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CYCLICAL VARIATION IN HOUSEHOLD TANGIBLE ASSETS AND CREDIT

The findings so far indicate that the behavior of households has become an increasingly important factor in determining the rate of gross capital formation in the United States. But do changes in the rate of household capital formation qualify as an important source of cyclical instability in the economy as a whole, as has historically been the case with capital formation by business enterprises? The literature on business cycles commonly assigns to fixed investment by business enterprise the dominant causal role in major economic expansions and contractions, and to inventory change the dominant role in less severe expansions and contractions. Although much disagreement exists about why expansions and contractions come to an end or why they begin, enterprise motivations to expand capital facilities or inventories at varying rates are heavily stressed. On the whole, households have been assigned a passive role in the analysis of cyclical movements; changes in their expenditures are presumed to follow in the wake of the income movements generated by investment activity in the enterprise sector. But it can plausibly be argued that attempts on the part of households to adjust their stocks of tangible assets to levels consistent with their present and prospective incomes, and to a structure that makes optimum use of technological innovation, will lead to precisely the same kind of acceleration and deceleration of the rate of change in capital stocks as do attempts on the part of business enterprises to adjust the size of their capital stock in order to maximize profits.[1]

[1] Recent empirical studies of the demand for household tangible capital—automobiles, appliances, housing, etc.—have treated purchases of household durables as a way of adjusting to the difference between actual and "preferred" or "desired" stock position. Preferred or desired stocks of household tangible assets are

TANGIBLE ASSETS

An investigation of the causal factors underlying cyclical movements in income and output is beyond the scope of this study. But an investigation limited to establishing the relative variability of enterprise and household capital expenditures is useful, simply because of the growing relative importance of the latter. In addition, it is often true that expenditures which generate cyclical fluctuations will show greater relative variability than those which follow in the wake of the generating factors. Four of the series described in Chapter 2 are used for this analysis: enterprise expenditures on structures and equipment (E_s and E_d, respectively), and household expenditures on structures and equipment (H_s and H_d, respectively).

There are a number of alternative ways by which relative cyclical variability can be measured. Perhaps the most straightforward measure is a simple comparison of the relative size of expansions and contractions within the reference cycle chronology developed by the National Bureau of Economic Research. The four series described above were matched against the NBER reference cycle chronology, and the percentage change from reference cycle trough to peak and from peak to trough computed. A good measure of cyclical amplitude within this framework consists of the algebraic difference, percentage increase during expansions less percentage decrease during contractions. For series that conform positively to reference cycle movements, the amplitude measure will be the sum of the two absolute changes, since in this case the series will show increases during reference cycle expansions and decreases during contractions.[2]

Table 9 summarizes the amplitude measures for all reference cycle

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generally related to the household's long-run (permanent) real income and to the relative price of the asset, while purchases are explained as consisting of some fraction (representing a lag in adjustment) of the difference between desired stock so defined and actual stock at the beginning of the period. Examples of this treatment can be found in A. Harberger, ed., *The Demand for Durable Goods,* Amsterdam, 1960, and G. Chow, *The Demand for Automobiles in the U.S.,* Amsterdam, 1957.

[2] A comparison of amplitudes measured against reference cycle dates will not necessarily show the same result as a comparison of amplitudes in the series themselves; it depends on whether the series to be compared have the same leads and lags vis-à-vis the reference cycle peak and trough dates. Thus one series with a relatively small specific cycle amplitude but perfect conformity (zero leads and lags) to reference cycles might show a larger reference cycle amplitude than another series with a larger specific cycle amplitude but a substantial lead or lag.

TABLE 9

Amplitudes of Selected Capital Formation Series During Reference Cycle Episodes, 1897-1962

Ref. Cycle, Trough to Trough	Enterprise Dur. (1)	Enterprise Struc. (2)	Household Dur. (3)	Household Struc. (4)	(1)+(2) (5)	(3)+(4) (6)
A: AMPLITUDE IN CURRENT PRICES						
1900-04	35.6	11.1	33.4	65.9	21.6	49.2
1904-08	88.6	70.0	51.1	56.9	78.4	54.1
1908-11	36.9	18.7	19.7	21.6	26.6	20.6
1911-14	53.0	54.1	33.1	17.3	53.5	27.1
Average	53.5	38.5	34.3	40.4	45.0	37.8
1919-21	59.2	57.0	51.7	1.5	58.2	38.8
1921-24	48.6	40.8	30.3	28.8	44.4	29.8
1924-27	22.5	19.1	28.9	16.5	20.5	24.6
1927-32	128.4	91.1	111.0	55.7	108.8	95.2
1932-38	152.2	116.8	123.4	94.3	141.2	116.9
Average	82.2	65.0	69.1	39.0	74.6	61.1
1946-49	59.7	42.7	29.9	88.6	54.0	50.8
1949-54	32.0	24.8	29.6	42.2	29.4	34.4
1954-58	52.2	38.1	28.5	13.9	46.5	22.7
1958-61	23.4	9.6	22.7	20.3	17.5	21.7
Average	41.8	28.8	27.7	41.2	36.8	32.4
Over-all average	60.9	45.7	45.6	40.1	53.9	45.0
Ratios of mean amplitudes						
	(3)/(1)	(4)/(2)	$\frac{(3)+(4)}{(1)+(2)}$			
1900-14	0.64	1.05	0.84			
1919-38	0.84	0.60	0.82			
1946-61	0.66	1.43	0.89			
1900-61	0.75	0.88	0.83			

