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PART A

STRATEGIC FACTORS IN CAPITAL FORMATION

CHAPTER III

THE COURSE OF RESIDENTIAL CONSTRUCTION, 1889-1953

THIS chapter presents an analysis of trends in the level and composition of private residential building from 1889 to 1953. The trend analysis is focused on the number of new housekeeping dwelling units started, expenditures for new housekeeping dwelling units, and gross capital formation in housekeeping residential real estate, which includes additions and alterations as well as new construction. Changes in the composition of residential building refer to the distribution of new dwelling units by type of structure and the relative importance in total residential construction of expenditures for additions and alterations and expenditures for new nonhousekeeping residential facilities. An Appendix (A) discusses various means other than new construction by which the inventory of residential facilities has changed over time, primarily conversions and demolitions of dwelling units.

To reveal secular movements in the volume of residential construction, annual data can be arranged in various ways. They may be combined into five year or decade averages, like those given on subsequent pages. Because the past record shows long swings in the volume of residential building, however, decade or half-decade averages often reflect only the upward or downward phase of a long cycle in a particular five- or ten-year period. Their usefulness for trend analysis is therefore limited and long-cycle averages have been computed to supplement the presentation of decade averages. The long-cycle averages are intended to help us see secular trends. No attempt is made in this study to analyze the forces that have determined the specific characteristics of fluctuations in residential construction. Description of the long cycles is not intended to imply any judgment on whether the swings have been self-generating or caused by exogeneous forces such as wars.

The description of cyclical movements in residential construction, it should be made clear, is not intended to provide means for mechanical extrapolation of past behavior. Presentation of the basic data is intended to provide a framework permitting analysis of the factors that have determined the level and movement of construction in the long run. Such an analysis is presented in succeeding chapters and serves as a basis for judgments on the future levels of residential building, which will be found in the concluding part of the study.

Volume of New Construction Defined

According to the definitions of the Bureau of Labor Statistics and the Department of Commerce, which are adhered to throughout this study, private nonfarm residential construction falls into two major categories: housekeeping and nonhousekeeping facilities. Housekeeping facilities consist of permanent dwelling units in various types of structures from the single-family house to the residential skyscraper. Nonhousekeeping construction comprises transient hotels, tourist courts, vacation cottages, clubhouses, dormitories, and similar accommodations without permanent housekeeping facilities.

Construction of housekeeping dwelling units is measured in this study in terms of the number of new dwelling units started,[1] the total expenditures for such units, and expenditures for additions and alterations of existing dwellings. Construction of nonhousekeeping facilities is measured only in terms of expenditures for new facilities.

New private, permanent housekeeping dwelling units are defined as:

". . . new houses, apartments, and other privately owned housekeeping dwellings of all types not located on farms. Prefabricated houses are included, if permanent and made of new materials. Temporary structures, units without housekeeping facilities,[2] and such movable structures as trailers and houseboats are not included. Accommodations in transient hotels, dormitories, and clubhouses are not counted in the dwelling-unit figures. These are usually nonhousekeeping quarters, and the buildings containing them are defined as 'nonhousekeeping residential.'[3]

"Coverage under . . . [this category] excludes the remodeling of existing residential structures or the conversion of nonresidential buildings into housing which are classified under 'additions and alterations.'

[1] A housekeeping dwelling unit is defined as a living accommodation containing housekeeping facilities and designed for occupancy by one household. *Housing Statistics Handbook*, Housing and Home Finance Agency, 1948, p. 5, and Dorothy K. Newman, "Estimating National Housing Volume," in *Techniques of Preparing Major BLS Statistical Series*, Bureau of Labor Statistics Bulletin 993, 1950, p. 13.

[2] Essentially permanent cooking facilities.

[3] Currently, summer cottages are not considered housekeeping dwelling units unless they meet all the following requirements:

"(a) Each contains built-in cooking facilities;
(b) Each contains built-in heating facilities (where required for year-round living);
(c) Each contains a private bath or has access to semi-private bath facilities; and
(d) It is the intention of the owner or builder to use or rent each unit as a semi-permanent family dwelling."

From David I. Siskind, "Construction in the 1947 Interindustry Study," in "Input-Output Analysis: Technical Supplement," multilithed, National Bureau of Economic Research, 1954.

Living quarters provided for superintendents, caretakers, or watchmen in warehouses and factories are excluded from residential building since construction of the residence in these cases is incidental to the nonresidential building. On the other hand, the residential figures do include housekeeping dwelling units in buildings that also contain stores. In such cases the housing accommodations are at least as important as the stores and usually account for a major part of both the physical volume and value of the construction job."[4]

The *dwelling unit* as a physical unit of measurement of housekeeping residential construction has an engaging simplicity; but this simplicity is deceptive, particularly when long-run analysis is involved. The dwelling unit is a notoriously unstandardized product with a wide range of variation in size, equipment, layout, and other physical characteristics in any one year as well as over time. Thus the changes in these characteristics that affected real capital input must receive attention in later chapters.

It would, of course, be desirable to use alternative or additional physical units of measurement, such as the number of rooms or of bedrooms, or the floor-space area; but no consecutive data are available on this basis. The dwelling unit has at least the advantage of being the unit traded in the market in which rights to the use of houses or parts thereof are exchanged through lease or purchase. Moreover, the dwelling unit corresponds to the social grouping of persons who demand separate residential housekeeping facilities—the household.

Expenditures for residential facilities include payment for the buildings proper and for the privately financed nonstructural site improvements, but not the cost of land.

Also included in the expenditure estimates is the value of all ". . . types of immobile equipment which when installed become an integral part of the structure and are necessary to any general use of the structure. Plumbing, heating, air conditioning and lighting equipment . . . are examples of service facilities which are considered a part of construction. In general, construction does not include the procurement of special purpose equipment designed to prepare the structure for specific use. Examples of such equipment are . . . refrigerators, ranges or dishwashers in homes."[5] There is some question, however, particularly for early years, as to whether the building permit data fully reflect the value of the equipment considered part of construction cost

[4] *Construction and Building Materials, Statistical Supplement* (prior to 1951, known as *Construction and Construction Materials*), Dept. of Commerce, May 1951, p. 84.

