

INVENTORY CYCLES AND THE DUAL STRUCTURE

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I Hypothesis

One may regard the title of this article as a bit eccentric, because despite the general recognition of the influence of the dual structure on economic growth, its influence on short-run business cycles is not so well comprehended. We have not come across any empirical study of this problem for any other country.

Our problem is as follows: As we have discussed elsewhere¹, the dual structure which has evolved in Japan has a close connection with the concentration of capital into the big corporations. This connection may be due to the fact that the banks have intimate ties with the big corporations in the institutional arrangement of the *zaibatsu*, etc., certainly the long-term and short-term lending policies of the banks have a strong bias in favor of big firms. Our analysis here attempts to throw new light on the influences this basic fact may have on short-term business cycles.

In a series of postwar business cycles (tight money policy—recession—recovery—boom), the key point in the following discussion lies in the fact that the smaller businesses very often served as a cushion, i.e., the disadvantages attendant on the process of the business cycles were shifted from the large to the smaller firms. As a model, we have a following picture in mind. When a policy of tight money was being pursued, loans to smaller firms were first curtailed, while for the time being, the big firms were not subject to restriction, sometimes continuing to receive loans even for inventory accumulation. If this is so, it is clear that the recession in the credit cycle will begin with small business, and only with some lag will begin to show a downturn for the bigger firms. Therefore, according to our hypothesis, the upper turning point for small and medium firms will precede those for big firms.

Second, we can assume a situation in which, as a result of the tight money policy, imports decline, exports increase and the balance of payments shows a surplus. In such a situation, the money market becomes very easy; the banks, with surplus funds, will engage in lending competition, with the result that the hitherto suppressed loans to small and medium-scale firms will turn upward. The loans for bigger firms, however, will rise only after some lag, as they were not so severely curtailed. Therefore it is likely that the index of loans to smaller firms will lead that of the bigger firms in the recovery phase.

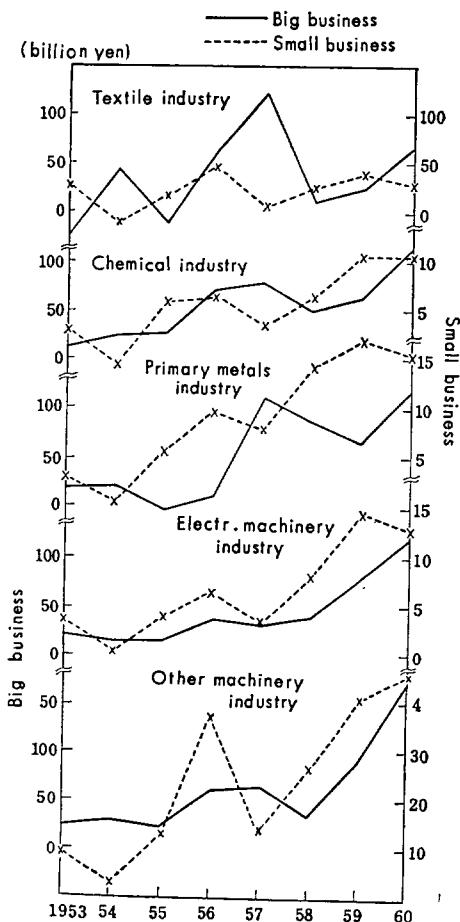
The third phase is the boom phase. As soon as the economy enters a "hot" boom like that of 1956, the big firms' demand for funds will increase sharply, and the banks will try

¹ "Some Causes and Consequences of Economic Growth in Japan," *Malayan Economic Review*, April 1961.

to meet their demand as much as possible. Once such a situation commences, it places a drain on the funds which might be allocated toward smaller businesses, so loans to the latter begin to decrease. So, the peak lending to smaller businesses precedes the peak for big business. Thus, since the peak as well as the trough of the credit cycle for small firms leads that of the big firms, the credit cycle as a whole shows this precedence on the part of small business loans.

The above model depends on the assumption that there is an inseparably close connection between the banks and the big corporations, and that the supply of loanable funds is always insufficient to meet the rapidly growing demand. We intend in the following to test this inference numerically against postwar Japanese experience.