(continued)

TABLE 9 (concluded)

Ref. Cycle, Trough to Trough	Enterprise Dur. (1)	Enterprise Struc. (2)	Household Dur. (3)	Household Struc. (4)	(1)+(2) (5)	(3)+(4) (6)
	B: AMPLITUDE IN 1929 PRICES					
1900-04	43.0	9.8	23.0	65.7	24.0	41.3
1904-08	74.5	59.2	32.7	49.2	66.3	40.7
1908-11	35.6	18.5	29.4	23.7	25.9	26.7
1911-14	53.6	50.9	17.3	18.2	52.2	17.8
Average	51.7	34.6	25.6	39.2	42.1	31.6
1919-21	44.1	6.6	17.4	-45.1	27.3	-0.9
1921-24	53.8	37.7	40.8	24.2	45.1	34.7
1924-27	22.6	17.1	36.7	15.3	19.5	29.0
1927-32	115.3	79.2	79.2	37.8	96.3	67.8
1932-38	138.4	80.3	111.7	78.8	120.1	105.5
Average	74.8	44.2	57.2	22.2	61.7	47.2
1946-49	46.6	17.2	13.6	61.2	38.4	26.7
1949-54	20.5	9.3	20.1	27.6	17.1	22.2
1954-58	39.1	32.2	23.7	6.4	36.8	18.9
1958-61	21.4	3.9	15.4	16.4	14.9	15.7
Average	31.9	15.6	18.2	27.9	26.8	20.9
Over-all average	54.8	32.4	35.5	29.2	44.9	34.3
Ratios of mean amplitudes						
	(3)/(1)	(4)/(2)	$\frac{(3)+(4)}{(1)+(2)}$			
1900-14	0.50	1.13	0.75			
1919-38	0.76	0.50	0.76			
1946-61	0.57	1.79	0.78			
1900-61	0.65	0.91	0.76			

Source: Estimated from Tables A-1 and A-2.

episodes since the turn of the century, excluding the two war periods.[8] The top half of the table shows amplitudes in current prices, the bottom half in 1929 prices; data are shown for the four series discussed above.

The results do not indicate that there are strong systematic differences between the comparable household and enterprise series, contrasting relative amplitude in the early part of the century with that in recent years. Amplitude for equipment tends to be somewhat larger in the enterprise than in the household sector both before World War I and after World War II; the differential is slightly smaller during the latter period. For structures, amplitude is somewhat larger in the household sector after World War II, though it had been smaller prior to World War I. For both series combined, amplitude in the enterprise sector is larger by approximately the same amount during both the relevant periods.

Examination of the basic series, however, indicates that these results are due to changes in the reference cycle conformity of the series. Prior to World War I, all four of the series conformed quite closely: peaks and troughs in the basic series either coincided with reference cycle peaks and troughs or had short leads (mainly at reference cycle peaks). Further, when the basic series led at peaks, the specific cycle trough-to-peak amplitude tended to be almost as large as the reference cycle trough-to-peak amplitude.

After World War II, in contrast, while the enterprise capital formation series conform closely to reference cycles, as before, the household series do not. Both single-family house construction and consumer durables tend to show long leads at reference cycle peaks and very large differences between specific cycle and reference cycle trough-to-peak amplitudes. In general, the household capital formation series rise sharply in the early stages of a reference cycle expansion and then decline steadily both during the late stages of expansion and the subsequent contraction. Thus the contribution of these household capital formation series to cyclical variability is not fully reflected by their reference cycle amplitude.

As an additional measure of cyclical variability for these series, therefore, deviations from long-term trend were estimated. Trend is measured as a linear interpolation between reference cycles. For each series, aver-

[8] The series generally tend to show negative amplitudes during wartime cycles. Civilian capital formation tends to fall during wartime expansions and rise during the postwar contraction because of the behavior of munitions output.

age values were calculated for all reference cycle episodes between 1897 and 1962; the reference cycle average was assigned to the chronological midpoint of the period. Annual trend values were then estimated as linear interpolations between average values for successive reference cycles. Annual deviations are the algebraic difference between this trend value and the actual value. Wartime periods are excluded from the calculation of reference cycle averages and hence from trends; averages for truncated reference cycles are used in periods preceding both wars.

