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CHAPTER IV

THE GROWTH OF RESIDENTIAL CAPITAL

GROSS capital formation in residential construction, which was described in the preceding chapter, represents gross additions to the housing stock. In this chapter we shall measure the portion of gross capital formation that results in net additions to residential capital—that is, net capital formation—and analyze long-term changes in the rate of growth of residential capital.

The Nature of Capital Consumption

Computation of net capital formation requires estimates of capital consumption. Capital consumption allowances are here defined as the sum of depreciation on existing residential structures and the remaining value of demolished structures (for a detailed analysis of the nature and measurement of capital consumption allowances see Appendixes D and E). Depreciation charges account for the bulk of capital consumption allowances, representing more than 90 per cent of total capital consumption in each of the last six decades. Such charges are calculated in this study as a constant 2 per cent of current net structure values. This rate of depreciation implies that 25 per cent of the original value of a structure remains after seventy years of life, and this results in a smaller charge for depreciation than is found in other studies of residential real estate. Allowances for demolition losses are based on rough estimates of the number of demolished units and of their average value at the time of demolition.

Depreciation of residential structures measures current deductions from the capital stock and represents the decline in value of existing housing units attributable to the decrease over time in the value the market places on the services produced by such residential facilities. This decline can be discerned directly in the increasing discount for age in market prices and rents for structures as they grow older (see examples in Appendix E).

In principle, residential structures are subject to the same forces of depreciation and obsolescence as is the capital stock of other segments of the economy. There are differences in degree, however, which are essential to an understanding of capital growth in residential real estate. One of these is a consequence of the fact that the institutional framework of the housing market permits the existence of a large and active market for the trading of existing dwellings. Depreciation and obsolescence of residential structures are usually associated with the transfer of aging structures to occupancy by lower income groups. This

process of "filtering down" of housing units is indeed one of the causes of the continual shifting of existing dwelling units among households, which has been so characteristic of the American housing scene. Another attribute of the filtering process is that the demand for new dwelling units has come not only from some portion (and probably a small portion) of newly formed households but also from households occupying existing dwelling units that have become obsolete or are located in declining areas. In this association between depreciation and obsolescence and transfer among users, the housing market is similar to the market for consumers' durables, particularly automobiles, but differs in degree from the market for most producers' goods, which more often are used by one producer until they are discarded.

Second, the life of residential structures has proved to be so much longer than that of most other real capital assets, and demand for depreciated and obsolete housing units so persistent in the long run, that physical withdrawals or demolitions have taken place at an exceedingly low rate (Appendix A and Chapter V). The economic life of structures has often been extended by a remarkable adaptability of the physical unit of use (the dwelling unit) through conversion—an adaptability for which there are few analogues among real capital assets. Historically, new residential construction has been undertaken in response to population growth rather than for the purpose of replacing withdrawn or demolished units—much more so than in any other major sector of the economy. Thus depreciation allowances have not been associated with any substantial volume of physical withdrawals of dwelling units and have exceeded by far any actual replacement resulting from such withdrawals.

The link between capital consumption and actual replacement has been further weakened by the historical conditions under which demolitions have taken place. Demolitions in the past have seldom been a result of physical deterioration or obsolescence of residential structures. More often, demolitions have been a consequence of supersession of land use, that is, a shift of sites of residential structures to more intensive (and frequently nonresidential) use. In addition, in most cases the new structures have not been built or purchased by the firms owning the demolished buildings, in contrast to other sectors of the economy in which the replacement of withdrawn capital units occurs largely within the same accounting units.

Ratio of Net to Gross Capital Formation

The ratio of deflated capital consumption allowances to the value of residential structures has been roughly stable over the period under study. Depreciation charges, which account for the major part of capital

consumption, are so calculated here as to yield this result, but any reasonable alternative method of estimation would have revealed essentially the same relative stability in the ratio of capital consumption to residential capital.[1]

TABLE 14

Relation between Expenditures for New Dwelling Units,
Gross Capital Formation, and the Cumulated Value of
Residential Structures, 1929 Prices, 1890-1950
(*dollars in billions*)