Figure 1 *Increments in Loans Outstanding: Big and Small Business*

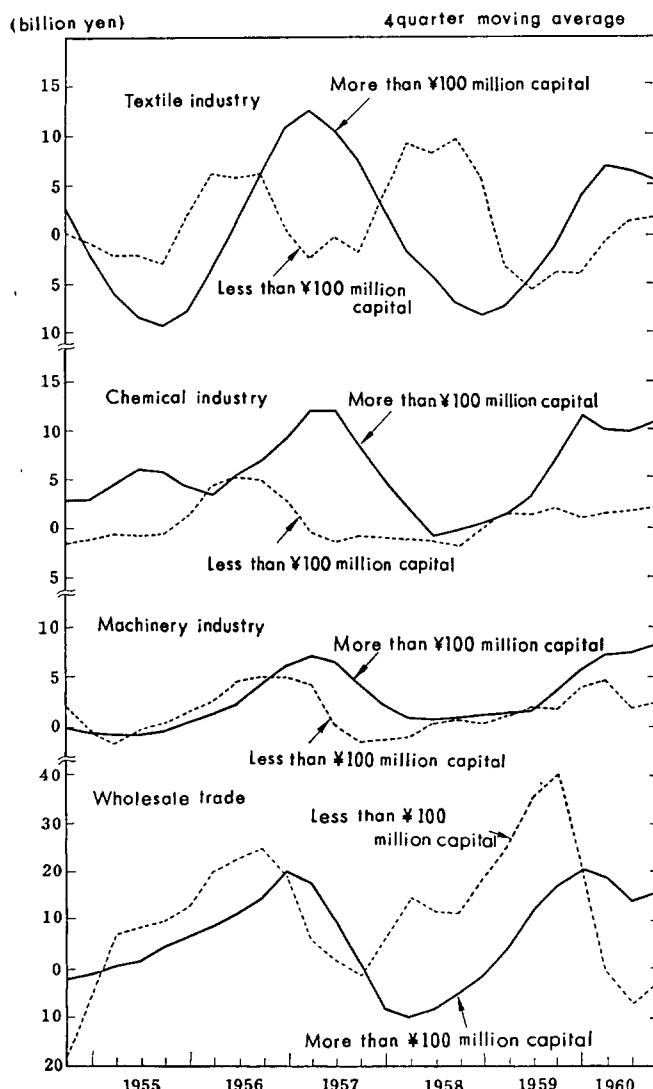


Sources: The Small Business Finance Corporation, *Chusho Kigyo Kinyu Tokei Shiryo* (Statistics on Small Business Finance) (*Chosa Jiho*, Vol. 1, No. 5; Vol. 2, No. 7.); and *Kinyu Tokei Hannenpo* (Semi-Annual Report of Financial Statistics), July, 1961.

Note: In order to trace data back to 1953, it was necessary to restrict financial institutions to all banks, and trust accounts of all banks in the case of big firms, and to all banks, trust accounts of all banks, and Credit Associations in the case of small firms.