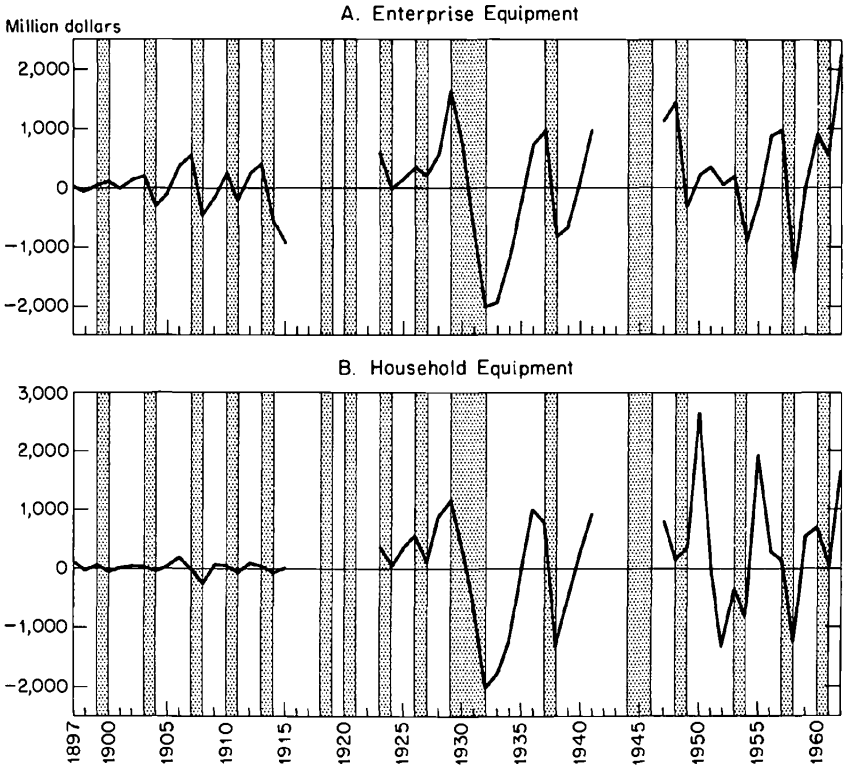
Charts 11 through 14 show the cyclical behavior of deviations from trend for the four series; Charts 11 and 12 show the absolute dollar magnitude of trend deviations, while 13 and 14 show percentage deviations from the trend level. All data are in constant (1929) prices. The shaded areas indicate reference cycle contractions.

The marked increase in cyclical variability for the household sector, both absolutely and relative to the enterprise sector, is clearly indicated. Comparison of absolute dollar amounts shows that, while cyclical variability was much greater in the business enterprise sector than in the household sector prior to the First World War, the reverse appears to have been true since the end of World War II. And despite the fact that the level of both household series has increased enormously from the period before World War I to the period after World War II, percentage deviations from trend seem to be about the same or perhaps even a bit larger during the later of these periods. In contrast, both enterprise series show considerably less cyclical variation relative to their trend during the latter period; the reduction in relative variability is especially marked for enterprise construction.

The visual evidence in these charts can be supplemented with a quantitative measure of variability. When variability is measured as the standard deviation of the difference between actual and trend values, consumer durables outlays show only one-quarter as much variability as producer durables prior to World War I, about the same amount during the interwar period, and somewhat more during the period after World War II (Table 10, Panel A). Household investment in structures shows about one-quarter of the variability of enterprise investment in structures prior to World War I, about one-half as much during the interwar period, and about twice as much during the period after World War II. Summing trend deviations for structures and equipment in each sector, household expenditures on capital assets show about one-quarter

CHART 11

CYCLICAL MOVEMENTS IN ABSOLUTE VALUE OF DEVIATIONS FROM TREND, HOUSEHOLD AND ENTERPRISE EXPENDITURES ON DURABLE EQUIPMENT, 1929 PRICES

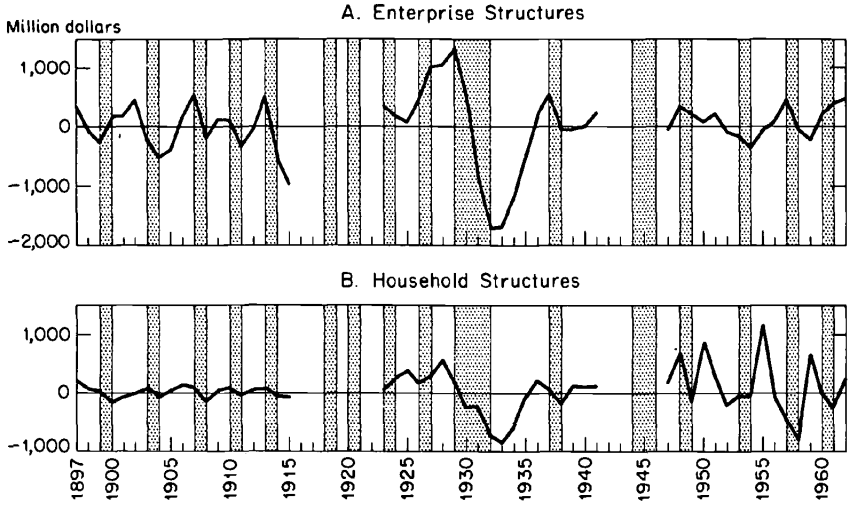


Source: Estimated from basic data in Table A-2.