	Structure Values (1)	Decade	Expenditures for New Dwelling Units (2)	Ratio of Column 2 to Column 1 (3)	Gross Capital Formation (4)	Ratio of Column 4 to Column 1 (5)
1890	$22.050	1890-1899	$17.689	80.2%	$19.820	89.9%
1900	35.525	1900-1909	18.581	52.3	20.695	58.3
1910	47.406	1910-1919	17.557	37.0	19.421	41.0
1920	55.317	1920-1929	37.247	67.3	39.749	71.9
1930	80.563	1930-1939	12.445	15.4	15.158	18.8
1940	79.006	1940-1949	20.173	25.5	23.175	29.3
1950	84.951					

Column	Source
1	Table D-1. Beginning-of-year values.
2	Table B-3.
4	Table B-6.

The ratio of gross capital formation in constant prices to the value of the housing stock, however, has undergone a sharp decline over time. Ratios of deflated gross capital formation in each decade, between 1890 and 1949, to the value of the housing stock in the first year of each decade (Table 14) show considerable fluctuation, with the nineties and the twenties characterized by the highest ratios and the thirties by the lowest. But a marked downward trend can be readily discerned. The average of the ratios for the first two decades was 74.1 per cent; for 1910-1929, 56.5 per cent; for 1930-1949, 24.1 per cent; and for 1934-1953, 33.4 per cent. The over-all percentage decline between the average ratios in the first and third pairs of decades was 69.3 per cent, and between 1890-1909 and 1934-1953, 54.9 per cent.

This decline in the ratio of real gross capital formation to the value of the housing stock is attributable to two factors. One is the fall in the ratio of newly constructed dwelling units to the total stock of

[1] The estimates of losses due to demolitions, presented in Appendix E, indicate a slight rise during the 1890-1929 period in the proportion of capital consumption allowances accounted for by demolitions, and a slight decline during the 1930-1949 period. However, the data and assumptions underlying these estimates are too crude to support any firm conclusions.

dwelling units during the 1890-1950 period. The average decade ratio of new dwelling units to stock dropped 58.9 per cent between the first and third pairs of decades (Table 15). The fall in that ratio was asso-

TABLE 15

Relation between New Nonfarm Dwelling Units Started
and the Stock of Nonfarm Dwelling Units, 1890-1950
(*dwelling units in millions*)

	Stock of Dwelling Units (1)	Decade	New Dwelling Units Started (2)	Ratio of Column 2 to Column 1 (3)
1890	8.319	1890-1899	2.941	35.4%
1900	10.589	1900-1909	3.606	34.1
1910	14.281	1910-1919	3.593	25.2
1920	17.733	1920-1929	7.004	39.5
1930	25.692	1930-1939	2.646	10.3
1940	29.683	1940-1949	5.393	18.2
1950	39.625			

Source

Column 1. *1890-1920*: David L. Wickens, *Residential Real Estate*, National Bureau of Economic Research, 1941, p. 55. The 1890 and 1900 estimates apply to June 1; the 1910 estimates, to April 15; and the 1920 estimate, to January 1. The data were derived by dividing Wickens' estimates of nonfarm private families (now termed "households") by the occupancy ratios implicit in his vacancy estimates. The percentages in column 3 would be largely unaffected by any reasonable adjustments in Wickens' vacancy ratios. The stock series is not fully reconcilable with the data on households (i.e. occupied dwelling units) or increments in dwelling units in Chapter IV, largely because of differences in dating. No attempt has been made to reconcile the stock figures, derived from Wickens' estimates, with the new dwelling unit series prepared for this study. The stock figures are inclusive of the small number of public housing dwelling units.
1930: M. H. Naigles, "Housing and the Increase in Population," Bureau of Labor Statistics, Serial No. R. 1421, 1942, p. 12. Data refer to April 1.
1940: Census of Housing 1940, Bureau of the Census, Vol. II, Part 1, p. 10. Data refer to April 1.
1950: Census of Housing 1950, Vol. I, p. 3. Data refer to April 1.
Column 2. Table B-1.

ciated with the decline in the rate of growth of nonfarm households (Chapter V) and was accentuated during the last two decades by the sharp increase in conversions of existing dwellings, which add to the housing inventory but are not counted as newly constructed units.