II Lead of the Small Firms in Credit and Inventory Cycles

Figure 2 *Inventory Changes: Large and Small Business in Four Industries*

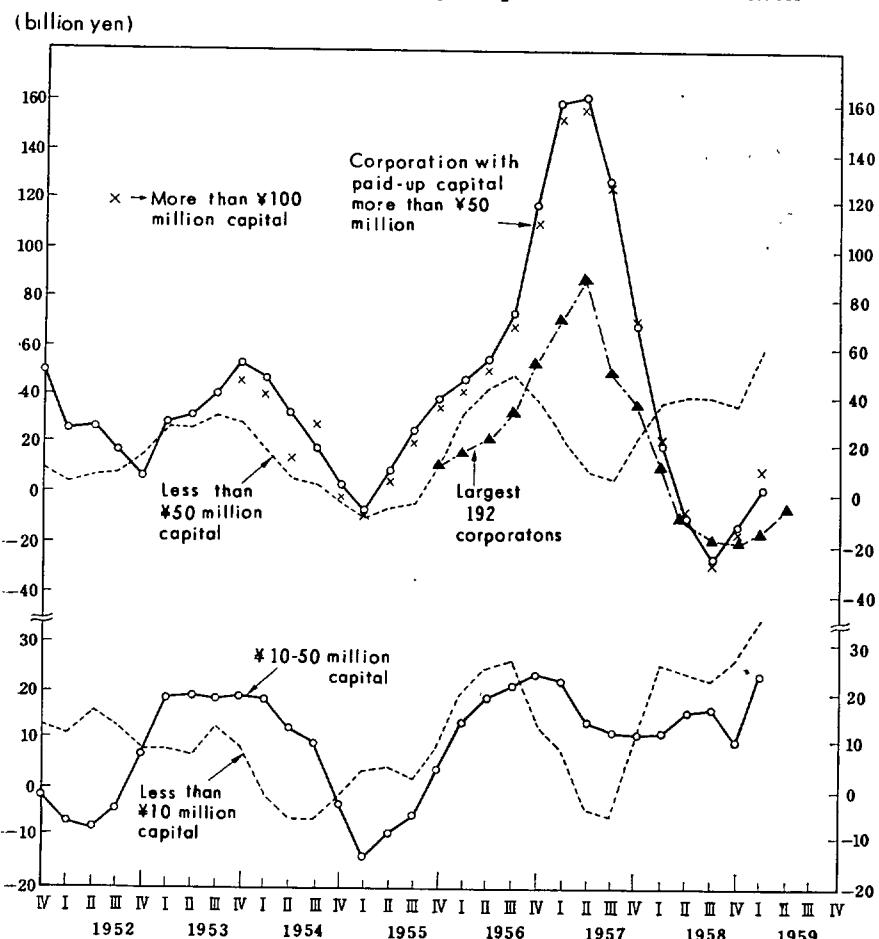


In a economy in which firms are extraordinarily dependent on bank borrowing, differences in the credit cycle patterns between large and small firms will naturally be reflected also in their inventory cycles. There seems to be an intimate relation between loans and inventory investment; in particular, movements in the supply of working capital directly regulate the movement of inventory investment in postwar Japan. Therefore, we shall take up here together, two aspects of the short-run cycles, viz., the credit and inventory cycles, in order to elucidate the influence of the dual structure on business cycle patterns.

In Figure 1, increments in loans outstanding from financial institutions are depicted by industry for large and small firms. By big firms, we mean those with paid-up capital of more than 10 million yen, and by small firms, those with less than that figure. Year-to-year increments in outstanding loans, both operating and equipment, are illustrated for five industries, viz., textiles, chemicals, primary metals, electrical machinery, and other machinery. We have disaggregated the series into in-

dustries to avoid the possibility that a lead on the part of small business loans for industry as a whole might reflect differences in the cycle between industries. But the lead of loans to small business is evident in each industry except electrical equipment, and even there, if four quarter moving averages were to be depicted, some lead could be found. In the 1954—

Figure 3 *Inventory Investment, 1952—1959, (4 quarter moving average) by Size of Corporations in All Industries*



Source: Computed by the Ministry of Finance, Quarterly Report of Corporate Enterprise Survey.

'55 depression, the small firm troughs are all found in 1954, while those of the big firms, except in electrical machinery, are all in 1955. In the 1956—57 boom, the small firm peaks come in 1956, and those of the big firms in 1957.

This duality in the credit cycles should naturally be reflected in different inventory cycles for big and small firms. By selecting four industries, viz., textiles, chemicals, machinery, and wholesale trade, from the Quarterly Report of the Finance Ministry's Corporate Enterprise Survey, we can depict the inventory cycles for large and small business in 1954—59. The dividing line here is 100 million yen paid-up capital. Although these figures are not adjusted by the changes in inventory valuation, they should suffice to show the lead and lag relation in the inventory cycle.

Figure 2 depicts the lead of the small business inventory cycles in the four industries named; a similar lag is also found in the paper and allied products, iron and steel, electric machinery, shipbuilding, and other transportation equipment industries. Thus, the lead of the smaller firms in both the credit and inventory cycles is almost beyond doubt, and seems to be a pronounced trait of the Japanese economy.