Note: Shaded areas represent reference cycle contractions; white areas, expansions.

CHART 12

CYCLICAL MOVEMENTS IN ABSOLUTE VALUE OF DEVIATIONS FROM TREND, HOUSEHOLD AND ENTERPRISE EXPENDITURES ON STRUCTURES, 1929 PRICES



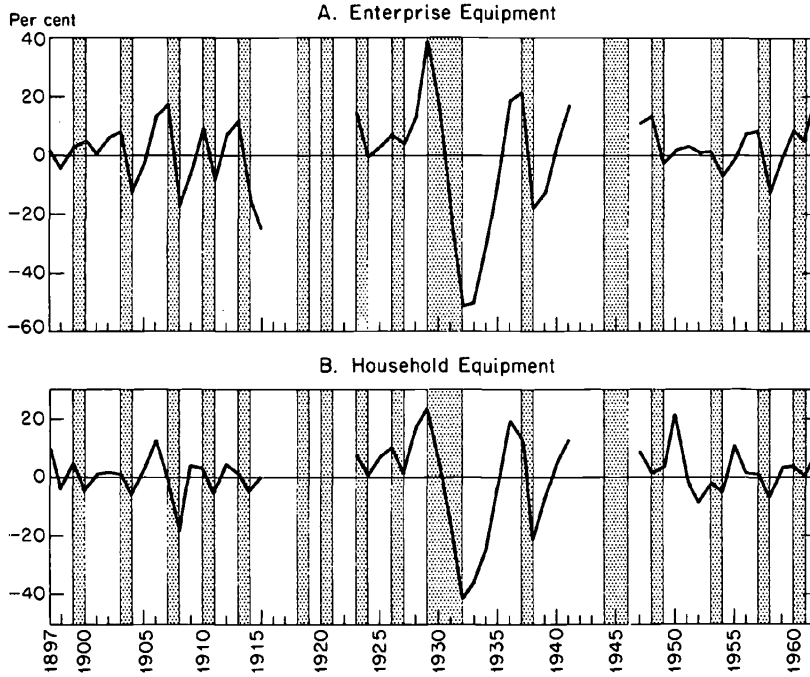
Source: Estimated from basic data in Table A-2.
Note: Shaded areas represent reference cycle contractions; white areas, expansions.

of the variability of enterprise expenditures prior to World War I, roughly two-thirds as much during the interwar period, and almost 40 per cent more during the post-World War II period. Interestingly enough, for the entire period 1897–1962, household and enterprise expenditures on capital assets showed just about the same average variability.

Much the same patterns are shown by an examination of quarterly data for the period after World War II. For quarterly deviations from trends based on reference cycle averages, consumer durables show somewhat more variability than producer durables, while the move-

CHART 13

CYCLICAL MOVEMENTS IN PERCENTAGE DEVIATIONS FROM TREND VALUE, HOUSEHOLD AND ENTERPRISE EXPENDITURES ON DURABLE EQUIPMENT, 1929 PRICES

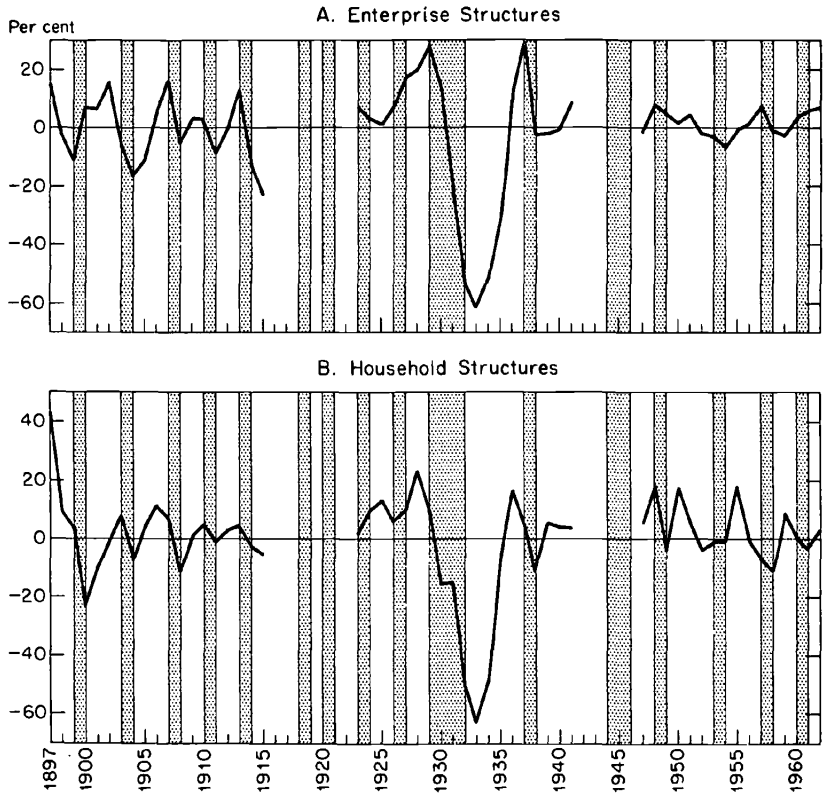


Source: Estimated from basic data in Table A-2.