The other factor in the decline of the ratio of real gross capital formation to the value of the housing stock is the drop in real construction expenditures per new dwelling unit over the last six decades (Chapter VII).

The effects of the declines in the ratio of new dwelling units to the

stock of dwelling units and in the real value per unit were only partially offset by the growing importance of expenditures for residential additions and alterations.

The relative stability in the ratio of capital consumption to the value of the housing stock, contrasted with the decline in the ratio of gross capital formation to the value of the stock, has resulted in a rise over time in the ratio of capital consumption to gross capital formation. That is, there has been a long-term increase in the proportion of gross capital formation required to offset capital consumption and, therefore, a long-term drop in the proportion that resulted in net additions to residential capital. Thus the ratio of deflated net to gross capital formation within long cycles in the latter shows a decline from 60 per cent in 1892-1905 and a little more than 50 per cent in 1905-1925 to about 32 per cent in 1925-1950 (Table 16). The ratio was 34.3 per cent in 1934-1953.

TABLE 16

Ratio of Net Capital Formation to Gross Capital Formation
within Long Cycles in Gross Capital Formation,
1889-1950 and 1892-1950
(per cent)

Period	Ratio of Data in Current Prices	Period	Ratio of Data in 1929 Prices
1889-1909	62.7	1892-1905	60.2
1909-1926	54.8	1905-1925	53.5
1926-1950	34.0	1925-1950	32.3
1926-1941	31.6	1925-1941	34.6
1941-1950	35.9	1941-1950	28.0

Source: Tables B-6 and B-8. Terminal years weighted one-half.

Net Capital Formation

Since capital consumption allowances change only slowly, the cyclical variations in gross capital formation (Chapter III) are reproduced quite closely in the series on net capital formation. Net capital formation (Tables B-8 and B-9 and Chart 9) traces the same long cycles that were found in gross capital formation. Where the turning points in gross capital formation were clearly marked, the same turning points are found in the corresponding series on net capital formation. However, where the levels of the peak years in gross capital formation were not much different from those of preceding or following years, there is some tendency for the peaks in net capital formation to lead the turning points of the corresponding series on gross capital formation.[2]

[2] Thus the 1887, 1905, and 1925 peaks in the data in current prices on net capital formation and the 1887 peak in the data in constant prices on net capital formation lead the corresponding peaks of the gross capital formation series.

CHART 9

Net Capital Formation in Residential Real Estate,
in Current and 1929 Prices, 1889-1953

Source: Table B-8.
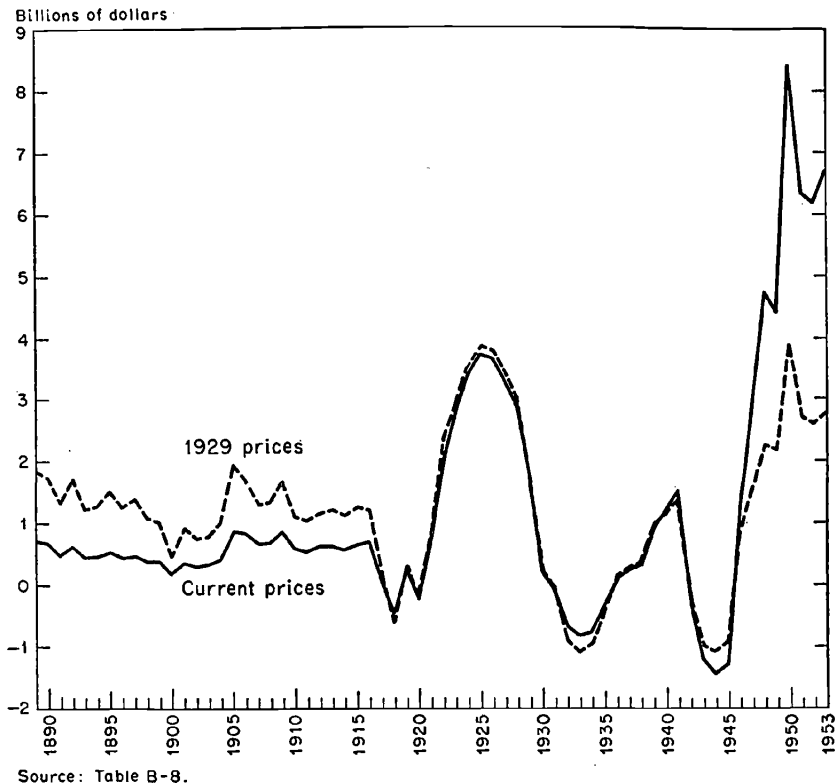
Where the level of gross capital formation in a peak year was not much greater than the levels of preceding years, the steadily increasing burden of capital consumption allowances tended to push back the peak in net capital formation by one or more years.

