	53	31
December	32	58	10	27	55	18	12	55	33

*H—Higher, S—Same, L—Lower.

See footnotes at end of table, p. 185.

TABLE II–7.—*National Association of Purchasing Agents business survey figures*—Continued

[Showing expected changes in direction of inventory stocks and related variables]

	Production			New orders			Inventories		
	H*	S*	L*	H	S	L	H	S	L
1953—January	38	58	4	34	52	14	15	53	32
February	28	63	9	28	55	17	13	62	25
March	21	70	9	20	59	21	19	60	21
April	24	70	6	26	61	13	14	60	26
May	21	71	8	19	59	22	11	60	29
June	21	64	15	18	57	25	18	48	34
July [1]									
August	19	59	22	20	47	33	20	50	30
September	21	60	19	19	47	34	24	40	36
October	22	52	26	17	43	40	19	44	37
November	16	58	26	18	48	34	15	45	40
December	14	50	36	12	44	44	15	38	47
1954—January	16	54	30	18	44	38	14	41	45
February	16	56	28	30	40	30	13	36	51
March	24	58	18	31	52	17	11	45	44
April	33	49	18	43	40	17	12	43	45
May	29	54	17	35	49	16	14	50	36
June	31	53	16	39	47	14	11	43	46
July [1]									
August	30	48	22	38	43	19	10	53	37
September	35	53	12	45	40	15	11	60	29
October	41	51	8	46	44	10	14	52	34
November	43	46	11	49	37	14	19	55	26
December	44	44	12	50	33	17	19	56	25
1955—January	42	47	11	38	49	13	21	55	24
February	43	49	8	55	37	8	21	62	17
March	50	45	5	53	41	6	30	55	15
April	58	38	4	57	37	6	31	48	21
May	52	43	5	54	37	9	32	49	19
June	36	57	7	33	53	14	32	60	8
July [1]									
August	45	40	15	58	34	8	26	52	22
September	45	48	7	40	52	8	29	48	23
October	43	52	5	43	50	7	23	59	18
November	41	53	6	39	47	14	30	54	16
December	40	54	6	35	49	16	28	55	17
1956—January	33	54	13	34	48	18	23	60	17
February	32	56	12	30	52	18	30	55	15
March	33	57	10	33	50	17	32	57	11
April	37	49	14	36	45	19	34	50	16
May	28	51	21	33	41	26	33	54	13
June	20	59	21	25	47	28	31	50	19
July [1]									
August	25	51	24	34	48	18	28	43	29
September	38	53	9	39	48	13	27	49	24
October	36	47	17	34	46	20	26	52	22
November	39	53	8	36	43	21	17	56	27
December	24	58	18	24	45	31	30	49	21
1957—January	28	49	23	32	45	23	31	49	20
February	27	55	18	27	50	23	29	52	19
March	27	50	23	24	54	22	21	57	22
April	25	50	25	27	48	25	15	53	32
May	24	54	22	26	42	32	17	49	34
June	30	50	20	25	50	25	14	51	35
July [1]									
August	21	54	25	23	48	29	19	52	29
September	31	47	22	35	44	21	15	51	34
October	17	56	27	24	47	29	16	50	34
November	21	50	29	24	46	30	18	43	39
December	18	37	45	17	40	43	17	42	41
1958—January	12	40	48	15	37	48	16	43	41
February	16	39	45	24	45	31	15	39	46
March	19	51	30	24	42	34	12	43	45
April	16	54	30	27	44	29	9	47	44
May	29	51	20	36	45	19	7	41	52
June	34	55	11	39	46	15	10	43	47
July	35	49	16	46	39	15	13	43	44
August	45	40	15	48	41	11	13	57	30
September	53	38	9	58	29	13	15	50	35
October	54	38	8	50	38	12	19	50	31
November	52	34	14	47	40	13	26	47	27
December	35	46	19	32	47	21	23	51	26

*H—Higher, S—Same, L—Lower.

See footnotes at end of table, p. 185.

TABLE II–7.—*National Association of Purchasing Agents business survey figures*—Continued

[Showing expected changes in direction of inventory stocks and related variables]

	Production			New orders			Inventories		
	H*	S*	L*	H	S	L	H	S	L
1959—January	42	45	13	46	39	15	24	49	27
February	44	44	12	49	40	11	34	48	18
March	47	46	7	48	44	8	43	41	16
April	56	41	3	53	35	12	42	52	6
May	60	35	5	53	40	7	39	50	11
June	46	48	6	42	48	10	45	39	16
July	35	55	10	36	48	16	38	46	16
August	31	54	15	31	50	19	22	50	28
September	28	53	19	27	42	31	16	47	37
October	29	47	24	28	45	27	15	43	42
November	27	48	25	28	42	30	20	43	37
December	29	54	17	33	42	24	22	52	26
1960—January	44	43	13	41	42	17	26	52	22
February	24	63	13	28	47	25	34	50	16
March	26	51	23	30	45	25	29	53	18
April	26	56	18	32	48	20	25	49	26
May	18	60	22	24	49	27	17	53	30
June	24	54	22	27	47	26	18	51	31
July	22	48	30	24	40	36	15	52	33
August	26	49	25	35	42	23	13	46	41
September	23	60	17	29	53	18	13	50	37
October	26	54	20	27	47	26	11	51	38
November	13	62	25	19	53	28	16	46	28
December	15	57	28	17	49	34	13	50	37
1961—January	20	47	33	24	42	34	18	51	31
February	24	47	29	25	46	29	13	51	36
March	29	52	19	32	48	20	16	54	30
April	48	40	12	58	33	9	18	55	27
May	49	44	7	48	41	11	17	58	25
June	45	45	10	43	43	14	12	60	28
July	35	51	14	37	48	15	14	60	26

*H—Higher, S—Same, L—Lower.

[1] In the early years it was thought that returns might be poor in July. This accounts for absence of July figures in 1948, 1951, and 1953–57. The 2-month, July–August, figure in 1947 and 1952 is similarly explained. More recently, it has been found that good returns are obtainable in July.

Source: National Association of Purchasing Agents Business Survey. H=percentage of executives expecting rises, S=percentage of executives expecting no change, L=percentage of executives expecting declines. The survey report represents a compilation developed from slightly more than 200 purchasing executives who are members of the NAPA Business Survey Committee. The committee was selected by industry, by size of company and by geographical distribution. The general makeup of the committee has remained the same since the survey began in 1947, with necessary replacements being drawn from purchasing agents similarly situated with respect to industry, geographical area, and size of company. Little variation has occurred in the number of reports received. Almost all of the committee members report on each monthly survey. Summary reports are made within 2 weeks after the survey form is mailed. The number of reports received at each date is the same for all of the series shown in the table. The report represents an unedited summary of the returns received. An early summary of the effectiveness of the NAPA business survey was made by Heinz E. Luelicke and published in the Dec. 2, 1953 issue of the *Bulletin of the National Association of Purchasing Agents*.

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TABLE II–8.—*Weaving mills total gray goods: Production, inventories, and unfilled orders*

	Looms operating (end of month)	Cloth woven		Inventories (end of month)		Unfilled orders, other than for wool fabrics (end of month)
		Weekly average	Total for period	Owned by weaving mill	Billed and held for others	
		Millions of linear yards				
1961:						
January (4 weeks)	410.3	208.8	835.2	1,160.7	397.7	1,973.2
February (4 weeks)	410.6	217.1	868.2	1,183.0	384.2	2,130.4
March (5 weeks)	411.9	219.8	1,098.8	1,171.1	349.2	2,341.2
April (4 weeks)	412.3	218.1	872.5	1,162.5	355.4	2,333.6

Source: "Current Industrial Reports: Woven Fabrics: Production, Inventories, and Unfilled Orders," Bureau of the Census, May 1961, series M22A (61)–5. This and table II–9 are presented purely for illustrative purposes. They represent data collected by the Food, Textile, and Apparel Branch of the Census Industry Division. So far the data are presented only in linear yards units. The coverage is for higher than obtained for textiles in the current industry survey. The principal reasons for the better response appear to be (1) cooperative arrangements made with trade associations which collect part of the data, and (2) the fact that request is made for data in linear yards units (officials in the Branch believe that most large textile companies keep perpetual inventory figures in linear yards but not in dollars for the different kinds of cloth held).