[5] *Ibid.*, p. 1.

and fully exclude the value of equipment not considered part of such cost.

Expenditures for new residential facilities can be measured at several points in construction operations and can be defined to cover various portions of the price paid by the first purchaser of a residential structure. All such measures for housekeeping dwelling units, in both the current official series and the new pre-1921 estimates presented in this monograph, are derived primarily from building permit data.[6] These furnish the permit valuation of dwelling units *authorized* in a given period. This is the construction cost, as estimated in the building permit application, of dwelling units for which permits were issued in a specified period. The permit valuation of units authorized is converted to the permit valuation of dwelling units *started* in a given period, i.e. it is reduced by the valuation of units whose permits were allowed to lapse and is adjusted to take into account lags in starts. Permit valuation is further converted to the construction cost of dwelling units started by (1) allowing for the typical understatement of the final cost of structures and (2) including those elements of cost (such as architects' and engineers' fees, operative builders' profits,[7] and land development costs) ordinarily excluded from the permit valuation.

Finally, the construction cost of dwelling units started is converted to estimates of ". . . the monetary value of the construction work per-

[6] For a discussion of the derivation procedure for the pre-1921 estimates used in this study, see David M. Blank, *The Volume of Residential Construction, 1889-1950*, National Bureau of Economic Research, Technical Paper 9, 1954. For details of the derivation procedure of the official estimates of dwelling units starts since 1921, see the following studies: David L. Wickens, *Residential Real Estate*, National Bureau of Economic Research, 1941, pp. 41-60, for the 1920-1929 decade; H. M. Naigles, *Housing and the Increase in Population*, Bureau of Labor Statistics, Serial No. R. 1421, 1942, for the 1930-1939 decade; *Housing Statistics Handbook*, 1948, pp. 10-13, for the 1940-1944 period; and Newman, *op. cit.*, pp. 13-18, for the post-1944 period.

For a discussion of the derivation of other major estimates of dwelling unit starts and a comparison between such estimates and those used in this study, see Blank, *op. cit.*, pp. 25-32 and 58-59. Also discussed in Blank are the historical data presented in the recent BLS publication *Construction during Five Decades, Historical Statistics, 1907-52*, Dept. of Labor Bulletin 1146, 1953.

For a discussion of the derivation technique of the official series on expenditures for housekeeping residential construction, see Lowell J. Chawner, *Construction Activity in the United States, 1915-37*, Dept. of Commerce, 1938, pp. 38-45; *Housing Statistics Handbook*, 1948, pp. 15-17; Roland V. Murray and Bruce M. Fowler, "Estimating Expenditure for New Construction," in *Techniques of Preparing Major BLS Statistical Series*, as cited, pp. 50-54; and *Construction and Construction Materials, Statistical Supplement*, May 1950, pp. 79-81.

[7] "Profits on land . . . and speculative profits of operative builders" are excluded from the expenditure estimates. *Construction and Construction Materials, Statistical Supplement*, May 1950, p. 80. The segment of operative builders' profits included in the adjustment for understatement of costs is, in principle, "normal" profits on construction operations.

formed . . . during the stated periods of time. This monetary value is equivalent to the cost of the materials put in place or otherwise consumed, the wages of workers who placed the materials, and appropriate charges to the work for overhead and profit."[8] Although for some purposes it would be desirable to measure construction volume as the aggregate expenditure on residential dwellings by first purchasers at the time of purchase, no such series for this country has ever been devised. The expenditure series used in this study, which are based in part on official Bureau of Labor Statistics and Department of Commerce series, and in part on new estimates developed for this study, are all estimates of the *value of work put in place.*

Long Swings in Housekeeping Residential Construction

No matter which one of the several series presented in this study is considered, the volume of housekeeping residential construction underwent several long fluctuations of major amplitude over the six decades from 1890 to 1950. The precise turning points of the long swings differ among the several series. In general, however, starting with a peak around 1890, residential construction fell to a trough about 1900, rose to a peak between 1905 and 1909 (with a plateau formation during the early part of the 1910-1919 decade), declined to a trough around 1917, rose to a high in about 1925, fell again to a trough about 1933, and reached a tentative terminal peak in 1950.[9] There has been some decline since 1950.

The long rise from the early thirties to 1950 was interrupted by a decline from 1941 to 1944. If this movement is treated merely as a suppressed portion of the long post-depression expansion, resulting from wartime restriction of construction, then three long cycles in housekeeping residential construction occurred over the six decades. Alternatively, if the cycle from 1941 to 1950 is considered a separate

[8] Murray and Fowler, *op. cit.*, p. 50.

[9] The long swings in all the series on nonfarm housekeeping residential building are quite apparent in the data. The turning point dates were chosen simply as the year of highest building activity in each peak period and the year of lowest activity in each trough period. The differences between the turning points in the several series are indicated in Table 5, B-7, and B-9. For details see Blank, *op. cit.*, Sec. II. The choice of 1950 as a tentative terminal peak for all housekeeping series was based on two considerations. First, the annual number of dwelling unit starts in 1951, 1952, and 1953 was about a quarter below the 1950 high. Second, it seems unlikely that the 1950 high will be reached again in the near future. This view is based largely on the declining number of young people who will reach marriageable age during the next half decade, and the resulting effect on family formation, as well as the great decrease in the percentage of doubled-up families since the end of World War II (see Part C, Chapter XVII, below).

long cycle, four cycles in residential construction were experienced over this period.[10]

Although the data in this chapter are restricted to the years since 1889, there is considerable evidence that major swings in residential construction long antedate the period under study here. Indexes of the number of dwelling units authorized and the permit valuation of such units in a sample of cities indicate that a major cycle occurred after the Civil War, with peaks in 1871 and 1887 and a trough around 1878.[11] In a somewhat different sample of cities Long found the same cyclical pattern, together with evidence of a preceding trough during the Civil War.[12] Thus residential construction appears to have experienced long swings of major amplitude for at least the last ninety years.[13]

Number of Dwelling Units Started

The long swings in the number of dwelling units started in the 1889-1953 period are apparent in Chart 3. As the location of turning points suggests, decade averages (Table 1) show an irregular pattern.