We have so far treated our hypothesis by using data divided only into large and small firms. But there are series available dividing the firms by size in more detail. Figure 3 depicts the inventory cycles of different sizes of firms, although here the disaggregation by industry is abandoned. Here too we find that the large firms' cycles lag behind those of the smaller firms. In the 1956-57 boom, for instance, the inventory investment of the largest 192 corporations peaked in April-June of 1957, while firms with paid-up capital of less than 10 million yen had reached their peak in July-September of the preceding year. That is, the latter peak led by three quarters. In the following recession, the small business trough occurred in July-September, while that of the large firms occurred in October-December 1958, with a lag of five quarters.

III Difference in the Cycles of Incorporated and Unincorporated Firms

We have shown above that the small firms always lead in the credit and inventory cycles. But does the hypothesis hold true for the lag-lead relationship between incorporated and unincorporated firms?

For estimates of inventory investment allocated between incorporated and unincorporated business, we can use data from the official national income statistics. There seems, however, to be serious doubt about the reliability of the official estimates of inventory investment, especially in relation to the unincorporated sector. Before proceeding with our analysis, therefore, it may be appropriate to discuss the basic data on inventory investment in the unincorporated sector.

In connection with inventory investment by unincorporated businesses, Mr. Nobuyoshi Namiki² has recently raised an interesting point. If the official inventory investment estimate for the unincorporated sector (inclusive of inventory valuation adjustment) is deducted year by year from the noncorporate, total inventories of the National Wealth Survey, 1955, we get a very strange result. The inventory balance for non-farm unincorporated enterprises would become negative from 1951 backward, and in the case of farmers' inventory balance, from September 1955 backward. Namiki believes that there was a very large undervaluation of farm inventories in the National Wealth Survey, and in the case of non-farm unincorporated firms, the inventory investment in the national incomes statistics has been greatly overestimated, in addition to the possible under-valuation (?) of inventories in the 1955 Wealth Survey. In the case of farm inventories, if the inventories (¥ 206 billion) in December 1955 of the Wealth Survey were to be increased by about four times, then he finds that there would be no minus balances in the earlier period, and also that it would almost be compatible with estimates of inventories from the data of the Farm Household Economy Survey,

² N. Namiki, *Zaiko Hendo nikansuru Jakkan no Bunseki* (An Analysis of Inventory Changes), Economic Planning Agency, Economic Research Institute, Research Series No. 4.

(using the procedure: per unit inventories \times total number of farm household).

In view of the statistics Mr. Namiki has cited, his judgment seems to be approximately correct. In this paper, we shall devote ourselves to a study of inventory investment in non-farm unincorporated firms. As a basic data in this field is from the *Unincorporated Commercial and Manufacturing Enterprise Survey*, by the Bureau of Statistics, Office of the Prime Minister, it is necessary to examine it in detail. Unfortunately, the size of the sample used in this survey is very small, about 500 units each in manufacturing and in commerce, respectively, inventory investment per unit of enterprise, which is the basis of the estimate in the official statistics, is derived in the manner suggested in Table 1.

Table 1 relates to manufacturing. As the basic data is essentially weak, we must strengthen the data to yield more reasonable figures. In *each quarter*, the inventories at the beginning and the end of the period per unit of enterprise are surveyed, and the difference is assumed to comprise inventory investment. This is, in turn, enlarged by some device to aggregate non-corporate inventory investment quarter by quarter in the national income statistics. The problem is that, as the sample is very small (around 500), the inventories at the end of one quarter from a given survey frequently differ from those at the beginning of the next quarter in the next survey. In a given firm, the two should be the same. Therefore, we have attempted to compute two other reference series (the second and the third column) in Table 1. The second column is computed as differences between inventories at the end minus those at the beginning of *each fiscal year*. Although the series in the first column does not show any marked cycle, the second series indicates clear ups and downs which correspond perfectly to the actual business cycles. However, since the figure at the beginning of the year is not equal to that at the end of the previous year, we have averaged the two and used the averages as inventory figures for each quarter. In this case, the sample may be thought to be automatically doubled from about 500 to about 1,000 each in

Table 1 *Inventory Changes per unit of Enterprise in Unincorporated Manufacturing*