The data in this table are shown separately for cotton, synthetic, silk, and wool apparel fabrics gray goods.

TABLE II–9.—*Woven fabrics* [1] *inventories and unfilled orders, end of the month, of converters, wholesalers, and other piece goods' dealers*

[Millions of linear yards]

	Inventories owned by converters, wholesalers, and other piece goods' dealers				Unfilled orders for finished fabrics
	Gray goods, total	Finished goods			
		Total	Located at finishing plants	Not located at finishing plants	
1961:					
January	705.0	854.3	690.8	163.5	816.3
February	691.4	850.5	691.3	159.1	861.8
March	684.3	829.9	682.0	147.9	924.4
April	679.7	840.3	680.6	159.6	898.5

[1] Includes cotton, synthetic and silk, and wool fabrics.

Source: See note for table II–8.

TABLE III–1.—*Wholesale trade inventory stocks and sales ratios as reported by the Census*

	Wholesalers, total (billions)	Merchant wholesalers			
		Total inventories (billions of dollars)	Stock—sales ratios (percent)		
			Total	Durable	Nondurable
1929	5.05	(1)	(1)	(1)	(1)
1939	3.87	(1)	(1)	(1)	(1)
1948	9.97	(1)	(1)	(1)	(1)
1954	13.08	(1)	(1)	(1)	(1)
1956—November	----------	11.10	116	143	93
December	----------	10.75	118	150	90
1957—January	----------	10.82	120	149	91
February	----------	10.86	130	162	100
March	----------	10.87	121	153	92
April	----------	10.87	120	152	91
May	----------	10.82	115	147	87
June	----------	10.84	121	154	92
July	----------	10.76	118	152	88
August	----------	10.76	115	149	85
September	----------	10.95	120	155	90
October	----------	11.04	112	146	84
November	----------	11.07	125	168	91
December	----------	10.62	124	174	87
1958—January	----------	10.68	129	183	90
February	----------	10.62	141	200	97
March	----------	10.70	131	183	91
April	----------	10.65	124	172	88
May	----------	10.63	122	166	86
June	----------	10.69	121	161	88
July	----------	10.59	119	159	86
August	----------	10.59	117	153	87
September	----------	10.75	113	144	86
October	----------	10.94	107	137	82
November	----------	10.95	119	155	89
December	----------	10.56	110	150	79
1959—January	----------	10.73	124	171	88
February	----------	10.88	127	173	90
March	----------	11.10	115	151	83
April	----------	11.33	113	148	82
May	----------	11.42	115	147	86
June	----------	11.57	111	140	84
July	----------	11.59	114	146	84
August	----------	11.69	118	150	89
September	----------	11.58	111	141	84
October	----------	11.71	113	143	87
November	----------	11.77	119	152	90
December	----------	11.43	110	148	79
1960—January	----------	11.44	128	172	92
February	----------	11.70	127	171	90
March	----------	12.01	120	166	82
April	----------	12.07	121	162	86
May	----------	12.17	122	163	86
June	----------	12.27	118	157	84
July	----------	12.30	132	178	93
August	----------	12.30	117	158	84
September	----------	12.20	120	160	86
October	----------	12.35	122	163	89
November	----------	12.29	122	169	87
December	----------	11.86	122	175	84
1961	----------	(1)	(1)	(1)	(1)

[1] Not available.

Source: U.S. Department of Commerce, Bureau of the Census. Figures for total inventories for 1929, 1939, 1948, and 1954 are taken from the Censuses of Business in those years. Prior to 1956 those (and 1935) were the only years for which the Census Bureau published wholesale inventory statistics. These figures include all wholesalers: merchant, manufacturers' sales branches and offices; agents and brokers, assemblers (mainly of farm products), petroleum bulk stations, and wholesalers administrative offices and auxiliary units. They are end of the year figures, stated at cost.

Beginning in 1955, the Bureau of the Census has published the *Monthly Wholesale Trade Report* covering merchant wholesalers only. Merchant wholesalers are defined in the current *Standard Industrial Classification Manual* and exclude the nonmerchant wholesalers listed above. Also excluded from these figures are inventories of farm product raw material merchants (SIC–505) because such inventories

are subject to large bias due, in part, to the lack of adequate monthly records on the dollar value of inventories.

Firms reporting in the survey are part of a probability sample of over 17,000 firms (about 26,000 establishments) which is drawn from 2 sources: (1) 1954 Census of Business lists of all wholesalers in that year, and (2) Bureau of Old-Age and Survivors Insurance lists of wholesalers entering business (or requesting new employer identification numbers) since 1954. The sample is supplemented 4 times a year for new firms on the BOASI lists.

The reporting panel includes a fixed panel of about 1,400 very large firms reporting monthly and 4 rotating panels each containing about 3,900 smaller firms, with each panel reporting every 4th month. In any given month, the total reporting panel includes about 5,300 firms.

Beginning January 1961 the sample has been revised to reflect the 1958 Census of Business lists of merchant wholesalers. The introduction of the revised sample affects, to some degree, the continuity of the data published in this series, so the 1961 figures are not included in the table shown here. Differences may occur in part due to sampling error in the monthly estimates, and in part to the changes from the 1954 to 1958 Business Census in the classification of business of individual firms which have been incorporated into the present sample. To provide a comparison with the old sample data, monthly estimates for 1960 will be revised to correspond to the new series and thereby provide a year of overlap.

Sampling variability for the dollar estimates collected in the census of business is from 0.6 to 1.1 percent. This measure of sampling variability does not include biases that may arise from estimates which are imputed for firms that fail to respond. Approximately 10 percent of sales and 25 percent of inventories are imputed for nonresponse.

Inventories represent stocks, at cost of merchandise on hand for sale at the end of the month. The stock/sales ratios are percentages derived by dividing the estimated dollar volume of inventories, at cost, by the dollar volume of sales.

A breakdown based on 20 kinds of business is also available.

For a detailed description of the sample, estimating procedures, and reliability of the data, see the descriptive material in the *Monthly Wholesale Trade Report.* The monthly report data are not seasonally corrected.

TABLE III—2.—*Wholesale trade inventory stocks and sales ratios as reported by the Office of Business Economics (with adjustment for seasonal variation)*

	Total		Durable		Nondurable	
	Wholesale inventory	Inventory sales ratio	Inventory	Invertory sales ratio	Inventory	Inventory sales ratio
	Billions	*Percent*	*Billions*	*Percent*	*Billions*	*Percent*
1951—January	$9.3	91	$4.4	116	$4.9	78
February	9.6	98	4.4	125	4.1	81
March	9.7	102	4.6	131	5.1	85
April	10.0	106	4.7	138	5.3	88
May	10.2	109	4.9	153	5.3	85
June	10.1	110	5.0	161	5.1	84
July	10.1	111	5.1	170	5.0	82
August	9.9	108	5.0	156	4.9	80
September	9.9	108	5.0	156	4.9	82
October	9.8	107	4.9	153	4.9	82
November	9.7	105	4.8	145	4.8	80
December	9.7	105	4.8	155	4.9	82
1952—January	9.7	105	4.9	158	4.8	80
February	9.5	102	4.8	145	4.8	79
March	9.6	105	4.8	150	4.8	80
April	9.5	102	4.8	150	4.7	77
May	9.4	100	4.7	147	4.7	77
June	9.5	101	4.7	152	4.8	77
July	9.6	101	4.6	148	5.0	79
August	9.7	101	4.7	147	5.0	78
September	9.7	98	4.7	138	5.0	77
October	9.8	99	4.7	134	5.1	78
November	9.9	103	4.8	141	5.1	82
December	10.0	102	4.9	140	5.1	81
1953—January	10.0	106	4.9	148	5.0	83
February	10.1	104	5.1	142	5.0	81
March	10.2	104	5.2	149	5.0	79
April	10.2	103	5.1	141	5.1	81
May	10.3	105	5.1	150	5.1	81
June	10.4	106	5.1	150	5.3	83
July	10.5	105	5.3	156	5.3	82
August	10.6	107	5.3	151	5.3	82
September	10.6	106	5.3	156	5.3	82
October	10.6	110	5.3	161	5.3	84
November	10.6	110	5.2	153	5.3	84
December	10.5	108	5.1	150	5.3	84
1954—January	10.5	111	5.1	159	5.4	84
February	10.6	108	5.1	155	5.5	85
March	10.5	107	5.0	156	5.5	86
April	10.5	109	5.1	159	5.5	83
May	10.6	109	5.1	155	5.5	86
June	10.4	108	5.1	155	5.4	86
July	10.3	106	5.0	147	5.2	83
August	10.2	107	5.0	152	5.2	84