Decade averages of net capital formation (Table 17) and the corresponding averages for gross capital formation show substantial differences in movement. In current prices, the upward movement in gross capital formation during the three decades following 1890 is almost wiped out in net capital formation. In constant prices, the relative stability of the decade averages for gross capital formation during the same thirty years is converted into a substantial decline in net capital formation. The postwar period 1946-1953 emerges as the period of greatest net additions in current prices, although the increase between the twenties and 1946-1953 was less marked than in the case of gross capital formation. In terms of constant prices, however, net

TABLE 17

Annual Average Net Capital Formation
in Housekeeping Residential Real Estate, by Decades,
in Current and 1929 Prices, 1890-1953
(*millions of dollars*)

| DECADE | ANNUAL AVERAGE NET CAPITAL FORMATION | |
	Current Prices	*1929 Prices*
1890-1899	492	1,348
1900-1909	552	1,188
1910-1919	420	791
1920-1929 ·	2,418	2,524
1930-1939	—89	—155
1940-1949	1,169	595
1946-1953a	5,121	2,344

a Eight-year average.
Source: Table B-8.

capital formation in the postwar period was about 7 per cent lower
than in the twenties, while gross capital formation was slightly higher.

The same pattern is evident in the 1924-1928 and 1949-1953 periods,
the two half decades characterized by the greatest construction volume
in the entire span of years since 1890. In current prices, annual average
gross capital formation in 1949-1953 was more than double that in
1924-1928 ($10.8 billion as against $4.9 billion); but average net capital
formation was not quite double ($6.4 billion compared with $3.4 bil-
lion). In constant prices, gross capital formation in 1949-1953 was
within 6 per cent of the level in 1924-1928 ($4.8 billion as against
$5.1 billion). But net capital formation was about one-fifth lower
($2.8 billion compared with $3.5 billion).

Net capital formation in both current and constant prices was nega-
tive in the 1930-1939 decade, as indicated in Table 17. There have
actually been three periods of net disinvestment in housekeeping resi-
dential real estate in the last sixty years. The first and last were asso-
ciated with the two World Wars, while the second coincided with the
Great Depression of the thirties (Table B-8). Net disinvestment in
1918 and 1920 was relatively small. From 1931 through 1935, net capital
formation in both current and constant dollars was negative, reaching
a maximum of over $800 million in current prices and over $1.1 billion
in constant prices in 1933. Again during World War II, net capital
formation was negative from 1942 through 1945. Disinvestment was at
a maximum in 1944, when it reached almost $1.5 billion in current
prices and about $1.1 billion in constant prices. In all, eleven years in
the last six decades were associated with negative capital formation.

Cycle averages of net capital formation in current prices show an
uninterrupted rise when the 1925-1950 period is considered as a single

cycle. When it is divided into two cycles, there is a slight decline from the 1905-1925 cycle to the 1925-1941 cycle, but the 1941-1950 cycle again shows an increase to a level higher than that of any preceding cycle (Table 18). Net capital formation in constant prices, however,

TABLE 18

Annual Average of, and Amplitude of Long Cycles in, Net Capital
Formation in Housekeeping Residential Real Estate,
in Current and 1929 Prices, 1887-1950
(*dollars in millions*)