Over the first three decades there was not much change in the annual average of dwelling units started. But the 1920-1929 average was about twice that for any preceding decade and markedly higher than the average of either of the decades following.[14] However, the average for the eight postwar years 1946-1953 was higher than that for any decade since 1890 and 41 per cent above that for the twenties. The lowest average number of starts of any of the six decades was in the 1930-1939 period.

[10] The measures in this chapter are presented on both a three-cycle and a four-cycle basis.

[11] Blank, *op. cit.*, Table 14, p. 60.

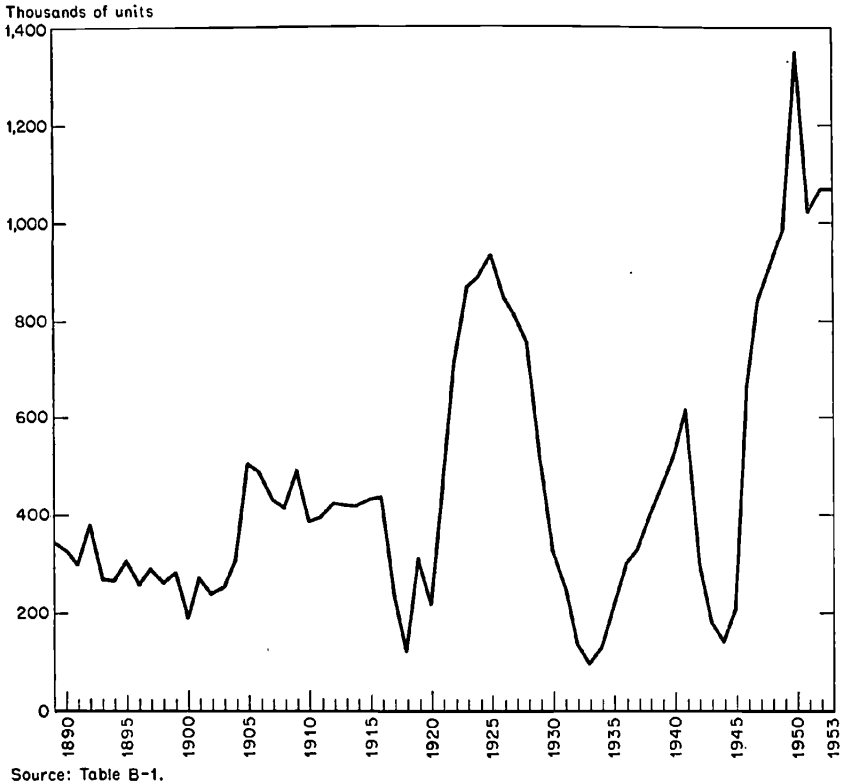
[12] Clarence D. Long, Jr., *Building Cycles and the Theory of Investment*, Princeton University Press, 1940, pp. 130-136. His turning point dates were 1864, 1871, 1877-1878, and 1888-1892 for both dwelling units and permit valuation.

[13] Colean and Newcomb take the view that there have been no long cycles in *total* construction, except those resulting from or following the Civil War and World War I. They do not claim, however, that there have been no long cycles in residential building. Indeed, it is only when they lower the weight of residential building in existing series that they derive an index of total construction volume apparently unmarked by long cyclical swings from 1878 to 1914. Miles L. Colean and Robinson Newcomb, *Stabilizing Construction: The Record and Potential*, McGraw-Hill, 1952, Appendix N. For a discussion of long cycles in total *building* activity see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, National Bureau of Economic Research, 1946, pp. 418-420.

[14] An interdepartmental committee of federal agencies has been attempting to reconcile BLS estimates of dwelling unit starts in the 1940-1949 decade with the net change in the nonfarm housing inventory between 1940 and 1950 as derived from the 1940 and 1950 Censuses of Housing. A preliminary report of this committee indicates that the official estimates of the number of dwelling units started in the forties are understated by about 6 per cent, with the largest error concentrated in the first half of the decade. For a fuller discussion see Appendix D.

CHART 3

New Private Permanent Nonfarm Housekeeping Dwelling Units Started, 1889-1953



Source: Table B-1.

TABLE 1

Annual Average Number of New Private Permanent Nonfarm Housekeeping Dwelling Units Started, by Decades, 1890-1953
(*thousands*)

Decade	*Annual Average Number of Dwelling Units Started*
1890-1899	294
1900-1909	361
1910-1919	359
1920-1929	700
1930-1939	265
1940-1949	539
1946-1953[a]	990

[a] Eight-year average.
Source: Table B-1.

Five-year averages also show that the building rate of the forties and early fifties was much higher than that of the twenties. In the peak period 1923-1927 the annual average number of dwelling units started was 872,000. This volume was surpassed in the 1949-1953 peak period, in which starts averaged 1,100,000 units.

Long-term movements are often more accurately defined by long-cycle averages (Table 2). The 1905-1925 cycle, measured peak to peak,

TABLE 2

Annual Average Number of New Private Permanent Nonfarm Housekeeping Dwelling Units Started within Long Cycles, 1892-1950
(*thousands*)

Period	*Annual Average Number of Dwelling Units Started*
1892-1905	281
1905-1925	464
1925-1950	484
1925-1941	430
1941-1950	581

Source: Table B-1. Terminal years weighted one-half.

registered an annual average of dwelling units started about two-thirds higher than that of the preceding cycle. The 1925-1950 cycle average was only 4 per cent higher than the 1905-1925 cycle average, despite the fact that the former includes the two half decades with the greatest number of starts of the entire sixty-year period. Both the depression cutdown of residential building in the first half of the thirties and the wartime restrictions in the first half of the forties held down the percentage increase in the 1925-1950 cycle.

If the 1925-1950 period is treated as two cycles, the 1925-1941 cycle shows an annual average number of dwelling unit starts about 7 per cent below the average of the preceding cycle. But the 1941-1950 average is about a quarter higher than that of the 1905-1925 cycle and slightly more than a third higher than that of the 1925-1941 cycle.