Note: Shaded areas represent reference cycle contractions; white areas, expansions.

CHART 14

CYCLICAL MOVEMENTS IN PERCENTAGE DEVIATIONS FROM TREND VALUE, HOUSEHOLD AND ENTERPRISE EXPENDITURES ON STRUCTURES, 1929 PRICES



Source: Estimated from basic data in Table A-2.

Note: Shaded areas represent reference cycle contractions; white areas, expansions.

TABLE 10

Time Series Variability in Durable Goods Expenditure Series

	1897-1915	1923-41	1947-62
A: STANDARD DEVIATIONS OF DIFFERENCES BETWEEN TREND AND ACTUAL VALUES (millions of 1929 dollars)			
Households			
Durables	91	933	1,049
Structures	94	365	498
Durables and structures	172	1,254	1,450
Enterprises			
Durables	356	953	874
Structures	397	832	246
Durables and structures	718	1,737	1,056
RATIOS, HOUSEHOLDS TO ENTERPRISES			
Durables	.26	.98	1.20
Structures	.24	.44	2.02
Durables and structures	.24	.72	1.37
B: COEFFICIENTS OF VARIATION (1929 dollars)			
Households			
Durables	.066	.173	.066
Structures	.083	.181	.081
Durables and structures	.068	.170	.066
Enterprises			
Durables	.137	.218	.075
Structures	.120	.228	.043
Durables and structures	.121	.217	.061
Nondurables and services	.033	.046	.010

Source: Derived from Table A-2.

ments in single-family structures, on the average, are more than 50 per cent larger than those in enterprise structures.

Calculation of the coefficient of variation ($\sigma_x/\bar{x}$), using deviations from trend to estimate σ_x, supplements the visual impressions in the charts as to variation relative to trend (Table 10, Panel B). Two of the subperiods (1897–1915 and 1947–62) are characterized by a series of relatively short cyclical downturns and a strong upward trend. In the two enterprise sectors the coefficient of variation is markedly lower for 1947–62 than for the pre-World War I period. For one of these series (E_s) the *absolute* amount of variation is smaller (in constant prices) during the 1947–62 period than during either of the two earlier periods. Relative to mean values, the variability of enterprise capital outlays seems to have been reduced substantially.

In contrast, the relative variation in the two household series appears to be about the same in the post-World War II period as it was prior to World War I, despite the fact that the level of household capital outlays has grown substantially. Thus the absolute variability of capital formation in the household sector is now larger than in the enterprise sector for two reasons: first, the relative variability of enterprise capital outlays has declined markedly over time, and is now about the same as in the household sector; second, household investment has grown to be absolutely larger than enterprise investment, whereas formerly it was smaller. Further, it is interesting to note that household expenditures on goods and services not classified as capital assets ($C - H_d$) have become somewhat less variable during the post-World War II period, presumably due to the reduced variability of disposable income during this period relative to earlier ones.

In sum, the evidence suggests that, although the variability of household capital formation has been larger than that of enterprise capital formation since 1945, cyclical variability in the household sector has tended to offset rather than reinforce movements in the enterprise sector. Household capital formation has tended to grow at a rapid pace in the early stages of a business cycle expansion, while enterprise capital formation has shown its strongest movements at late stages. To be sure, this pattern has been the result of circumstances that may not be generalizable—the surge in expenditures on consumer capital at the time of the Korean War, and the 1955 surge in automobile sales. Thus

the postwar cyclical timing pattern may have been fortuitous, and cyclical movements in household capital formation may in future tend to reinforce movements in the enterprise sector. During the current cyclical expansion (1961 onward), for example, both series still appear to be moving toward cyclical peaks at the present time (late 1965).

On the whole, it seems reasonable to describe the pattern of cyclical expansions and contractions in the post-World War II period, to the extent that fixed capital formation is involved, as consisting mainly of variations in the rate at which household capital has been formed, with variations in enterprise expenditures on durable equipment also playing an important role. Variations in enterprise expenditures on structures, with the exception of the 1954–58 cycle, have been minimal. These relations are in sharp contrast to those for earlier periods, when movements in household fixed capital formation played only a minor role in the movement of total capital formation.