		AMPLITUDE OF RISE AND FALL			AMPLITUDE OF RISE AND FALL	
PERIOD	ANNUAL AVERAGE[a]	*Total*	*Per Year*	ANNUAL AVERAGE[a]	*Total*	*Per Year*
		(*based on current prices*)			(*based on 1929 prices*)	
1887-1905	$ 473[b]	258.0%	14.3%	$1,252[b]	231.7%	12.9%
1905-1925	926	602.5	30.1	1,318	536.2	26.8
1925-1950	1,133	1,332.2	53.3	805	1,245.2	49.8
1925-1941	898	775.3	48.5	880	852.8	53.3
1941-1950	1,552	828.9	92.1	673	1,115.3	123.9

a Terminal years weighted one-half.
b Estimates of net capital formation for 1887 and 1888:

	Current Prices	*1929 Prices*
1887	$736	$1,859
1888	562	1,430

Source: Table B-8.

experienced only a small rise between the first two cycles and a sharp drop from the 1905-1925 cycle to the 1925-1950 cycle. When the latter period is broken into two cycles, both show a decline from the 1905-1925 average, with the 1941-1950 average characterized by an even lower level than that for 1925-1941.

The amplitude of long cycles in net capital formation has increased even more than the amplitude of cycles in gross capital formation (Table 18). Treating both current-price series in terms of three cycles, the cycle amplitude in gross capital formation, measured in total percentage rise and fall over the cycle, almost doubled between the first and second cycles and about doubled between the second and third; the cycle amplitude in net capital formation more than doubled from the first to the second and more than doubled again from the second to the third cycle. When the third cycle in each series is subdivided into two cycles, the cycle amplitude of net capital formation in the 1925-1941 and 1941-1950 periods exceeded that of the 1905-1925 cycle.

The differences in cycle amplitudes between gross and net capital formation are more extreme in the deflated series. While the 1926-1950 cycle of gross capital formation in constant prices had an amplitude

almost three times as large as that in the first cycle, the corresponding cycle of net capital formation showed an amplitude more than five times as great. The difference in amplitude also appears if the fluctuation associated with World War II is treated as a separate cycle.

Net capital formation was characterized not only by a greater increase in amplitude over the six decades under study, but also by a larger relative amplitude within each cycle. This relationship exists in both the current- and the constant-price series within each of the cycles registered during the last six decades, and regardless of whether amplitude is calculated in terms of the total percentage rise and fall over the cycle or in terms of percentage rise and fall per year.

The Growth in the Housing Stock

The growth in the inventory of residential facilities can be measured in terms of the increase in the number of dwelling units and in terms of the increase in the value of residential structures in both current and constant prices. In terms of dwelling units, the housing inventory in 1950 was almost five times as large as in 1890, almost 40 million units as against 8.3 million (Table 15). Of the total net increase of some 31 million dwelling units, 25.2 million or about four-fifths were accounted for by the construction of new housekeeping units. The remainder consisted primarily of conversions, farm residences transferred to nonfarm occupancy, and other units added to the nonfarm housing stock through reclassification. Conversions were the most important, as well as a growing, component of this residual category.

The value of residential structures, measured in current prices, shows a 20-fold increase between 1890 and 1950, or a percentage increase 4 times larger than the growth of stock in terms of dwelling units. By 1954 the value of the housing stock reached a level 27 times as high as in 1890. At the end of 1889, residential capital totaled about $8.6 billion; at the end of 1949, about $173.6 billion (Table 19); at the end of 1953, $235 billion.[3] This drastic rise was partly attributable to net capital formation over the sixty-year period and partly to the great upward revaluation of the inventory due to price increases. The decade rates of growth again show great variability, with the largest increases in this case occurring in the decades of rapid price rise. Thus the current value of residential capital more than doubled in the 1910-1919 and 1940-1949 decades, while the twenties showed the smallest relative increase of any of the six decades except the thirties.

[3] These estimates exclude public housing units and dwelling units transferred into the nonfarm housing stock (e.g. from farm use). The value of such units at the end of 1949 would probably not have exceeded 10 per cent of the estimate of residential capital given in the text. See Appendix D for a discussion of the coverage of the capital estimates.

TABLE 19

Growth of Residential Capital in Current Prices,
1889-1949
(dollars in billions)

End of Year	Value of Residential Structures, Excluding Land	Change from Preceding Decade
1889	$ 8.600	
1899	13.677	+59.0%
1909	24.367	+78.2
1919	50.947	+109.1
1929	80.563	+58.1
1939	77.426	−3.9
1949	173.555	+124.2

Source: Table D-1.