Fiscal year	Inventory Changes, I	Inventory Changes, II	Inventory Changes, III
	Total at the end <i>less</i> Total at the begin. <i>of each quarter</i> —official estimate—	Total at the end <i>less</i> Total at the begin. <i>of each fiscal year</i>	Average of totals at the end of this quarter and at the begin. of next quarter <i>less</i> average of totals at the end of last quarter and at the begin. of this quarter
1952	66,696 (yen)	-9,558 (yen)	— (yen)
1953	30,258	22,027	9,190
1954	35,303	-26,556	5,440
1955	32,685	19,821	7,198
1956	35,717	59,877	45,649
1957	59,724	-58,938	-57,407
1958	41,207	76,960	41,078

Source: The Bureau of Statistics, *Kojin Shokogyo Keizai Chosa* (Unincorporated Commercial and Manufacturing Enterprise Survey).

manufacturing and commerce respectively. Thus, the third column is the increment in each fiscal year of the averaged inventories. In this case also, we get a fairly reasonable cyclical fluctuation. The above three series are unadjusted with respect to inventory valuation changes, but the error due to this omission would be very much smaller in this sphere than that due to the incorrect treatment of the basic data.

From 1953 to 1958, the accumulated total of inventory changes is ¥ 234,894 according to the first column, but ¥ 93,191 according to the second column, and ¥ 51,148 according to the third column. The third series seems to be most reasonable and reliable, with the total of the third minimized to 22% of the total of the first. As the inventory investment is presumed to be overestimated in the non-farm non-corporate sector, this method of minimizing it would be a useful guide in improving the official national income statistics. When we look at the official statistics, we are surprised to see such high shares of non-corporate inventory investment in the total private inventory investment. From fiscal year 1951 onward, this proportion moves as follows: 29.2% (1951), 41.1% (1952), 41.2% (1953), 57.4% (1954), 41.4% (1955), 13.8% (1956), 29.0% (1957), and 424.7% (1958). There may be something wrong in this. I feel confident that the weakness in the statistics can be overcome in some degree, if we carefully handle the basic data along lines suggested above.

Then, why is first column of Table 1 too high, and the second and third columns more reliable? What is the reason underlying this? The search for the reason is not simple, but there may be a tendency for firms to decrease the inventories on their books at the beginning of the period and increase them at the end, to hold down the amount of sales and profits subject to taxation. If this is the case, the inventory investment estimates in the first column are systematically overstated. We should direct our attention, then, not to the *increase or decrease* of inventories in the sample at the particular period, but to the *level* of inventories at different periods. The level seems more dependable than the changes within the same sample, for it seems to reflect generally the changing inventory situation. From

Figure 3 (A) *Inventory Investment per Unit of Manufacturing Enterprise in the Non-Corporate Sector, 1953—1958*
—Smoothed out by 4-quarter moving average—

this point of view the average inventories in the third column would be more useful.

How about the quarter-to-quarter behavior of inventory investment in the third column? The graphic representation in Figure 4, adjusted for inventory valuation changes and smoothed by the use of four quarter moving averages, clearly shows inventory cycles similar to those of small corporations with paid-up capital under 10 million

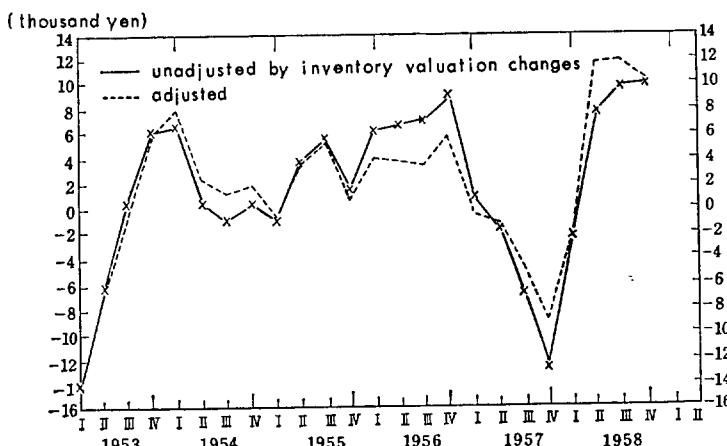
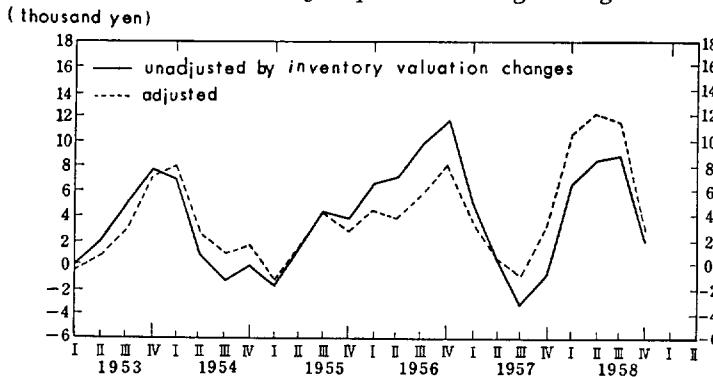