The long swings in dwelling unit starts have increased in amplitude. The increase was more than 40 per cent between the first and second cycles and about two-thirds between the second and third cycles (Table 3).[15]

[15] All relative amplitude measures were derived in the following manner: Within each peak-to-peak cycle, the trough year value and the initial and terminal peak year values were converted to relatives of the cycle average. The trough relative was algebraically subtracted from the initial and terminal peak relatives and the remainders summed. See Burns and Mitchell, *op. cit.*, pp. 131-141.

TABLE 3
Amplitude of Long Cycles in Housekeeping Dwelling Units Started, 1892-1950
(*per cent*)

Period	*Total Rise and Fall*	*Rise and Fall per Year*
1892-1905	181.4	14.0
1905-1925	260.4	13.0
1925-1950	434.5	17.4
1925-1941	318.9	19.9
1941-1950	291.6	32.4

Source: Table B-1.

If the 1925-1950 cycle is broken in two, the increase appears somewhat less marked, with the 1941-1950 cycle amplitude almost 10 per cent below that for the 1925-1941 cycle. But both amplitudes were higher than that for the 1905-1925 cycle (by 22 and 11 per cent respectively). This long-run increase in cycle amplitude is even more conspicuous in the expenditure series shown later.

If the amplitude is measured on a per-year basis (Table 3), the pattern is not quite so clear. The per cent rise and fall per year in the second cycle was slightly below that in the first cycle. But the per cent rise and fall per year during the 1925-1950 cycle was greater than that in both preceding cycles, and the two subcycles within the 1925-1950 period show an even greater per-year amplitude.

A major reason for the increasing amplitude of the long cycle in residential construction can be found in the changing relation between the timing of these long cycles and the swings in rates of secular growth of the economy as a whole. From the peak in dwelling units started in the early 1890's to the trough around World War I, the peaks and troughs in residential construction consistently diverge from the turning points in the long swings in gross national product (Table 4). The divergence is so great that the construction series at times is almost a complete inversion of the GNP series. From the peak in construction in 1925 to date, however, the two series are largely coincident.

A peak in the late eighties in the dwelling unit series precedes only slightly the trough in the early nineties in the rate of secular growth of GNP. The trough in the late nineties in dwelling unit starts falls almost halfway in the 1892-1905 swing in GNP, and the peak of residential construction in the last years of the 1900-1910 decade is only several years earlier than the GNP trough in the early 1910's. There is no turning point in the GNP series to correspond with the trough in the mid-1910's in dwelling units. On the other hand, the turning points in the mid-twenties and mid-thirties of the dwelling unit series coincide

TABLE 4

Comparison of Turning Points in Long Swings in Housekeeping Dwelling Units Started, Expenditures on Housekeeping Dwelling Units, and Gross National Product
(*nine-year averages; based on 1929 prices*)

	Dwelling Units	*Expenditures for Dwelling Units*	*Gross National Product*
Peak	1889	1891	1883
Trough	1899	1900	1892
Peak	1909	1909	1905
Trough	1916	1917	1911
Peak	1925	1925	1926
Trough	1934	1934	1934
Peak	..	..	..

Source: Tables B-1 and B-3, and Simon Kuznets, "Swings in the Rate of Secular Growth," mimeographed, National Bureau of Economic Research, Work Memorandum 37, 1952, Table 6. The 1889 and 1891 peaks in the dwelling unit and expenditure series are based on an extrapolation of the data in Tables B-1 and B-3 by indexes of units and expenditures in the sample of cities used in the derivation of the new residential construction estimates.

with the turning points of the GNP series. The series recording expenditures for dwelling units shows approximately the same changing relation to the GNP series.

The divergence in the timing of major swings in residential construction and in the rate of secular growth of real GNP during the early years under study tended to damp the amplitude of long swings in both series. Conversely, the coincidence of the two swings since World War I tended to reinforce the amplitudes of both. The two World Wars undoubtedly played a major role in imposing this coincidence upon the long swings in residential construction and in the growth of the economy at large, although the importance of their influence cannot be measured.

In any event, both wars have played a direct role in shaping the cyclical pattern of residential construction, through the restriction of residential construction, the effect of this restriction on the levels of the postwar building booms, and the impact of war conditions on family formation and birth rates.

An additional factor that may have contributed to the increasing amplitude of the long cycle in residential construction is the growing importance of operative or speculative builders. In earlier years the great bulk of residential construction was on contract and therefore directly responsive to consumer demand. Since the early twenties an increasing proportion of residential construction has been undertaken

by operative builders who build homes for sale in the open market. The growing role of builders who have assumed the risk-taking function probably has made the industry more subject to waves of pessimism and optimism and led to more pervasive cumulative movements in construction activity. Errors in judgment may be more massive when they are made by entrepreneurs who must anticipate changes in consumer demand than when consumers themselves order houses on contract.

Changes in the Structure-Mix

During the last five decades there has been a striking change in the structure-mix of residential construction. Through the twenties the trend was away from single-family houses.[16] Since the early thirties this trend has been reversed. With the exception of the years 1917-1920, the ratio of single-family houses to total dwelling units started declined fairly continuously over the first three decades of this century, although there was no year in this period in which such houses represented less than 50 per cent of all dwelling units started. Conversely, the combined proportion of dwelling units in two-family houses and multi-family structures rose over these thirty-odd years. These trends may be seen in Charts 4 and 5 and Table B-2.