TABLE III—2.—*Wholesale trade inventory stocks and sales ratios as reported by the Office of Business Economics (with adjustment for seasonal variation)*—Continued

	Total		Durable		Nondurable	
	Wholesale inventory	Inventory sales ratio	Inventory	Inventory sales ratio	Inventory	Inventory sales ratio
	Billions	*Percent*	*Billions*	*Percent*	*Billions*	*Percent*
1954—September	10.3	107	5.1	150	5.2	84
October	10.3	106	5.1	150	5.2	83
November	10.3	102	5.1	142	5.2	80
December	10.4	102	5.1	142	5.3	80
1955—January	10.5	103	5.1	138	5.4	83
February	10.5	104	5.1	138	5.4	84
March	10.6	102	5.2	137	5.4	82
April	10.6	101	5.2	137	5.4	81
May	10.7	101	5.3	133	5.4	82
June	10.9	102	5.4	135	5.5	82
July	11.0	103	5.4	132	5.5	83
August	11.0	104	5.5	134	5.5	86
September	11.1	104	5.6	133	5.5	85
October	11.4	106	5.6	133	5.7	86
November	11.4	103	5.7	133	5.7	84
December	11.4	102	5.8	132	5.6	82
1956—January	11.6	103	5.9	131	5.7	84
February	11.7	105	6.0	133	5.8	89
March	11.9	110	6.1	142	5.8	89
April	12.0	109	6.1	139	5.9	89
May	12.1	106	6.1	136	6.0	88
June	12.2	108	6.2	138	6.0	88
July	12.3	110	6.2	144	6.1	88
August	12.5	111	6.3	147	6.2	90
September	12.6	114	6.4	152	6.2	89
October	12.7	111	6.4	149	6.3	89
November	12.8	110	6.5	148	6.3	88
December	13.0	110	6.6	150	6.4	86
1957—January	12.9	111	6.5	141	6.3	89
February	12.8	111	6.5	148	6.3	89
March	12.8	112	6.5	148	6.3	89
April	12.8	113	6.5	154	6.3	89
May	12.7	110	6.5	151	6.2	86
June	12.7	111	6.6	157	6.1	86
July	12.7	111	6.7	156	6.0	85
August	12.8	112	6.7	160	6.1	85
September	12.8	114	6.7	163	6.1	86
October	12.8	116	6.7	171	6.1	87
November	12.8	117	6.7	171	6.1	87
December	12.7	117	6.6	174	6.1	86
1958—January	12.6	118	6.6	174	6.0	87
February	12.5	119	6.5	181	6.0	87
March	12.4	120	6.4	178	6.0	88
April	12.2	114	6.3	170	5.9	84
May	12.1	113	6.2	168	5.9	84
June	12.1	111	6.2	163	5.9	84
July	12.1	110	6.2	163	5.9	82
August	12.1	109	6.2	155	5.9	82
September	12.1	106	6.2	151	5.9	81
October	12.1	105	6.2	151	5.9	80
November	12.1	104	6.3	147	5.8	78
December	12.0	103	6.3	147	5.7	77
1959—January	11.9	101	6.3	147	5.6	75
February	11.9	100	6.3	143	5.6	75
March	12.0	98	6.3	137	5.6	74
April	12.1	98	6.4	136	5.7	74
May	12.2	98	6.5	133	5.7	74
June	12.4	98	6.6	135	5.8	75
July	12.5	100	6.7	140	5.9	77
August	12.6	103	6.6	143	5.9	78
September	12.5	100	6.5	141	6.0	76
October	12.5	104	6.5	148	6.1	81
November	12.6	102	6.5	141	6.1	79
December	12.6	99	6.6	140	6.1	77
1960—January	12.7	102	6.6	140	6.1	79
February	12.7	102	6.7	142	6.1	78
March	12.8	105	6.8	151	6.1	78
April	12.9	103	6.8	145	6.1	77
May	13.1	106	6.9	153	6.2	78
June	13.0	104	6.9	153	6.1	76
July	13.0	106	7.0	159	6.1	77

TABLE III—2.—*Wholesale trade inventory stocks and sales ratios as reported by the Office of Business Economics (with adjustment for seasonal variation)*—Continued

	Total		Durable		Nondurable	
	Wholesale inventory	Inventory sales ratio	Inventory	Inventory sales ratio	Inventory	Inventory sales ratio
	Billions	*Percent*	*Billions*	*Percent*	*Billions*	*Percent*
1960—August	13.1	107	7.0	156	6.1	77
September	13.1	107	6.9	160	6.2	79
October	13.2	108	6.9	160	6.3	80
November	13.3	109	6.9	164	6.4	80
December	13.2	107	6.8	158	6.4	80
1961—January	13.1	107	6.7	156	6.4	80
February	13.2	106	6.7	160	6.5	79
March	13.3	106	6.7	160	6.6	80
April	13.4	107	6.7	156	6.7	82
May	13.4	104	6.7	152	6.7	79

Sources: U.S. Department of Commerce, Office of Business Economics, *Survey of Current Business*, The benchmark data currently in use for these series is the 1954 Census of Business. Beginning in January 1956 (with revisions back to 1948) the current movement has been traced with monthly data collected on merchant wholesalers by the Census Bureau. Adjustments, based on the 1954 census, were made by the Office of Business Economics to take into account the amount of trade of wholesalers other than merchant (about 16 percent). These include agents and brokers; assemblers (mainly of farm products); and wholesalers' administrative offices and auxiliary units

The blowup adjustment was made to represent inventories and sales of all wholesalers and was based on the definitions and classifications of the 1954 Census of Business. Exceptions to the census definitions and classifications are as follows: (1) Operations of corporate manufacturers' sales branches and offices and marketing stations of petroleum refiners havebeen excluded, since sales and inventories of these branches are covered in the manufacturing series of the Office of Business Economics; (2) sales of agents and brokers have been included on the basis of actual receipts of the agents and brokers rather than as the total value of goods sold as reported in the census of business. Also no allowance has been made for wholesale establishments with no paid employment.

Monthly data based on earlier methods have been published back to 1939. For methods employed in developing these earlier series, see pp. 17 and 18 of the October 1951 *Survey of Current Business* and p. 13 of the October 1952 *Survey of Current Business*. A description of the new series beginning in 1948 appear on p. 31 of the August 1957 issue of the *Survey*.

TABLE IV–1.—*Retail trade stocks as reported by the Census*

[Dollar amounts in billions]

	Merchandise inventories, Dec. 31	Sales inventory ratio
1960	24.7	8.9
1959	23.2	9.2
1958	22.1	8.8
1957	22.3	8.9
1956	21.2	9.2
1955	21.0	9.2
1954	19.1	(1)
1953	19.3	9.0
1952	18.8	9.4
1951	19.1	8.2

[1] Not available.

Source: U.S. Department of Commerce, Bureau of the Census, "Annual Survey of Retail Trade," *Annual Retail Trade Report.*

The present estimates are prepared from a sample which consists of about 36,000 organizations controlling and operating about 125,000 retail stores. The sample includes (1) all organizations operating 11 or more stores, (2) all establishments with sales of over $5 million, and (3) a random sample of the remaining stores from 230 Census retail sampling areas. The estimates from this last sample group are derived essentially by weighting the reported inventories of each member of the sample by a value dependent upon its probability of selection. Because these estimates are based on a sample, exact agreement is not expected with the results that would be obtained from a complete census of retail stores in which the same enumeration procedure were used. However, because every retail store in the United States has had a chance of being selected for the sample, and because the probability of selection for each store in the sample is known, it is possible to approximate the sampling variability of the estimates made from the sample. For all retail stores, the sampling variability was 1 percent for 1960 inventories. (See section above on reliability of data.) This measure of sampling variability does not allow for biases which might arise from nonresponse and other reporting deficiencies. In 1960 nonresponse amounted to about 3 percent for inventories, 5 percent for sales.