Figure 3 (B) *Inventory Investment per Unit of Retail and Wholesale Enterprise in the Non-Corporate Sector, 1953-1958*

—Evened out by 4-quarter moving average—



sector's inventory cycle over that of the corporate sector as a whole is hereby indirectly demonstrated, although the former data is given by individual enterprise and the latter (corporate enterprise) is in aggregate terms.

The existence of this lead-lag relation between the small and big business cycles suggests the following remarks:

- 1) It is not clear whether or not the duality of the credit and inventory cycles discussed above are peculiar to the Japanese economy. In view of the fact, however, that we have never seen such an analysis for other countries, there is a possibility that this characteristic is special to the Japanese economy. If so, the concentration of capital in the big firms seems to have played a role not only in the formation of the dual structure in a secular or structural sense, but also in creating a double sequence of credit cycles in the short-run or cyclical sense.
- 2) In such an economy, monetary policy would have a particularly differential effect between large and small business, and might even contribute toward widening the duality of the economic structure, as against the conventional view that it would have a uniform or "neutral" effect on the economy.
- 3) If there is a lead in the credit cycle of small business, we can use it in economic forecasting. By paying attention to the movement of loans to small business, we can predict the peak or trough in the big business credit cycle or in the aggregate cycle. We shall attempt a statistical analysis of this proposition in the following section.

IV *The Duality of Credit Cycles and Economic Forecasting*

If there has been an empirical rule that the inventory and credit cycles of small and middle-sized firms precede those of big firms by three or four quarters, we can make use of this relationship in economic forecasting. Let us take up here, for example, the quarter-to-quarter increments in outstanding loans for operating funds by all financial institutions to large and small enterprises, using a paid-up capital of 10 million yen as a dividing line.

yen in Figure 3 (A) and (B). It is interesting, moreover, that the pattern of fluctuations is similar in both manufacturing and commerce.

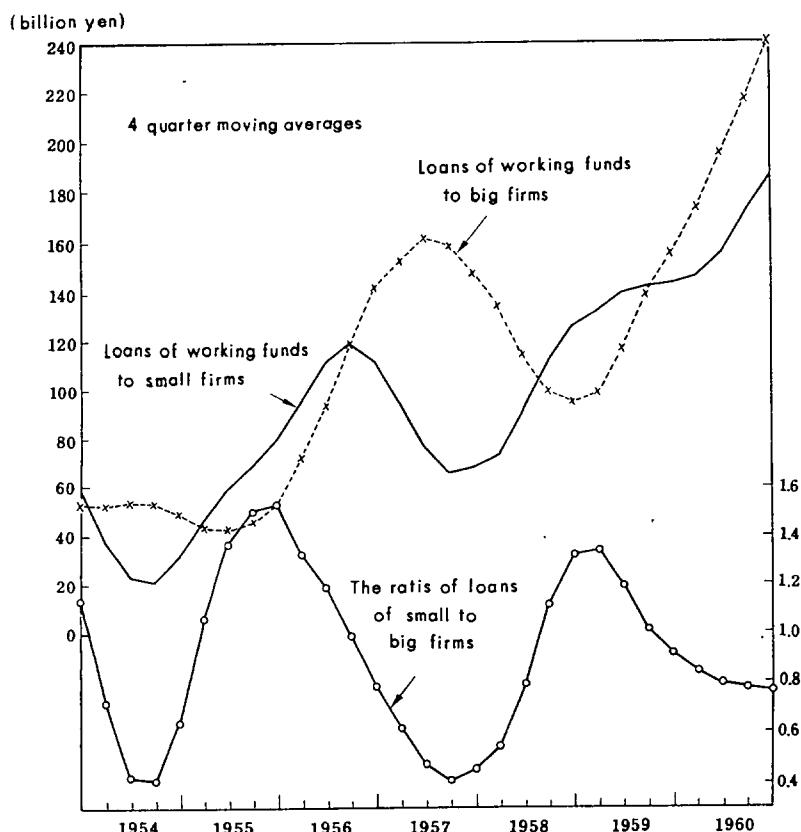
Comparing the movement of unincorporated non-farm inventory investment with the inventory investment of the smallest corporate enterprises, we find a similar timing of the upper and lower turning points. The lead of the unincorporated