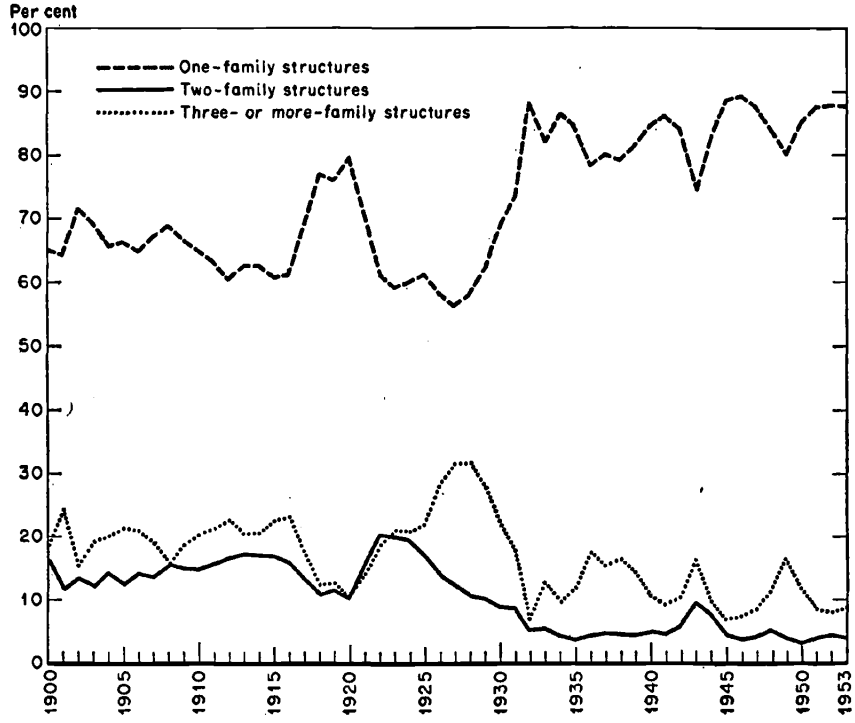
Since the early thirties, however, there has been a significant shift in the proportion of single-family houses and two- or more-family structures. Single-family houses have, in general, accounted for a larger proportion of total dwelling units started than at any time since 1900 (with the exception of the 1917-1920 period, noted above). The share of dwelling units in multi-family structures has declined, and that in two-family houses has been reduced to slight importance.

There is some evidence that the peak in the proportion of dwelling units built in multi-family structures has in the past lagged behind the peak in total residential construction. In the first boom period for which comprehensive data are available, the peak in total dwelling units started was in 1905. Three- or more-family structures accounted for their largest percentage of total units in 1912-1916. Similarly, in the next boom the peak in total starts was in 1925, while the peak in the proportion of units in multi-family structures was in 1927-1928. This lag was probably associated in part with the longer propagation period for such projects. Larger capital funds are required, and consequently

[16] Changes in the types of residential structure in which new housekeeping dwelling units have been provided can be analyzed in terms of one-family houses, two-family houses, and three- or more-family structures (defined as multi-family structures). A more refined classification of the last category is not available for past periods.

CHART 4

Percentage Distribution of Private Nonfarm Dwelling Units Started, by Type of Structure, 1900-1953



Source: Table B-2.

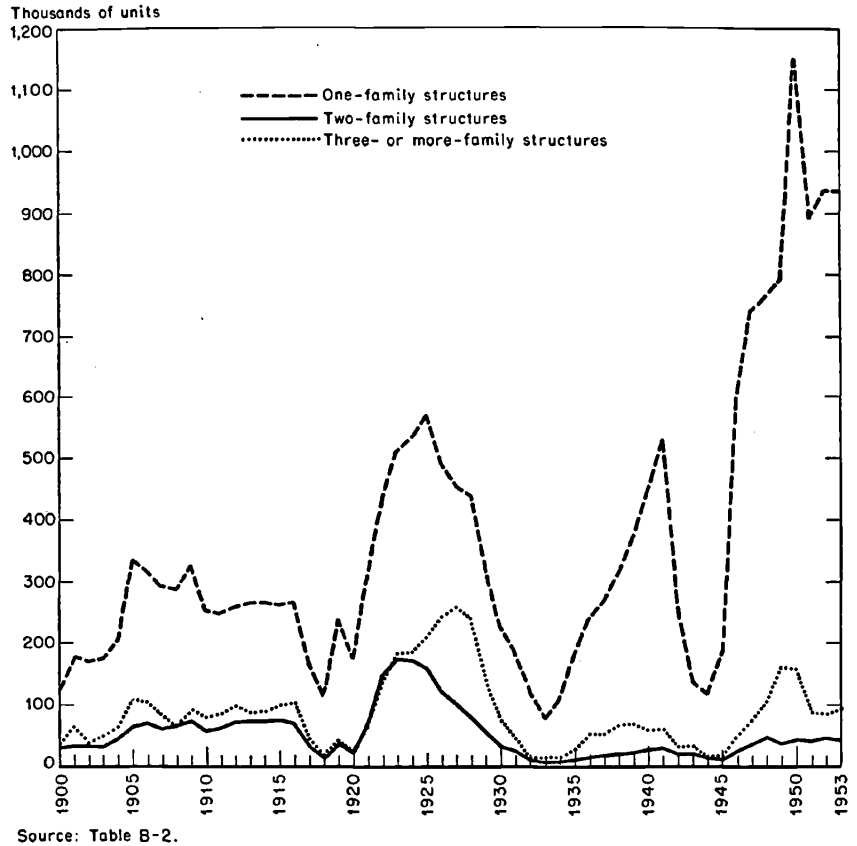
a longer period of time is needed to assemble these funds and to assure the sponsor and lender of the strength of housing demand.

The change in the structure-mix of residential construction since the early thirties is, of course, associated with the "suburban push" made possible by the automobile and road improvements. Before the automobile became popular, residential development in and around cities was generally limited to the areas accessible by streetcars, suburban railroads, and rapid transit lines. These means of mass transportation increased the radius of development but led to clustering of residential communities along lines of transportation and around stops and stations—a pattern that can still be observed in the settled suburbs of older cities. Clustering encouraged the construction of two-family houses and multi-family structures.

The automobile opened up vast new areas for residential development, both in the interstices left by public transportation lines and beyond. It expanded the supply of relatively inexpensive land available

CHART 5

Private Nonfarm Dwelling Units Started, by Type of Structure, 1900-1953



Source: Table B-2.

for residential building and thus helped to create conditions more favorable to single-family house construction. The time lag between the expansion of automobile use during the twenties and the change in the structure-mix of residential construction during the thirties represents in part a slow adjustment of living habits to technological change and may be due in part to historical factors.[17] Further, the large number of conversions during the thirties and forties may have supplied a major portion of the demand for dwelling units in multi-family structures during this period (see Appendix A). The effects of the change

[17] Among these may be the stimulation of apartment house construction during the late twenties through the easy financing device of mortgage bonds, and the more adverse effects of the ensuing business contraction on rental housing construction.