These data represent estimated book values of inventory stocks. The differences in stock levels reflect differences in replacement costs as well as changes in physical volume.

A breakdown on the basis of 17 types of retail stores is available. For a detailed description of the methods and procedures used, see the latest *Annual Retail Trade Report.*

TABLE IV–2.—*Retail trade inventories*

[Seasonally adjusted in billions of dollars as computed by Office of Business Economics]

	Total	Durable	Nondurable		Total	Durable	Nondurable
1950—December	19.9	8.8	11.1	1956—April	23.9	11.1	12.8
1951—January	20.6	8.7	11.9	May	23.9	11.0	12.9
February	21.2	8.8	12.4	June	23.8	10.8	13.1
March	21.8	9.4	12.4	July	23.8	10.7	13.2
April	22.0	9.6	12.4	August	23.7	10.5	13.3
May	22.4	9.8	12.6	September	23.4	10.2	13.2
June	21.8	9.7	12.1	October	23.3	10.1	13.2
July	21.7	9.8	11.9	November	23.5	10.4	13.1
August	21.8	9.7	12.0	December	23.9	10.7	13.2
September	21.4	9.8	11.7				
October	21.3	9.7	11.6	1957—January	24.0	10.8	13.2
November	21.2	9.7	11.5	February	23.9	10.8	13.1
December	21.2	9.7	11.5	March	23.7	10.7	13.0
				April	23.7	10.6	13.1
1952—January	21.1	9.7	11.4	May	23.9	10.7	13.2
February	21.1	9.7	11.4	June	24.1	10.8	13.3
March	21.0	9.6	11.4	July	24.1	10.8	13.3
April	20.8	9.5	11.3	August	24.3	11.0	13.2
May	20.7	9.3	11.4	September	24.4	11.1	13.2
June	20.5	9.2	11.3	October	24.2	10.9	13.3
July	20.3	8.9	11.5	November	24.3	11.2	13.1
August	20.2	8.7	11.5	December	24.5	11.4	13.1
September	21.0	9.3	11.7				
October	21.4	9.6	11.8	1958—January	24.5	11.3	13.1
November	21.5	9.8	11.8	February	24.3	11.2	13.1
December	21.6	9.9	11.7	March	24.1	11.0	13.1
				April	23.9	10.8	13.2
1953—January	21.5	9.9	11.6	May	23.9	10.8	13.1
February	21.7	10.1	11.6	June	24.1	10.8	13.3
March	22.0	10.3	11.7	July	24.0	10.7	13.3
April	22.4	10.5	11.8	August	23.9	10.7	13.2
May	22.5	10.5	11.9	September	23.7	10.5	13.2
June	22.3	10.5	11.8	October	23.5	10.3	13.2
July	22.7	10.7	12.0	November	23.6	10.5	13.1
August	22.8	10.6	12.2	December	24.0	10.8	13.2
September	22.9	10.9	12.0				
October	22.7	10.7	12.0	1959—January	24.2	11.0	13.2
November	22.4	10.6	11.9	February	24.1	11.0	13.2
December	22.7	10.7	12.0	March	24.2	11.1	13.0
				April	24.5	11.3	13.2
1954—January	22.5	10.7	11.8	May	24.5	11.5	13.1
February	22.4	10.6	11.8	June	24.8	11.7	13.1
March	22.6	10.5	12.1	July	25.6	11.9	13.2
April	22.7	10.4	12.3	August	24.8	11.6	13.2
May	22.8	10.5	12.3	September	24.8	11.5	13.3
June	22.6	10.4	12.2	October	24.7	11.5	13.3
July	22.4	10.2	12.2	November	24.2	11.0	13.2
August	22.5	10.3	12.2	December	24.3	11.0	13.2
September	22.4	10.2	12.2				
October	22.0	10.0	12.0	1960—January	24.49	11.26	13.24
November	22.1	10.0	12.1	February	24.81	11.59	13.22
December	22.1	10.1	12.0	March	25.12	11.64	13.48
				April	24.96	11.63	13.33
1955—January	22.2	10.2	12.1	May	25.20	11.76	13.44
February	22.4	10.3	12.0	June	25.32	11.82	13.50
March	22.6	10.5	12.1	July	25.42	11.90	13.51
April	22.8	10.5	12.2	August	25.20	11.65	13.55
May	23.0	10.8	12.3	September	25.34	11.76	13.58
June	23.2	10.8	12.4	October	25.36	11.90	13.46
July	23.4	10.8	12.5	November	25.42	11.93	13.49
August	23.3	10.8	12.5	December	25.44	11.93	13.51
September	23.2	10.7	12.5				
October	23.3	10.7	12.6	1961—January	25.16	11.61	13.55
November	23.6	11.0	12.6	February	24.90	11.39	13.51
December	23.9	11.2	12.7	March	24.41	10.95	13.46
				April	24.41	10.90	13.51
1956—January	24.1	11.4	12.7	May	24.52	10.99	13.53
February	24.2	11.5	12.7	June	24.58	11.07	13.52
March	23.8	11.2	12.6				

Source: U.S. Department of Commerce, Office of Business Economics, Business Structure Division, *Survey of Current Business.*

Beginning with the year-end 1950 these estimates utilize as benchmarks the data in the *1952 Annual Retail Trade Report* of the Bureau of the Census. The old estimates from 1938 through 1950 were not revised to the new benchmarks and are, therefore, not comparable as to level with the current series. Revised figures, based on the *1960 Annual Retail Trade Report*, will be available by the end of 1961. It is expected that the revision will be to a higher level than the present series and that some changes will appear in the shorter movements back to 1955 because of new seasonal measurements.

Current movements are traced through a fixed panel which when initiated in 1956 consisted of 2,000 retail trade establishments. Of the original panel about two-thirds are still active and of these active respondents

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over 90 percent report inventories. The estimates here presented are derived from this panel by weighting the reported inventories of each sample observation by a value dependent upon its probability of selection. Also incorporated in the current series are data from the Federal Reserve Board monthly survey of department stores.

Since these data represent estimated book value of inventories on the basis used by the companies reporting, differences may not clearly reflect changes in physical volume of inventory if price changes occur during the period of inventory accumulation.

The data shown are estimates of inventories held at the various kinds of stores and are not on a commodity basis. The breakdown into durable and nondurable inventories is based on the durability of the commodities accounting for the major portion of the retailers' sales. Thus nondurable items carried by retailers dealing primarily in durable goods would be reported in durable goods inventories.

The durable goods stores inventories are reported by 3 subgroups: (1) automotive, (2) furniture and appliances, and (3) lumber, building and hardware; the nondurable by 3 subgroups: (1) apparel, (2) food, and (3) general merchandise.

For a more detailed description of the new series which begins in December 1950, see pp. 14–16 of the November 1952 *Survey of Current Business* and p. 18 of the January 1954 *Survey*.

TABLE IV–3.—*Department store stocks indexes—United States*

[1947–49 average=100]

[Adjusted for seasonal variation]

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1939	35	35	35	35	35	36	36	36	36	37	37	37
1940	38	38	38	38	38	37	37	37	38	38	39	40
1941	40	40	41	42	42	43	45	47	49	54	54	54
1942	54	59	62	66	69	71	70	67	64	62	60	59
1943	58	53	53	51	51	53	55	57	58	57	57	59
1944	59	61	59	58	58	57	57	58	58	58	58	56
1945	57	58	57	60	62	63	63	61	60	60	60	57
1946	60	62	65	68	72	76	81	83	86	88	92	97
1947	96	96	94	93	92	91	90	91	91	94	97	100
1948	103	105	107	108	107	108	108	109	108	106	107	106
1949	102	100	101	100	100	100	99	97	98	99	100	100
1950	101	102	103	103	105	104	104	109	116	121	123	123
1951	128	130	135	137	137	136	137	134	129	123	120	124
1952	122	121	119	119	119	119	120	120	122	123	125	125
1953	128	129	128	130	131	132	133	133	132	132	131	129
1954	126	126	128	127	127	126	127	127	129	129	130	131
1955	131	131	132	132	134	137	137	137	138	138	140	142
1956	146	147	146	146	146	147	148	151	150	152	152	151
1957	151	150	151	153	153	153	154	153	153	154	154	150
1958	148	146	144	143	145	147	147	147	150	152	152	150
1959	153	151	150	152	152	155	158	160	160	158	160	161
1960	161	160	162	158	161	164	167	169	168	167	169	165
1961	162	161	161	162	164	164	-------	-------	-------	-------	-------	-------

Source: Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*. The Federal Reserve has been publishing monthly indexes of total department store sales and stocks since the early 1920's and weekly sales indexes since 1941. The benchmark data for these series is the quinquennial census of retail trade, and major revisions are required following the incorporation of each census into the series. The latest major revision was made in 1957; the monthly figures were revised back to 1939 to insure comparability. Since no information on department store stocks is collected in the census, stock revisions are made by applying benchmark sales figures to sample sales-stock ratios selected from the latest year's Federal Reserve figures.