Figure 5, in four quarter moving averages, depicts very clearly the double sequence of the credit cycles in large and small business.

In the trough of the 1954-55 recession, we can see a lead by small business of about three quarters, and in the peak of the 1956-57 boom the lead is again about the same length. In the trough of the 1957-58 recession, the big business lag lengthened to about five quarters. This lengthened lag should be noted. Also to be noted is the fact that the big business curve intersects that of the small firms about nine months before the peak of the former (April-June 1957), and that this point of intersection (July-September 1956) was the peak of the small business cycle. In 1959, however, July-September became again the intersection point of the two cycles. Nevertheless, April-June 1960 was not a turning point in the big business cycle. The curve was still following an upward tendency. Moreover, the small firms' cycle does not peak at this point of intersection; it also continues to rise, although there was a conspicuous retardation of the rate of increase about this time.⁸

If the credit cycle picture for 1954-59 is taken as typical, then we may predict me-

Figure 5 *Credit Cycles for Large and Small Business*



⁸ Rigorously speaking, the two trends in the big and small business cycles should be the same, in order that such a judgment on forecasting can be established. Therefore, our analysis will have also a limitation in this respect.

chanically that, from the point of intersection (July—September 1959), a recession in the small firms' cycle should emerge. But actually, both the large and small business curves continued to rise after that date. Is this an indication that the duality of the credit cycles is not sufficient as a tool of economic forecasting? Perhaps it would not be sufficient. No tool, however, has been sufficient in itself. We believe that the comparison of these movements would be a useful addition to our tools of economic forecasting.

The different pattern of movement in the credit cycles after July—September 1959 from the pattern before that time may be explained by the extraordinary rise in fixed investment in 1959—60 (a 38% increase), motivated by a concern on the part of entrepreneurs to strengthen their competitive power in the face of the coming liberalization of foreign trade⁴, and by the acceleration of the small business financing through policy measures. This boom in fixed investment probably pulled up inventory investment too, disturbing the tendency we have described above. We can note, however, the slowing of the upward tendency of the small firms' cycle toward the end of 1959. This may justify our view that the end of 1959 might have been the upper turning point of the small firms' credit cycle, had other things been equal.

Our analysis so far has contributed to some extent toward a prediction of the turning point of the inventory cycle. For instance, we have come across predictions that the inventory boom would end at the end of 1958, around April 1959, or around June 1959. But based upon the above analysis, we could have strongly contradicted these opinions, for the loans of working funds to the big firms reached their trough just around the end of 1958, as we can see in Fig. 5, so that could hardly have been the peak of the inventory cycle. April or June 1959 still could not be the upper turning point, because the upswing phase would have been too short in that case. Thus our analysis of the duality of credit and inventory cycles has been effective so far in judging the turning points, though the regularity of the cycles was disturbed somewhat after the middle of 1959. Probably because of the intense investment boom of 1959—60, the period of this inventory-credit cycle is being prolonged. Nevertheless, we note that the cycles thus analyzed show about a three year period. A similar period can be seen also in the ratio of loans to small and large business in Figure 5. It is probable that even if the peak-to-peak length of the big firms' credit cycle is prolonged to a little more than three years, we may soon see a cyclical decline in 1961.

⁴ The Japanese government has declared its intention to raise the proportion of imports liberalized from 65% to 90% by September 1962.