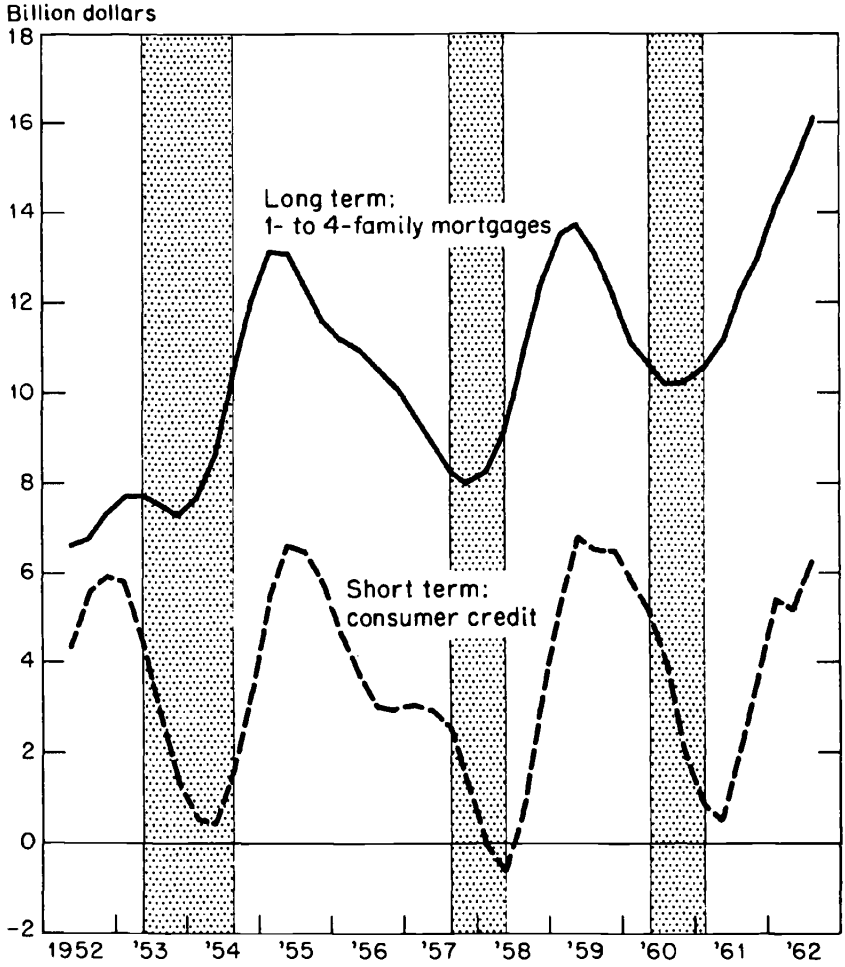
CREDIT

One of the reasons, perhaps the most important one, for the increase during recent decades in the relative cyclical variability of household capital formation is the rapid growth of credit financing. The growth of credit use among households has already been described and documented (see Chapter 3, above), and some of the possible explanations for it have been discussed. In this section the cyclical variability of credit use among households is examined, and some rough comparisons are made between the household and the business sectors.

Charts 15 through 18 summarize the relevant information. The data are from the Federal Reserve Board's Flow of Funds estimates, available quarterly beginning in 1952. Some of the series, especially the business loan data that reflect inventory changes, have sharply erratic movements from quarter to quarter. The data have therefore been smoothed by constructing a three-quarter moving average centered on the middle quarter. Chart 15 shows the smoothed series for quarterly changes in short-term consumer credit outstandings and in outstanding mortgage debt on one- to four-family housing; Chart 16 contrasts quarterly changes in short-term consumer credit outstandings with changes in the bank loans of business enterprises; Chart 17 contrasts quarterly changes in mortgage debt on one- to four-family housing with the sum of new issues

CHART 15

QUARTERLY CHANGES IN OUTSTANDING DEBT IN THE HOUSEHOLD SECTOR, 1952–62

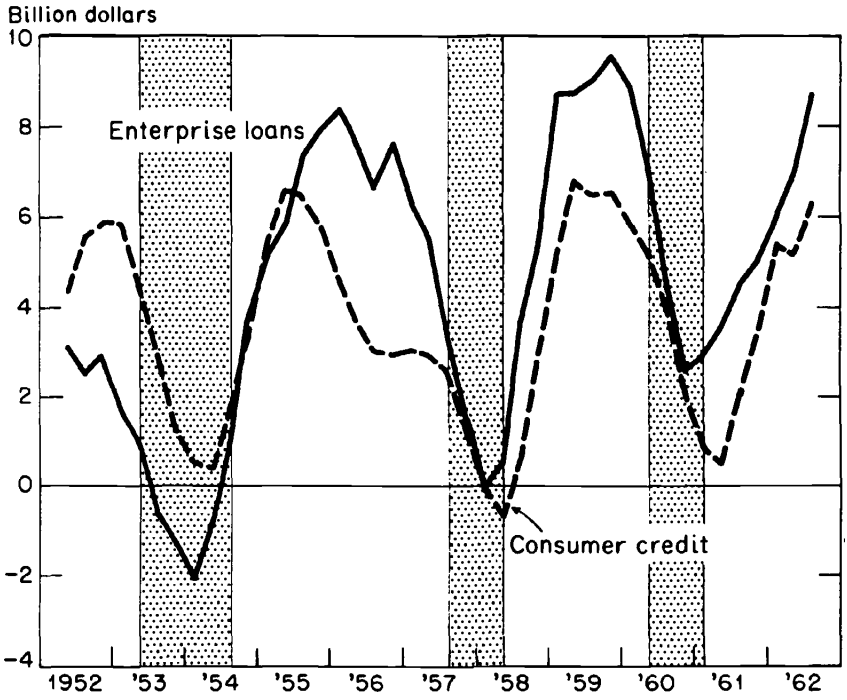


Source: Long-term data from *Flow of Funds Accounts, 1945–62,* 1963 Supplement, Board of Governors of the Federal Reserve System, Table 27. The data in the chart include all mortgage loans on one- to four-family housing taken out by individual persons whether or not these individuals occupy the house bought with the mortgages. Thus the category does include some mortgage debt on tenant occupied housing. Short-term data from *Flow of Funds.* The data include instalment and noninstalment borrowing.