The effects of price changes are eliminated in Table 20, where the growth of residential capital is measured in constant prices. The total increase in the value of residential structures between 1890 and 1950 was $62.9 billion, or a rise of 285 per cent over the sixty-year period. Thus the percentage growth of the housing stock in constant prices was only one-fifth of that in current prices and somewhat less than in terms of the number of dwelling units. Between 1890 and 1954 the value of the housing stock increased $74.8 billion (from $22.1 to 96.9 billion) or about 338 per cent.

The two decades of greatest growth were 1890-1899 and 1920-1929, when structure values increased 61.1 and 45.6 per cent, respectively. The last two full decades were at the opposite end of the scale: 1940-1949 saw growth of only 7.6 per cent, the smallest during the sixty-year period; and there was an actual decline of 1.9 per cent in 1930-1939. Structure values grew by 21 per cent in 1944-1953 and by 14 per cent

TABLE 20

Growth of Residential Capital in 1929 Prices,
1890-1949
(dollars in billions)

End of Year	Value of Residential Structures, Excluding Land	Change from Preceding Decade
1889	$22.050	
1899	35.525	+61.1%
1909	47.406	+33.4
1919	55.317	+16.7
1929	80.563	+45.6
1939	79.006	−1.9
1949	84.951	+7.5

Source: Table D-1.

in 1950-1953. The long-term movement of this growth rate has been even more sharply downward than the movement of the ratios of new dwelling units to the inventory of dwelling units. The average decade rate of growth of deflated residential capital during the first two decades was 47.3 per cent; during the second two decades, 31.2 per cent; and during the last two full decades, 2.8 per cent. Between the end of 1933 and the end of 1953, the average decade rate of growth was 11.4 per cent. Thus the average decade growth rate declined from about one-half during 1890-1909 to one-third during 1910-1929. During the twenty years from 1930 to 1949 the stock of residential capital only slightly more than maintained itself. Even during the twenty years following 1933 the average decade rate of growth was only about one-tenth.

Real Capital per Existing Dwelling Unit

The long-term decline in the rate of growth of residential capital has been associated with a fall in real capital per existing dwelling unit. In current prices, the average value of existing dwelling units (excluding the land under them) more than quadrupled over the last six decades, rising from a little more than $1,000 at the end of 1889 to about $4,600 at the end of 1949 (Table 21). The two periods of largest

TABLE 21

Average Value of Existing Dwelling Units (Excluding Land),
Bench-Mark Dates, 1889-1949
(*dollars*)

End of Year	Current Dollars	1929 Dollars
1889	1,034	2,651
1899	1,292	3,355
1909	1,706	3,320
1919	2,873	3,119
1929	3,135	3,135
1939	2,608	2,662
1949	4,611[a]	2,257[a]

[a] The estimate of the number of dwelling units in the housing stock at the end of 1949 was reduced by 5 per cent in this calculation in order to maintain consistency of coverage in the two series used in the derivation of average value figures.

Source: Tables 15 and D-1.

absolute increase were the 1910-1919 and 1940-1949 decades, when prices of residential real estate and building costs experienced their greatest rises. The only decade showing an actual decline in average values was the thirties.

Deflated average values, however, show an opposite movement, rising during the nineties but declining slightly thereafter, except for a

small increase during the 1920-1929 decade. The decline was greatly accelerated during the thirties and forties. In these decades there was a sharp drop in the ratio of new construction expenditures to the value of the housing stock. The deflated average value per existing dwelling unit at the end of 1949 was about 15 per cent lower than in 1889 and about 33 per cent lower than in 1899. This fall in average dwelling unit value of the housing stock was the result of three forces: the increasing age of the housing stock and the consequent increase in average accumulated depreciation on existing units; conversions within the existing stock, which increase the number of dwelling units without adding proportionately to the value of the housing stock; and the decline in real expenditure per new dwelling unit added to the housing stock over this period (Chapter VII). Expenditures on additions to and alterations of existing units were insufficient to offset the forces leading to a decline in deflated average values.