Current monthly figures are drawn from a sample of department stores accounting for roughly 85 percent of the dollar universe for sales and 75 percent of the dollar universe for stocks. The data are collected independently by the 12 Federal Reserve banks for department stores within their districts and are combined and published by the main office of the Board of Governors of the Federal Reserve System in Washington.

The *Standard Industrial Classification Manual's* definition of department stores (531), current at the particular time, is used in these series as it is in the census of business. Stocks are stated at retail value rather than cost.

Further breakdown for sales and stocks is available monthly by (1) roughly 70 department classifications, and (2) over 200 metropolitan areas, cities, and downtown areas. These figures are available back to 1919.

For detailed description of the methods and procedures used, see the *Federal Reserve Bulletins* of April 1958 (weekly series), December 1957 (monthly series), October 1952, December 1951.

TABLE IV–4.—*Department store sales indexes—United States*

[1947–49 average=100]

[Adjusted for seasonal variation]

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1939	33	33	34	34	34	34	34	34	35	35	35	37
1940	35	35	35	35	36	37	37	38	38	38	39	40
1941	39	40	41	42	44	43	45	51	46	42	45	45
1942	52	47	48	47	46	45	48	50	51	52	52	53
1943	54	61	52	53	54	57	56	55	56	57	58	57
1944	58	56	58	59	63	60	62	63	64	65	66	68
1945	66	68	71	62	65	68	71	68	70	73	74	75
1946	79	83	86	86	88	91	90	98	92	90	93	94
1947	93	94	95	95	97	96	96	96	99	98	104	102
1948	101	102	101	105	104	105	106	105	104	108	102	102
1949	102	99	100	101	101	99	95	96	99	98	99	99
1950	98	99	101	103	102	104	124	114	111	105	104	111
1951	127	118	109	109	107	108	108	109	111	112	114	112
1952	112	110	112	110	114	115	111	116	114	119	115	118
1953	117	119	121	117	122	119	119	117	116	116	118	116
1954	114	117	114	117	115	118	118	119	118	120	120	123
1955	127	122	124	127	126	123	131	127	129	132	129	130
1956	132	130	132	132	132	135	133	136	140	133	139	136
1957	134	138	136	133	135	138	137	139	137	132	134	135
1958	132	126	131	133	133	133	138	140	136	138	138	141
1959	140	142	138	144	145	145	148	144	144	148	146	146
1960	147	142	138	154	142	145	148	144	144	150	142	147
1961	142	145	146	148	144	149	-------	-------	-------	-------	-------	-------

Source: See table IV–3.

TABLE IV–5.—*Department store merchandise ratios*

[Not seasonally adjusted]

	Stocks to sales	Outstanding orders to sales	Stocks plus outstanding orders to sales	Receipts to sales
1940—January	3.0	1.0	3.9	0.8
February	3.5	1.0	4.5	1.4
March	2.8	.7	3.5	1.1
April	2.9	.6	3.5	1.0
May	2.7	.6	3.3	.9
June	2.6	.7	3.4	.8
July	3.3	1.4	4.7	.8
August	2.8	1.2	3.9	1.2
September	2.6	.9	3.5	1.3
October	2.6	.9	3.5	1.2
November	2.5	.7	3.2	1.1
December	1.4	.3	1.7	.7
1941—January	2.8	1.0	3.9	.9
February	3.3	1.2	4.5	1.3
March	2.8	1.0	3.7	1.2
April	2.5	.9	3.4	1.0
May	2.5	1.0	3.6	1.0
June	2.7	1.6	4.2	.9
July	3.3	2.4	5.7	1.0
August	2.7	1.9	4.6	1.3
September	2.7	1.5	4.2	1.4
October	3.2	1.3	4.6	1.4
November	3.1	1.0	4.1	1.1
December	1.6	.5	2.1	.6
1942—January	2.7	1.5	4.2	.9
February	3.7	2.3	6.0	1.5
March	3.3	1.9	5.2	1.4
April	3.7	1.8	5.5	1.3
May	4.3	1.7	6.1	1.2
June	4.4	1.5	5.9	.9
July	5.2	1.9	7.1	.9
August	4.3	1.4	5.6	1.1
September	3.5	1.2	4.7	1.0
October	3.1	1.2	4.2	1.0
November	2.9	1.2	4.1	.9
December	1.5	.8	2.3	.6

TABLE IV–5.—*Department store merchandise ratios*—Continued

	Stocks to sales	Outstanding orders to sales	Stocks plus outstanding orders to sales	Receipts to sales
1943—January	2.9	2.1	5.0	0.9
February	2.5	2.1	4.6	.9
March	2.5	2.3	4.8	1.1
April	2.3	2.2	4.5	1.0
May	2.6	3.0	5.5	1.0
June	2.5	3.5	6.0	1.0
July	3.3	4.5	7.8	1.2
August	3.3	3.6	6.9	1.3
September	2.9	2.7	5.6	1.1
October	2.6	2.4	4.9	1.0
November	2.2	2.1	4.3	.9
December	1.4	1.5	2.9	.7
1944—January	2.8	3.0	5.9	1.0
February	3.0	3.0	6.0	1.2
March	2.3	2.1	4.5	1.1
April	2.6	2.2	4.8	1.0
May	2.4	2.3	4.7	1.0
June	2.6	2.9	5.5	1.0
July	3.1	3.8	6.9	1.0
August	2.8	2.9	5.7	1.3
September	2.5	2.4	4.9	1.1
October	2.3	2.2	4.6	1.1
November	1.9	2.0	3.9	.9
December	1.2	1.6	2.8	.7
1945—January	2.3	3.7	6.0	1.1
February	2.5	4.0	6.5	1.2
March	1.9	2.7	4.6	1.1
April	2.7	3.3	6.1	1.2
May	2.5	2.8	5.4	1.1
June	2.5	2.9	5.3	1.0
July	3.0	3.7	6.8	1.0
August	2.8	3.1	5.9	1.1
September	2.6	2.7	5.2	1.0
October	2.1	2.3	4.4	1.0
November	1.8	2.3	4.1	.9
December	1.1	1.8	2.9	.7
1946—January	2 2	3.9	6.0	1.1
February	2.2	4.0	6.2	1.2
March	1.9	3.2	5.1	1.2
April	2.0	2.7	4.8	1.2
May	2.2	3.0	5.2	1.1
June	2.3	3.3	5.6	1.1
July	3.0	4.3	7.3	1.1
August	2.6	3.3	5.9	1.2
September	2.7	3.1	5.8	1.1
October	2.6	2.5	5.1	1.2
November	2.2	1.7	3.9	1.1
December	1.5	1.1	2.6	.7
1947—January	3.0	2.3	5.3	1.0
February	3.3	2.4	5.7	1.3
March	2.6	1.4	4.1	1.1
April	2.7	1.2	3.8	1.0
May	2.4	1.0	3.4	.9
June	2.5	1.5	4.0	.8
July	2.9	2.3	5.2	.8
August	2.8	2.2	5.0	1.2
September	2.4	2.0	4.4	1.2
October	2.5	1.8	4.2	1.3
November	2.3	1.4	3.7	1.1
December	1.3	.9	2.3	.7
1948—January	2.9	2.2	5.1	1.1
February	3.4	2.1	5.5	1.4
March	2.7	1.2	3.8	1.2
April	2.8	1.0	3.9	1.0
May	2.7	1.0	3.6	.9
June	2.5	1.3	3.8	.8
July	3.0	2.0	5.1	.9
August	3.0	1.8	4.8	1.2
September	2.6	1.5	4.1	1.2
October	2.6	1.3	3.9	1.2
November	2.5	.9	3.4	1.1
December	1.4	.5	1.9	.6
1949—January	2.9	1.4	4.3	.9
February	3.3	1.5	4.8	1.2
March	2.9	1.0	3.8	1.2
April	2.6	.7	3.3	1.0