Note: Shaded areas represent business cycle contractions; white areas, expansions.

CHART 16

QUARTERLY CHANGES IN SHORT-TERM LIABILITIES, HOUSEHOLD AND ENTERPRISE SECTORS, 1952–62

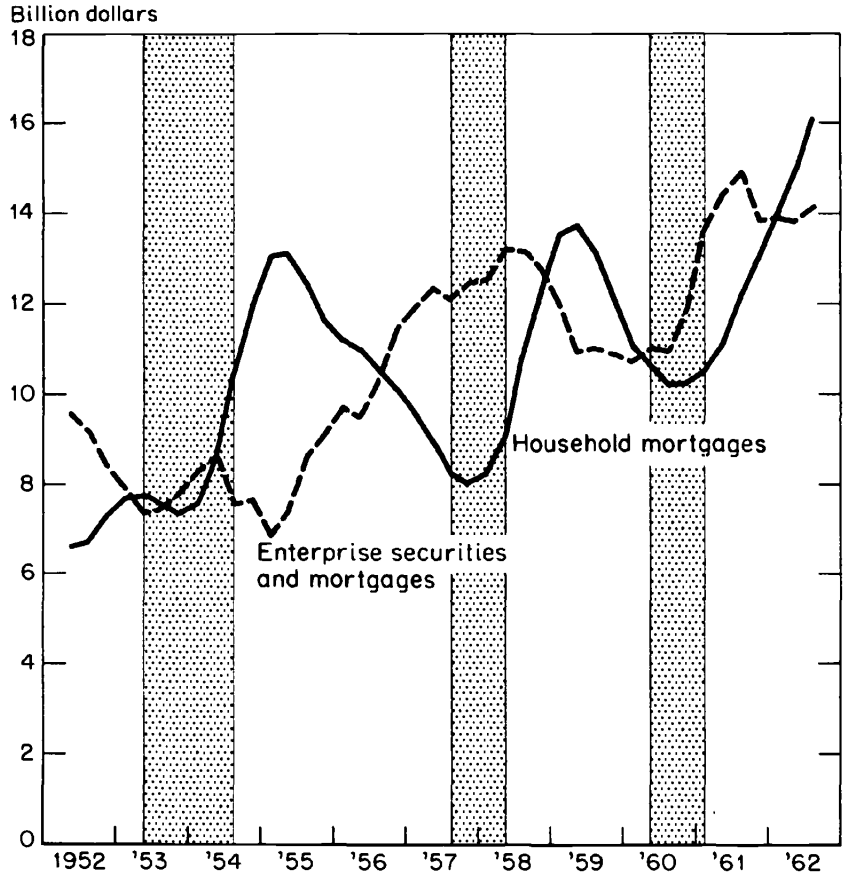


Source: Enterprise loan data from *Flow of Funds,* Table 2. These data include nonprofit organizations. Short-term consumer credit: See notes to Chart 15.

Note: Shaded areas represent business cycle contractions; white areas, expansions.

CHART 17

QUARTERLY CHANGES IN LONG-TERM LIABILITIES, HOUSEHOLD AND ENTERPRISE SECTORS, 1952–62

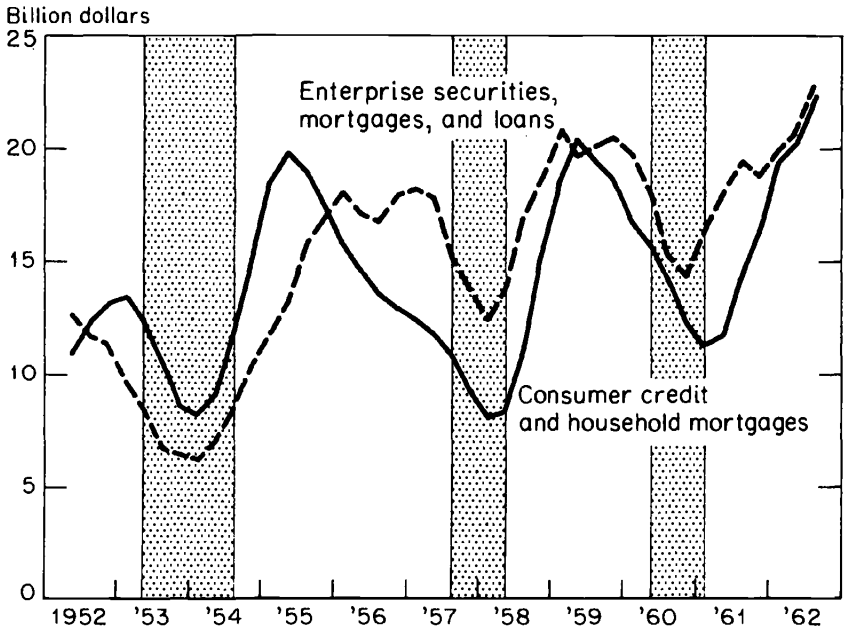


Source: Enterprise mortgage data from *Flow of Funds*, Table 28. These data include mortgages taken by nonprofit organizations. Household mortgages: See notes to Chart 15.