Reliability of the Capital Formation Estimates

The derivation of the official series on residential construction expenditures, which underlies the capital formation estimates for the last half of the period analyzed in this monograph, has been significantly improved in recent years; and the new estimates presented here for earlier years are believed to represent a major advance over previous estimates. Nevertheless, there are certain weaknesses in the construction estimates that limit the reliability of the data. These weaknesses are due primarily to the lack of direct information, except for recent years, on building activity in non-permit-issuing areas, on underreporting and lapses of permits in permit-issuing areas, and on the accuracy with which permit valuations conform to actual construction cost. The further back in time the estimates go, the more important these weaknesses become; even in current years the error margins in the estimates may be significant. Even wider margins of error are implicit in the estimates of expenditures for additions and alterations, the second component of gross capital formation.

One possible independent check of the validity of the estimates is a comparison of net capital formation with estimates of net increments to residential capital, derived from direct estimates of residential wealth at bench-mark dates. A detailed examination of residential wealth data and a comparison of increases in residential capital with the estimates of net capital formation presented in this chapter can be found in Appendix D.

Unfortunately, this approach is useful only for long-period comparisons. For short periods the use of residential wealth estimates is subject to hazards that can lead to errors of significant magnitude. The

likelihood of error results from ". . . the comparative importance of net changes [in wealth] and of the [wealth] totals used as diminuend and subtrahend. Under conditions of steady growth or decline, the shorter the period the smaller the total change compared with the initial and terminal quantities. Hence errors in the latter may greatly affect the net difference, i.e. the total change. The longer the period, on the contrary, the less the relative effect on the net difference of errors in the terminal quantities."[4]

The major sources of error in estimation of residential wealth or capital lie in the valuation process, the difficulties of separating land from structure values, and the problems of coverage and intersector shifts of wealth (for details see Appendix D). The errors inherent in the valuation process are probably the most serious and can lead to highly misleading estimates of short-period increments in residential capital. To illustrate, in a decade in which residential capital grew by 25 per cent, a 10 per cent error in the independent wealth estimate for the terminal year would lead to a 50 per cent error in the estimate of capital increment. And 10 per cent errors in opposite directions in the initial- and terminal-year valuations would lead to an error of almost 100 per cent in the increment estimate. A 10 per cent error in valuation is well within the likely error margins in wealth estimates, particularly for periods when prices are changing rapidly.

The 1940-1950 decade provides an example of the magnitude of the inherent error in this approach. In this decade the growth in deflated capital derived from bench-mark wealth estimates is four and a half times that indicated by deflated net capital formation. Although the capital formation estimates for this decade may err on the low side, it is hardly possible for this understatement to be as much as one-tenth of the error suggested by the wealth data. Thus wealth estimates appear to be virtually useless as independent checks of capital formation estimates for short periods.

For long periods, however, wealth estimates permit a more reliable, if still rough, test of the validity of the net capital formation series presented here. For the entire period 1890-1950 there is quite good conformity between capital formation, estimated directly, and the increment in residential capital derived from 1890 and 1950 bench-mark estimates of residential wealth. A small shortage in capital formation suggested by this comparison (Appendix D) may be due partly to errors in the 1950 wealth estimate (conformity between the two estimates is very close for the forty-year period ending in 1930) and partly to some understatement in the estimates of capital formation.

[4] Simon Kuznets, *National Product since 1869*, National Bureau of Economic Research, 1946, p. 198.

To date, every reworking of residential construction expenditure estimates for conceptual reasons has led to upward revisions, and it is reasonable to assume that the estimates presented in this volume still err on the conservative side. In particular, there is some reason to believe that the capital formation estimates for the years since 1940 involve some understatement. Preliminary findings of an interdepartmental committee of federal agencies suggest that the official estimates of expenditures on new dwelling units in the 1940-1949 decade, which are used in this study, may be about 5 per cent under the actual level of such expenditures (see Appendix D for details). Official estimates for current years may also be understated, but by a somewhat smaller amount. Further, the evidence on addition and alteration expenditures, discussed in Chapter III, indicates that these estimates are probably biased downward, perhaps by as much as 50 per cent. But no reasonable adjustment of the capital formation estimates for probable error margins would be likely to alter any of the broad trends described in this monograph.