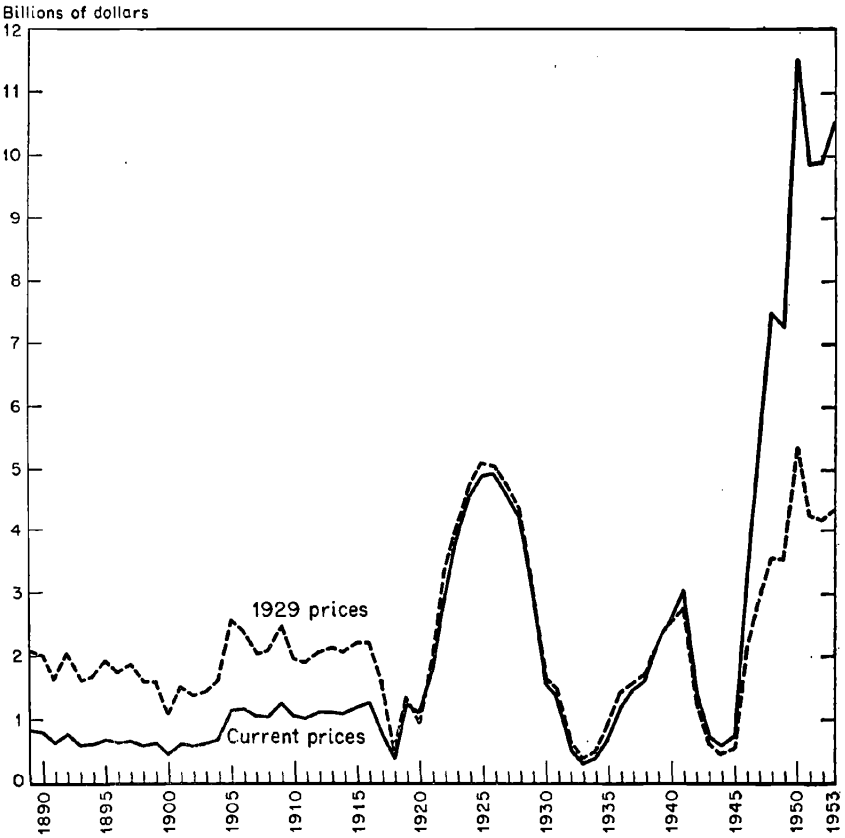
in the structure-mix of residential building on construction expenditures are examined in Chapter VII.

Expenditures for New Housekeeping Dwelling Units

The cycles in the number of new housekeeping dwelling units started are paralleled by long swings in construction expenditures for such units (Chart 6 and Table B-3). The cycles are evident in annual data on expenditures in both current and constant prices.[18] The turning

CHART 6

Expenditures for Private Nonfarm Housekeeping Dwelling Units, in Current and 1929 Prices, 1889-1953



Source: Table B-3.

[18] The conversion to constant prices is performed by deflating current expenditures by a construction cost index. The derivation of this index, the possible biases inherent in it, and its relation to market price indexes are discussed in detail in Appendix C. The conclusion reached there is that for long-term analysis a construction cost index can be used as a reasonable approximation of a price index.

points in these series approximate, although they do not always conform precisely to, the turning points in the dwelling unit series (see Table 5).[19]

TABLE 5
Turning Point Dates in Long Cycles in Housekeeping Residential Construction

	DWELLING UNITS STARTED (1)	EXPENDITURES FOR DWELLING UNITS *Current Prices* (2)	EXPENDITURES FOR DWELLING UNITS *1929 Prices* (3)
Peak	1892	1889	1892
Trough	1900	1900	1900
Peak	1905	1909	1905
Trough	1918	1918	1918
Peak	1925	1926	1925
Trough	1933	1933	1933
Peak	1950	1950	1950
Peak	1925	1926	1925
Trough	1933	1933	1933
Peak	1941	1941	1941
Trough	1944	1944	1944
Peak	1950	1950	1950

Source: Tables B-1 and B-3.

The difference in timing of the turning points of the several series makes it difficult to form any judgment about changes in the duration of the long cycles. In the series on dwelling units started and deflated expenditures, the cycles have increased in length, but the series in current prices reveals no consistent pattern.

Decade averages (Table 6) show a rising trend of expenditures in current prices for the first three decades, a decline during the thirties, and a recovery during the forties to a level still 10 per cent below the average for 1920-1929.[20] Averages for deflated expenditures, however, show little change during the first three decades, a steep rise during the twenties, a sharp decline in the thirties, and a recovery in the forties to a level only a little more than half the level in 1920-1929. For the eight-year period 1946-1953, average expenditures in constant prices were about equal to those in 1920-1929, whereas average annual

[19] The turning points in the annual series on deflated expenditures are identical with those in the annual series on units started (Table 5). The peaks in the annual series on expenditures in current prices lead the dwelling unit series slightly in 1889 and lag that series in 1909 and 1926.

[20] The understatement in dwelling units started in the 1940-1949 decade of about 6 per cent (cf. footnote 14, above) implies a corresponding underestimate, but of somewhat smaller proportions, in the expenditure series. See Appendix D for a fuller discussion.

TABLE 6

Annual Average Expenditures for New Private Permanent Nonfarm Housekeeping Dwelling Units, by Decades, in Current and 1929 Prices, 1890-1953
(*millions of dollars*)

DECADE	ANNUAL AVERAGE EXPENDITURE	
	Current Prices	*1929 Prices*
1890-1899	645	1,769
1900-1909	858	1,858
1910-1919	1,020	1,756
1920-1929	3,596	3,725
1930-1939	1,133	1,245
1940-1949	3,255	2,017
1946-1953[a]	8,160	3,774

[a] Eight-year average.
Source: Table B-3.

expenditures in current prices were more than double those in the twenties. After price effects are eliminated, the 1920-1929 decade and the post-World War II years, 1946-1953, stand out, as they did in the earlier analysis of the number of dwelling units started, as the periods with the greatest physical volume of residential construction in the past sixty years. The negligible increase in deflated expenditures between the twenties and the post-World War II period, compared with the sizable rise in the number of dwelling units started, reflects the long-run decline in average real expenditure per dwelling unit, which is discussed in Chapter VII.