Note: Shaded areas represent business cycle contractions; white areas, expansions.

CHART 18

QUARTERLY CHANGES IN TOTAL LIABILITIES, HOUSEHOLD AND ENTERPRISE SECTORS, 1952–62



Source: Consumer credit and mortgage data from *Flow of Funds*, Tables 27 and 29. See notes to Chart 15 for explanation of mortgage data. Enterprise data from *Flow of Funds*, Tables 2 and 31. Mortgages and other loans include nonprofit organizations.

Note: Shaded areas represent business cycle contractions; white areas, expansions.

of corporate securities and the change in business mortgages; Chart 18 contrasts quarterly changes in the sum of both household debt instruments with changes in business external liabilities. By and large, the consumer credit series and the bank loan series constitute measures of short-term credit use, while the one- to four-family mortgage series and the corporate new issues and mortgage series constitute measures of long-term credit use.

These data suggest that credit changes emanating from the household

sector have played about as large a role in the cyclical movements of total credit as have changes originating in the business sector. Comparing the short-term credit series for households and enterprises, both the timing relations and the amplitudes of the cyclical swings are quite similar. Both series tend to show leads at cyclical troughs and at peaks, with the household series having slightly longer leads at peaks and shorter ones at troughs. The swings in the household series (peak to trough or trough to peak) ranged during this period from $5.4 billion to $6.9 billion; the comparable swings in the business series were somewhat larger, ranging from $5.8 billion to $10.9 billion.

For long-term credit changes, the household (mortgage) data also lead at both peaks and troughs, but the timing of the business series is quite irregular. The amplitudes of the cyclical swings in both series tend to be more moderate than those observed in Chart 16 for the short-term credit data; for the household series the swings range from $0.3 billion up to about $6 billion, while for the business series they range from $2.3 billion to about $6.4 billion.

When the short-term and long-term series are combined,[4] both the household and business sectors show a lead at cyclical peaks and troughs; the leads at peaks are longer and more variable for the household sector, while both series lead by either one or two quarters at all cyclical troughs. Cyclical credit swings in the two sectors are comparable in size; they range from $5.4 billion to $12.3 billion in the household sector, and from $5.7 billion to $12.6 billion in the business sector.

Cyclical swings in both short- and long-term credit originating in the household sector were of course a much less important component of the total during the decades prior to World War II. Not only were the absolute magnitudes much smaller compared to those in the enterprise sector, but until the 1920's the main characteristic of credit use in the household sector was steady growth rather than variability. Thus the phenomenon discussed above—the rough equality after World War II of the absolute cyclical variability of credit swings in the household and

[4] There is likely to be more substitutability between short-term and long-term credit in the business sector than in the household sector. Bank term loans, mortgages, and debt securities are apt to be close substitutes for business borrowers; which among these alternatives is selected will depend on rates, terms, and the preferences of the borrower. In contrast, household borrowers can rarely obtain mortgage credit for the purchase of assets other than houses (see Chapter 3, above).

corporate enterprise sector—has no counterpart during earlier periods of United States history.

On the whole, the evidence on cyclical variability suggests that household capital formation is currently about on a par with enterprise capital formation as a source of disturbance. Expenditures on household capital assets, however financed, show greater cyclical amplitudes than expenditures on business capital assets, and do not appear to be closely associated with financial variables from which they might be explained or predicted. For example, expenditures on automobiles, which constitute the bulk of the time-series variance in expenditures on household durables, have not been closely associated with either income level or income change during the last few decades. A similar situation prevails with regard to expenditures on housing. Both these series show very long leads at cyclical downturns and short ones at upturns, hence are more accurately viewed as a cause rather than a consequence of cyclical movements elsewhere in the economy.

The evidence on credit change strengthens the proposition that movements in the household sector help to generate cyclical disturbances. Both short-term instalment and long-term mortgage credit show the long leads at peaks and the short leads at troughs that characterize the goods series, and the magnitude of the credit swings corresponds roughly to that of the swings in total outlays. Thus most of the cyclical behavior of consumer outlays for equipment and structures can be attributed to the fact that these outlays are not closely tied to income but are ordinarily financed by means of credit.

One obvious implication of these findings is that analysis of business cycle movements should be at least as much concerned with the behavior of households as with the behavior of business firms. An important component of cyclical variability stems from the spending decisions of consumer units. Understanding and prediction of these decisions is therefore now as essential to analysis of cyclical movements in general as is understanding and prediction of business decisions to invest in capital facilities.