TABLE IV–5.—*Department store merchandise ratios*—Continued

	Stocks to sales	Outstanding orders to sales	Stocks plus outstanding orders to sales	Receipts to sales
1949—May	2.7	0.6	3.3	0.9
June	2.5	.9	3.4	.7
July	3.2	1.6	4.8	.8
August	2.8	1.4	4.2	1.1
September	2.6	1.5	4.1	1.2
October	2.7	1.3	4.0	1.3
November	2.5	.9	3.3	1.1
December	1.4	.5	1.9	.7
1950—January	3.0	1.5	4.5	1.0
February	3.4	1.5	5.0	1.3
March	2.9	1.0	3.9	1.2
April	2.9	.8	3.7	1.0
May	2.7	.7	3.4	.9
June	2.6	1.1	3.7	.8
July	2.7	2.3	5.0	.8
August	2.7	2.2	4.9	1.4
September	2.8	1.9	4.7	1.3
October	3.2	1.6	4.8	1.4
November	2.9	1.1	4.0	1.1
December	1.6	.7	2.2	.6
1951—January	3.0	1.9	4.9	1.1
February	3.8	2.3	6.1	1.3
March	3.5	1.3	4.8	1.3
April	4.0	1.1	5.0	1.1
May	3.5	.8	4.3	.8
June	3.4	1.2	4.5	.7
July	4.1	1.7	5.8	.8
August	3.5	1.3	4.7	1.1
September	3.2	1.2	4.4	1.1
October	2.9	1.0	4.0	1.1
November	2.6	.8	3.4	1.0
December	1.5	.5	2.0	.7
1952—January	3.1	1.2	4.3	.9
February	3.5	1.4	4.9	1.2
March	3.2	1.0	4.2	1.2
April	3.0	.8	3.8	1.0
May	2.9	.7	3.6	.9
June	2.9	1.2	4.0	.8
July	3.4	1.8	5.3	.9
August	3.0	1.6	4.6	1.1
September	2.9	1.5	4.5	1.2
October	2.7	1.3	4.0	1.2
November	2.7	1.0	3.7	1.1
December	1.4	.5	1.9	.7
1953—January	3.2	1.4	4.6	1.0
February	3.6	1.5	5.1	1.2
March	3.1	1.0	4.1	1.2
April	3.2	.9	4.1	1.1
May	3.0	.8	3.9	.9
June	2.9	1.2	4.1	.8
July	3.5	1.7	5.2	.9
August	3.3	1.4	4.7	1.2
September	3.1	1.3	4.3	1.2
October	2.9	1.0	4.0	1.2
November	2.8	.8	3.5	1.1
December	1.4	.4	1.8	.6
1954—January	3.3	1.2	4.4	.9
February	3.6	1.4	4.9	1.2
March	3.3	1.0	4.3	1.3
April	2.9	.7	3.6	1.0
May	3.1	.7	3.8	.9
June	2.8	1.0	3.8	.8
July	3.4	1.5	4.9	.9
August	3.1	1.3	4.5	1.1
September	3.0	1.2	4.2	1.2
October	2.9	1.1	4.0	1.2
November	2.6	.8	3.4	1.1
December	1.4	.4	1.8	.7
1955—January	3.1	1.1	4.2	.9
February	3.6	1.4	5.0	1.2
March	3.0	.9	4.0	1.2
April	2.9	.8	3.7	1.1
May	3.0	.8	3.7	1.0
June	2.9	1.1	4.0	.8
July	3.3	1.7	5.0	.9

TABLE IV–5.—*Department store merchandise ratios*—Continued

	Stocks to sales	Outstanding orders to sales	Stocks plus outstanding orders to sales	Receipt to sales
1955—August	3.0	1.4	4.5	1.2
September	2.9	1.3	4.3	1.2
October	2.9	1.2	4.1	1.2
November	2.6	.9	3.5	1.1
December	1.4	.4	1.8	.7
1956—January	3.3	1.2	4.5	1.0
February	3.6	1.3	5.0	1.2
March	3.0	.9	3.9	1.2
April	3.4	.9	4.3	1.1
May	2.9	.8	3.7	.9
June	2.8	1.2	4.0	.8
July	3.5	1.7	5.2	1.0
August	3.0	1.4	4.4	1.2
September	3.0	1.4	4.4	1.2
October	3.0	1.2	4.2	1.3
November	2.6	.8	3.5	1.1
December	1.5	.4	1.9	.6
1957—January	3.3	1.2	4.5	1.0
February	3.7	1.4	5.1	1.1
March	3.4	1.0	4.4	1.2
April	3.1	.8	3.9	1.1
May	3.0	.8	3.8	.9
June	3.1	1.3	4.3	.8
July	3.5	1.7	5.2	1.0
August	3.0	1.3	4.3	1.1
September	3.2	1.3	4.5	1.2
October	3.2	1.1	4.3	1.3
November	2.8	.8	3.6	1.1
December	1.5	.4	1.8	.6
1958—January	3.3	1.0	4.3	.9
February	4.1	1.3	5.4	1.2
March	3.2	.9	4.0	1.1
April	3.2	.8	4.0	1.1
May	3.0	.7	3.7	.9
June	3.1	1.2	4.3	.8
July	3.3	1.5	4.9	1.0
August	3.0	1.3	4.3	1.1
September	3.1	1.2	4.3	1.3
October	3.0	1.1	4.1	1.2
November	2.9	.9	3.8	1.1
December	1.4	.4	1.7	.6
1959—January	3.2	1.1	4.3	1.0
February	3.7	1.3	5.0	1.2
March	3.1	1.0	4.1	1.2
April	3.2	.9	4.1	1.1
May	3.0	.9	3.9	.9
June	2.9	1.3	4.3	.9
July	3.3	1.7	5.1	1.0
August	3.2	1.5	4.7	1.2
September	3.1	1.3	4.5	1.2
October	3.0	1.1	4.1	1.2
November	2.8	.9	3.7	1.1
December	1.4	.4	1.8	.7
1960—January	3.4	1.2	4.6	1.0
February	3.8	1.4	5.2	1.2
March	3.5	1.1	4.6	1.2
April	2.9	.8	3.7	1.0
May	3.3	.9	4.2	1.0
June	3.1	1.4	4.4	.8
July	3.7	1.8	5.5	1.0
August	3.2	1.4	4.6	1.2
September	3.3	1.3	4.6	1.2
October	3.2	1.1	4.3	1.2
November	3.0	.8	3.8	1.1
December	1.4	.4	1.8	.6
1961—January	3.6	1.2	4.7	.9
February	3.9	1.4	5.3	1.1
March	3.0	.9	4.0	1.2
April	3.5	.9	4.4	1.1
May	3.1	.9	4.0	.9
June	3.0	1.3	4.3	.8

Source: See table IV–3. Except for outstanding orders, these data are available back to January 1939.

TABLE V–1.—*Farm inventory stocks*

[In billions of dollars, as reported in the "Balance Sheet of Agriculture"]

Jan. 1 of—	Current prices			1940 prices		
	Livestock	Crops	Total	Livestock	Crops	Total
1940	5.1	2.66	7.76	5.1	2.7	7.8
1945	9.0	6.68	15.68	5.6	3.2	8.8
1946	9.7	6.3	16.0	5.4	2.9	8.3
1947	11.9	7.1	19.0	5.1	2.9	8.0
1948	13.3	9.0	22.3	4.9	2.6	7.5
1949	14.4	8.6	23.0	4.8	3.3	8.2
1950	12.9	7.6	20.5	4.8	3.2	8.0
1951	17.1	7.9	25.0	4.9	3.0	7.9
1952	19.5	8.8	28.3	5.1	2.9	8.0
1953	14.8	9.0	23.8	5.2	3.1	8.3
1954	11.7	9.2	20.9	5.1	3.4	8.5
1955	11.2	9.6	20.8	5.1	3.6	8.7
1956	10.6	8.3	18.9	5.1	3.5	8.6
1957	11.0	8.3	19.3	4.9	3.4	8.3
1958	13.9	7.6	21.5	4.8	3.7	8.5
1959	17.7	9.3	27.0	5.0	4.4	9.4
1960	15.6	7.9	23.5	5.1	3.8	8.9
1961	15.5	8.1	23.6	4.8	4.0	8.8

Source: U.S. Department of Agriculture, Economic Research Service, "Balance Sheet of Agriculutre."