Five-year averages do not significantly alter these observations. Average expenditures in current prices in the peak post-World War II period (1949-1953) were more than double those in 1924-1928, the peak period of the twenties ($9.8 billion compared with $4.6 billion), but expenditures in constant prices were 10 per cent lower ($4.3 billion against $4.8 billion).

Here again, analysis of long-cycle averages facilitates the study of trend movements. The cycle averages of expenditures in current prices show a rise over the roughly sixty-year period (Table 7). With the 1926-1950 period considered as a single cycle, the second cycle averaged about 160 per cent higher than the first cycle, and the last cycle about 40 per cent higher than the second. An uninterrupted rise emerges also when the 1926-1950 period is separated in two cycles. The 1926-1941 cycle average was 3 per cent higher than the 1909-1926 cycle average, and the 1941-1950 average was about double that for the 1909-1926 cycle.

The cycle averages of deflated expenditures, however, show a dif-

ferent pattern. There was a rise of only about one-third between the first and second cycles and a slight decline from the second to the third cycle. The smaller increase in deflated expenditures between the first two cycles, and the actual drop from the second to the third cycle compared with the slight rise in the number of dwelling units started, again reflect the long-run decline in average real expenditure per dwelling unit.

When the 1926-1950 period is treated as two cycles, the picture is

TABLE 7

Annual Average Expenditures for Housekeeping Dwelling Units within Long Cycles, in Current and 1929 Prices, 1889-1950 and 1892-1950
(*millions of dollars*)

Period	*Annual Average Expenditures in Current Prices*	*Period*	*Annual Average Expenditures in 1929 Prices*
1889-1909	740	1892-1905	1,640
1909-1926	1,915	1905-1925	2,265
1926-1950	2,661	1925-1950	2,203
1926-1941	1,976	1925-1941	2,259
1941-1950	3,803	1941-1950	2,105

Source: Table B-3. Terminal years weighted one-half.

largely unchanged. The annual real expenditures during 1925-1941 averaged about the same as during the previous cycle, but for the 1941-1950 cycle the average dropped about 7 per cent.

The expenditure data, like the series on dwelling units started, give evidence of the increasing amplitude of the residential construction cycle. The amplitude of expenditures in current prices increased by about three-quarters between the first and second cycles and more than doubled between the second and third cycles (Table 8). When the third cycle is separated into two cycles, the 1941-1950 period shows a slight decline in amplitude. However, the cycle amplitudes of expenditures in constant prices increased consistently over the six decades, whether measured in terms of three cycles or four cycles. When amplitude is defined on a per-year basis, there is a continuous rise in both the current- and the constant-price series, in both the three- and the four-cycle framework.

Expenditures on Additions and Alterations

Conceptually, those expenditures on existing structures which would have increased the value of such structures had they been made at the time of original construction are considered increments to the capital

TABLE 8
Amplitude of Long Cycles in Expenditures for Housekeeping Dwelling Units, in Current and 1929 Prices, 1889-1950 and 1892-1950
(*per cent*)

	CURRENT PRICES			1929 PRICES	
PERIOD	*Total Rise and Fall*	*Rise and Fall per Year*	PERIOD	*Total Rise and Fall*	*Rise and Fall per Year*
1889-1909	163.8	8.2	1892-1905	154.3	11.9
1909-1926	282.5	16.6	1905-1925	296.2	14.8
1926-1950	596.2	24.8	1925-1950	439.8	17.6
1926-1941	373.4	24.9	1925-1941	314.9	19.7
1941-1950	353.1	39.2	1941-1950	344.8	38.3

Source: Table B-3.

stock of the nation and, therefore, part of capital formation. Conversely, expenditures made simply to maintain the current value of structures are excluded from capital formation. In residential construction this means that addition and alteration expenditures are included in residential capital formation and that repair and maintenance expenses are excluded. This procedure is followed in this monograph.[21]

This conceptualization must be accepted for practical purposes, although the line of demarcation between addition and alteration expenditures and maintenance and repair expenses is often not clear. Some expenditures on alterations may substitute for maintenance expenses. In other cases expenditures whose primary purpose is alteration of residential structures may include some amount properly described as repair expense. Repairs may be undertaken in conjunction with structural additions by a contractor for a sum covering the whole job, and the owner may be unable to allocate costs between capital improvements and repairs. Conversely, maintenance and repair expenses may include some capital additions, particularly when the maintenance expenditures involve the installation of facilities of higher quality.

Estimates of expenditures for residential additions and alterations,

[21] Additions and alterations are defined by the Department of Commerce as follows: ". . . structural additions to and alterations of existing residential structures (including conversion of nonresidential building to residential use). Additions usually provide additional living space. Alterations may or may not provide more space, but they usually involve a conversion of space with respect to purpose or intensity of use." *Construction and Building Materials, Statistical Supplement,* May 1951, p. 84. There is some question as to whether the Department of Commerce estimates of additions and alterations include the small amount of such expenditures for nonhousekeeping facilities. Because of the way in which these estimates were derived, it seems reasonable to assume that they are not included.

even for current periods, are subject to wide margins of error. The official BLS–Commerce Department estimates, covering the period 1915 to date, are primarily based on bench-mark estimates derived from 1935-1936 and 1941 studies of consumers' budgets. Estimates for other years are obtained by interpolation and extrapolation on the basis of building permit data for additions, alterations, and repairs, adjusted for changes in family income and in the number of dwelling units standing.[22] This estimating technique apparently yields results that underestimate the actual level of expenditures for residential additions and alterations by varying though large amounts.