Benchmark levels for both livestock and crops are drawn from the quinquennial census of agriculture. All figures in the table represent the value of inventories of farm commodities and livestock held on farms in the continental United States as of Jan. 1 of the particular year.

Head count data for livestock are collected from a random sample of 170,000 farms (out of total farms of 4,000,000), whether livestock farms or not, in geographically distributed sample areas. Separate price estimates are collected by crop reporters and the Department of Agriculture makes the valuation based on the 2 sets of figures. At the same time the figure for the previous year is frequently revised following the incorporation of additional data supplied by State agricultural censuses, marketing surveys, etc., which have taken place in the course of the year. Finally, the livestock series is revised back about 4 or 5 years following each census of agriculture. Because of their declining importance as work stock, horses and mules were excluded from the 1961 estimates. A breakdown based on 8 classes of livestock and poultry is avalaible.

A similar procedure is used for the crop inventory series. Physical quantity data are reported for Jan. 1 of each year by crop reporters covering a geographically distributed sample of all farms. To these figures are applied price averages as of Dec. 15 of the previous year. Crop inventories include all crops held on farms for whatever purpose and crops held off farms as security for Commodity Credit Corporation loans. On Jan. 1, 1961, the latter totaled $648 million. Crop inventory estimates are revised only for the previous year. Such revisions reflect the most recent census of agriculture data. A breakdown based on 10 commodity groups is available.

The most recently available published description of this series is in "Impact of the War on the Financial Structure of Agriculture," U.S. Department of Agriculture, Bureau of Agricultural Economics, Miscellaneous Publication No. 567, August 1945. The figures are published yearly in a special release," Balance Sheet of Agriculture," in the August issue of the *Federal Reserve Bulletin* and in summary form in Department of Agriculture, "Agricultural Statistics."

TABLE V–2.—*Net change in farm inventories, livestock and crops, United States, 1950–60* [1]

[In millions]

Year	Livestock and products	Crops	Total
1950	$607	$208	$815
1951	1,017	159	1,176
1952	579	342	921
1953	−81	−540	−621
1954	260	230	490
1955	93	204	297
1956	−281	−134	−415
1957	−99	861	762
1958	556	357	913
1959	408	−316	92
1960	28	230	258

[1] Reflects the physical changes during the year in all livestock and crops on farms, except crops under CCC loan, with the changes valued at average prices for the year.

Source: Department of Agriculture, Farm Income Branch. These figures provide the farm part of the inventory change included in GNP figures. Quarterly figures on the detail shown here are currently published in the Department of Agriculture, "Farm Income Situation," and the total in the *Survey of Current Business*.

TABLE VI–1.—*Inventory stocks in the hands of civilian Federal Government agencies as of June 30, 1960*

[In millions]

Operating inventories of 26 agencies [1]	$231. 6
Construction inventories	44. 4
Standby inventories [2]	67. 4
Total inventories reported	343. 4

[1] Operating inventory for day-to-day operations. Such inventories for short-turnover operations of less than $10,000 are excluded. Atomic Energy Commission, General Services Administration, and Veterans' Administration account for ⅔ of the total shown in the table, and 15 agencies account for 99 percent. Virtually no additional inventory above $10,000 would be found in agencies other than the 26 which account for the total shown. The total shown, on the average, accounts for a 7 months' supply. Total supplies issued from inventory amounted to $527,500,000 during the 1960 fiscal year.

[2] Standby inventories represent amounts set up for emergency contingency, and maintenance and repair, excluding inventories of less than $10,000 at a single supply point.

Source: Office of Supply Management, Federal Supply Service, General Services Administration, U.S. Government. The figures were supplied in a special report for GSA use entitled "Agency Supply Activity Reporting to GSA." The information was collected on "GSA Form 1473: Supply Activity Report." The report is "designed to afford supply management officials a broad picture of the procurement and supply activities of the various bureaus and major subdivisions of Federal agencies." It replaces earlier reports on inventory and procurement, from which GSA was unable to obtain any comparable data. The 242 separate reports on which the above figures are based were received from 9 departments and 35 independent agencies, involving 74 agency warehouse operations and nearly 1,000 agency storeroom operations.

TABLE VI–2.—*Inventory stocks held by the Commodity Credit Corporation*

[End-of-year inventories in millions of dollars]

Program and basic commodities	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Price support program:											
Basic commodities:											
Corn	617	614	447	590	1,003	1,300	1,724	1,966	2,037	2,173	2,445
Cornmeal							1	1	2		
Cotton:											
Extra long staple	(1)					34	1	1	10	17	17
Upland	17	1	32	33	310	1,437	1,146	683	226	1,312	837
Peanuts:											
Farmers' stock	3	34	13	13		1	6	2	(1)	2	3
Shelled								8	5	11	10
Rice:											
Milled	2	(1)			20	167	116	59	46	40	14
Rough	(1)	(1)	(1)		(1)	9	2	30	15	18	4
Tobacco	1	1	1	1	1	(1)			8	4	
Wheat	653	350	352	1,177	1,962	2,399	2,294	2,132	2,192	2,892	2,948
Wheat flour							1	5	14		(1)
Total, basic commodities	1,294	1,000	846	1,814	3,296	5,347	5,291	4,886	4,554	6,469	6,276
Other price support commodities	631	207	208	804	935	735	601	561	894	983	1,124
Total, price support	1,926	1,206	1,053	2,618	4,231	6,082	5,892	5,447	5,448	7,452	7,400
Supply program	18	58	64	75	22	17	1	1	1	1	1
Foreign purchase program			1	1							
Emergency feed program				27	(1)						
Total, all programs	1,944	1,265	1,118	2,722	4,254	6,100	5,893	5,448	5,449	7,453	7,400

[1] Less than $500,000.

Source: These figures were supplied by the Fiscal Division of the Agricultural Stabilization and Conservation Service, Department of Agriculture. They are published yearly in Department of Agriculture's Agricultural Statistics.

TABLE VI–3.—*U.S. Government stockpile—Summary of Government inventories of strategic and critical materials*

[Values in millions of dollars based on market prices as of the dates shown]

	All strategic and critical materials				Specification grade only, of materials having objectives	
	Mar. 31, 1961	Dec. 31, 1960	Dec. 31, 1959		Dec. 31, 1958	Dec. 31, 1957
I. Total inventories:						
Strategic stockpile	5,670	5,706	6,277	6,127	5,777	5,868
Defense Production Act	938	935	887	756	632	312
Supplemental stockpile	830	799	627	609	[1] 340	[2] 276
Commodity Credit Corporation account	93	99	135	131	245	178
Federal Facilities Corporation (tin)	9	9	9	9	9	8
Grand total	7,540	7,548	7,935	7,632	7,003	6,642
II. Inventories within strategic stockpile objectives:						
Strategic stockpile	3,953	3,976	4,336	----------	3,740	----------
Defense Production Act	155	156	107	----------	111	----------
Supplemental stockpile	171	162	166	----------	16	----------
Commodity Credit Corporation account	41	51	63	----------	14	----------
Federal Facilities Corporation (tin)	0	0	0	----------	0	----------
Total	4,320	4,345	4,671	----------	3,881	----------
III. Inventories excess to strategic stockpile needs: [3]						
Strategic stockpile	1,717	1,730	1,942	----------	----------	----------
Defense Production Act	784	779	780	----------	----------	----------
Supplemental stockpile	658	637	461	----------	----------	----------
Commodity Credit Corporation account	52	48	72	----------	----------	----------
Federal Facilities Corporation (tin)	9	9	9	----------	----------	----------
Total	3,220	3,203	3,264	----------	----------	----------

[1] For this purpose includes $13,000,000 inventory held by Interior and later transferred to supplemental stockpile.

[2] For this purpose includes $8,000,000 inventory held by Interior and later transferred to supplemental stockpile.

[3] Includes specification and nonspecification grades of materials with objectives and total quantities of materials without objectives.

Strategic stockpile (specification grade only, of materials having objectives), Dec. 31:

1956	$6,500	1951	$3,440
1955	6,300	1950	2,719
1954	5,000	1949	1,149
1953	4,226	1948	821
1952	4,025		

Source: Stockpile Coordination Office, Production and Materials, Office of Civil and Defense Mobilization, Aug. 8, 1961. These figures are currently available in "Stockpile Report to Congress," issued twice a year. There is no overlap between these figures and those shown in table V–1.

TABLE VI–4.—*Defense inventories as of June 30* [1]

[In billions of dollars]

June 30	Total stocks	Undistributed stocks	Remaining total	Peacetime operating	Mobilization reserve	Economic retention	Contingency retention	Excess stocks	Claimant
1960	41.73	2.08	39.64	15.66	10.89	6.62	1.36	5.12	[2]
1959	44.20	3.06	41.15	15.31	11.53	4.70	1.61	7.15	0.85
1958	46.59	2.45	44.15	14.54	12.13	5.59	1.05	10.45	.41
1957	52.75	4.73	48.01	[3]	12.24	[3]	[3]	6.69	.54
1956	50.03	2.61	47.42	[3]	12.34	[3]	[3]	6.20	1.74
1955 [4]									
1954 [4]									

[1] Source: U.S. Department of Defense, Office of the Comptroller, "Real and Personal Property of the Department of Defense."

Department of Defense inventories are accounted for in the supply systems of the military services from time of acceptance by the service until they have been issued to a using unit. The supply system inventories are those being held in the storage or warehousing facilities of the military services for issue to the consuming military unit. Supply items which have been issued to the consuming military units, even though still in inventory, are not included in this table.

Figures are available for each service showing the dollar amount of inventories in each major commodity category (groupings of similar kinds of supplies and equipment) for each stratum (groupings according to the purpose for which the supplies are retained). These strata are defined as follows:

(*a*) Peacetime operating stock is material which is required to equip and train the planned peacetime forces.

(*b*) Mobilization reserve stock is material required to meet the mobilization reserve material requirement.

(*c*) Economic retention stock is that portion of the quantity in long supply which it has been determined will be retained for future peacetime issue because such is considered more economical than future procurement.

(*d*) Contingency retention stock is that portion of the quantity in long supply of an obsolete or nonstandard item for which no programed requirements exist and which normally would be considered as excess stock but which has been retained for possible military or defense contingencies.

(*e*) Excess stock is stock on which specific determination as being within the needs of the holding activity has not been made nor disposal action initiated.

(*f*) Claimant stocks are stocks on hand in a military service which are being held for another service or Government agency.

Under the "single manager" system a service owns all wholesale stocks in an assigned commodity area for all the services in the Department of Defense. The Army is currently the single manager for subsistence, and clothing and textile stocks, and the Navy is the single manager for medical and dental materials. These single manager stocks account for 25 percent of all Department of Defense inventories. This classification affects the division of inventories between the services but does not influence the distribution in the table presented here.

In addition to the totals shown here, minor additional items are not included in this classification. Shipboard supplies not included in 1960 are $276,000,000 and in 1959 are $263,000,00. In the 3 preceding years aircraft spare engines also were not included. Adding in these omissions, the following larger totals are obtained (years ending June 30):

	Billions
1960	$42.00
1959	44.47
1958	47.65
1957	53.80
1956	50.97

Reports on inventories as of Dec. 31 were made additionally for 1954, 1955, and 1956.

[2] In 1960 claimant stocks were not segregated from the other classifications in the table.

[3] In fiscal 1956 and fiscal 1957 the Air Force distributed inventories by a different system which makes Department of Defense totals impossible in these years.

[4] A roughly comparable figure to those in footnote 1 for June 30, 1955, is $50,780,000,000 and for Dec. 31, 1954, is $50,640,000,000.

INVENTORIES, INVENTORY INVESTMENT, AND INVENTORY CONTROL—A SELECTED BIBLIOGRAPHY

By

Julius W. Allen and Richard H. Gentry

Economics Division, Legislative Reference Service

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INVENTORIES, INVENTORY INVESTMENT, AND INVENTORY CONTROL—A SELECTED BIBLIOGRAPHY

This bibliography is intended to provide a guide to major items in the literature concerning inventories, their behavior in the aggregate, their role in business cycles and business cycle theory, and inventory control. In the course of preparing the bibliography it became apparent that the great bulk of the recent literature in the field referred back either directly or indirectly to two major studies, those by Abramovitz and Whitin, the first two listed in the bibliography. Although both are major works providing a broad synthesis of several topics, their focus is quite different. The Abramovitz book deals primarily with inventories as factors in business trends, a macroeconomic approach. Whitin's study, although based in part on earlier contributions of Arrow, Harris, and others, is a significant contribution in the field of inventory control, or what is often called the inventory problem, i.e., determining optimum inventory levels for a firm; in other words, following a microeconomic approach.

Recognizing the limitations and subjective judgments involved in any classification and the fact that many works will in fact cover areas that involve both a macroeconomic and a microeconomic approach, a few of them specifically attempting to relate the two, the compilers found it practical to separate the bibliography for the most part into these two approaches. As a result, the following subject outline is used:

I. Major general works.
II. Works essentially oriented towards inventory cycles, inventory investment, and aggregative inventory behavior.
    A. Major theoretical works originally published prior to 1950 which consider "stocks" in macroeconomic analysis.
    B. Inventories and the business cycle.
    C. Inventory policies of particular industries and at various times.
    D. Statistics of inventories.
    E. Miscellaneous, including inventories and credit availability, taxation, and accounting.
III. Works essentially oriented to inventory behavior of individual firms and inventory control.
    A. Theoretical works on inventory of a firm.
    B. Inventory control—economist oriented.
    C. Inventory control—management oriented.

Author index.

There are several specific types of works and related areas which are not covered in this bibliography. They include the following:

(1) Works in languages other than English.
(2) Works that are not available in print, such as those on microfilm.
(3) Business and trade reports on the status of particular inventories of a firm, industry, or the economy at large at a specific time.
(4) Works dealing with inventory accounting and its problems.
(5) Works on techniques for taking stock inventories.
(6) Textbooks on business cycles, which generally include a discussion of inventory cycles.

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I. Major General Works

1. Abramovitz, Moses. Inventories and business cycles with special reference to manufacturers' inventories. New York, National Bureau of Economic Research, 1950. 632 p.

   Probably the most basic and widely quoted book in its field. Consists of three main parts: (1) theories, materials, and methods of measurement; (2) cyclical behavior of inventories, especially in manufacturing; and (3) cyclical behavior of inventory investment.

2. Whitin, Thomson M. The theory of inventory management. 2nd ed. Princeton, New Jersey, Princeton University Press, 1957. 347 p.

   A fundamental work on optimizing inventory levels for the firm. Also deals with theories of inventories in the economy and inventory control in the national military establishment. Second edition contains an appendix of six articles published during 1954–1956. A 14-page bibliography is included.

II. Works Essentially Oriented Towards Inventory Cycles, Inventory Investment, and Aggregative Inventory Behavior

A. Major theoretical works originally published prior to 1950 which consider "stocks" in macroeconomic analysis

3. Hawtrey, R.G. Capital and employment. London, Longmans, Green and Co., 1937. 348 p.

   A critical evaluation of prevailing business cycle and employment theories. Stress is placed on the role of stocks in valid cycle theory.

4. ——— Trade and Credit. London, Longmans, Green and Co., 1928. 189 p.

   Extensive references to stocks of commodities and industrial fluctuations in the second half of the volume.

5. Kaldor, Nicholas. Speculation and economic stability. Review of Economic Studies, vol. 7, October 1939: 1–27.

   A survey of the effect of holding stocks with a view to resale at a higher price on economic stability. Includes a section on monetary policy and stability.

6. Keynes, John M. The general theory of employment, interest, and money. New York, Harcourt, Brace and Co., 1936. 403 p.

   Includes several references to inventories (stocks) in relation to business cycles, especially in chapter 22.

7. ——— A treatise on money, vol. II. New York, Harcourt, Brace and Co., 1930. 424 p.

   See especially chapter 29, pp. 130–147, which deals with fluctuations in the rate of investment in "liquid capital" or inventories.

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