Although there are no direct, independent checks of the official estimates, the hypothesis of underestimation is supported by other data. The Surveys of Consumer Finances suggest that home owners (including farm owners) alone spent nearly $5 billion in 1947 and more than $6 billion in 1948[23] for "home improvements," including repair and maintenance as well as additions and alterations. Allowing for the same kind of expenditures on tenant-occupied units, but for a lower expenditure per unit, the range of total annual expenditures should be in the neighborhood of at least $7 billion if the Survey data are reliable guides. In contrast, the joint nonfarm estimates of the Bureau of Labor Statistics and the Department of Commerce indicate annual expenditures of $3.6 to 4.3 billion, composed as follows:[24]

	1947	*1948*
	(*millions of dollars*)	
Residential maintenance and repair	2,850	3,360
Residential alterations and additions	735	925
Total	3,585	4,285

It is highly unlikely that home improvement expenditures on farm homes account for any major proportion of the discrepancy; it is equally unlikely that the understatement of expenditures on nonfarm homes is solely in the maintenance and repair item. If the Survey estimates were accepted as far as level is concerned, if the BLS–Commerce Department estimates were accepted in respect to the distribution between maintenance or repair and additions or alterations, and if expenditures on farm homes were assumed to be negligible, a maxi-

[22] *Construction and Construction Materials, Statistical Supplement,* May 1950, p. 180.

[23] *1948 Survey of Consumer Finances,* Board of Governors of the Federal Reserve System, Part V, p. 6, and *1949 Survey of Consumer Finances,* Part V, p. 9.

[24] *Construction and Building Materials, Statistical Supplement,* May 1953, pp. 6 and 14.

mum estimate of nonfarm additions and alterations would be about $1.5 billion annually in 1947 and 1948, or about double the official estimates.

On the basis of a more detailed analysis, the interindustry study for 1947 by the Bureau of Labor Statistics concluded that nonfarm additions and alterations in that year amounted to $1.183 billion, or about 60 per cent more than the official estimates.[25]

The divergences between the official estimates and the estimates derived from the Survey materials may have been unusually large in the years just following World War II. Owners during this period caught up with a great number of capital improvements deferred during the depression and war periods. Also, rent control placed a premium on conversions, since converted units under certain circumstances were exempt from control. In other words, the understatement in official estimates may have been somewhat smaller in other years. But there appears to be no way to measure either the absolute amount of understatement or its variation over time. These weaknesses of the data severely limit the reliability of the analysis which follows.

In Table B-4 the BLS–Commerce Department estimates of additions and alterations are presented in both current and constant dollars for the years 1915-1953. The data for the years 1915-1920 have been slightly modified to take account of the year-to-year movements in the new estimates of expenditures for housekeeping dwelling units.

The ratio of expenditures for additions and alterations to expenditures for new housekeeping dwelling units during the period 1915-1953 as a whole amounted to more than 11 per cent, whether calculated on the basis of the current- or the constant-price series (Table 9).[26] In view of the likelihood of understatement, additions and alterations apparently form a not unimportant part of capital formation in this field.

Expenditures for additions and alterations, although fluctuating in rough concurrence with the building cycle, are much more stable than housekeeping expenditures, and the ratio between the two, therefore, moves countercyclically. The ratio declined from between 11 and 12 per cent in the half decade 1915-1919, which included the World War I trough in residential building, to almost 7 per cent in the construction boom of the twenties. It rose to a peak of 23 or 24 per cent in the depression of 1930-1934 and dropped steadily to less than 10 per cent in the 1950-1953 period.

Although it might be expected that maintenance and repair expendi-

[25] Siskind, *op. cit.*

[26] The ratios were 11.1 per cent for the current-price series and 11.2 per cent for the constant-price series.

TABLE 9
Ratio of Addition and Alteration Expenditures to Expenditures for New Private Permanent Nonfarm Housekeeping Dwelling Units, Varying Periods, 1915-1953
(*per cent*)

Period	*Current Prices*	*1929 Prices*
1915-1919	11.6	11.2
1920-1924	6.7	6.6
1925-1929	6.8	6.8
1930-1934	23.0	23.6
1935-1939	20.3	20.7
1940-1944	15.8	15.4
1945-1949	14.0	14.6
1950-1953	9.5	9.5
1915-1929	7.3	7.5
1930-1953	13.0	14.7
1915-1953	11.1	11.2

Source: Tables B-3 and B-4.

tures would show a more stable pattern than those for new construction (since some maintenance expenditures are not deferrable), this is not necessarily the case for additions and alterations. A priori, one might reasonably expect that the latter would show about the same amplitude of fluctuations as that evidenced by new construction. The markedly greater stability of addition and alteration expenditures may be explained by several factors. So far as owner-occupied houses are concerned, the average expenditure per addition or alteration is, of course, much smaller than the expenditure for a new house, and many home owners during periods of low income may improve their housing satisfactions by remodeling rather than purchase of new houses. Also, the proportion of purchases of old houses to those of new houses increases during such periods, and purchases of old houses often involve alterations or additions to make them suitable for the new owners. In the case of dwelling units for tenant occupancy, conversions and other structural alterations to secure or improve occupancy are frequent during periods of declining or low incomes. The conversions of mansions and other large houses into smaller rental units, and of large luxury apartments into smaller units during the depression of the thirties, are examples.

Although they cover only about two full construction cycles, the data in Table 9 suggest a rising trend in addition and alteration expenditures relative to expenditures on new housekeeping dwelling units. The 1930-1953 ratio of the former to the latter, whether computed from current- or constant-dollar data, was about twice the ratio for the 1915-1929

period.[27] The same conclusion results from a comparison of the ratios at successive troughs and peaks. The ratio in the trough half decade 1915-1919 was about half the ratio in the trough period 1930-1934. Similarly, the ratios of addition and alteration expenditures to expenditures for new dwelling units in the peak periods 1920-1924 and 1925-1929 were at about two-thirds the level of the ratio in the postwar boom of 1950-1953.

This apparent increase in the relative importance of additions and alterations seems to be associated in part with a similar trend of conversions, expenditures for which are an important component of addition and alteration expenditures (see Appendix A). The increase is probably also associated with the growth in the size of the stock of housing relative to new construction.

Expenditures for New Nonhousekeeping Residential Facilities

There is no comprehensive series on a physical basis for new nonhousekeeping residential facilities, and there is indeed a question as to whether such a series (on the basis of square foot areas, for example) would be meaningful in view of the extremely heterogeneous nature of nonhousekeeping residential structures, which range all the way from transient hotels to motor courts, tourist cabins, vacation cottages, and dormitories. Therefore, changes in this type of construction can be measured only in terms of expenditures.

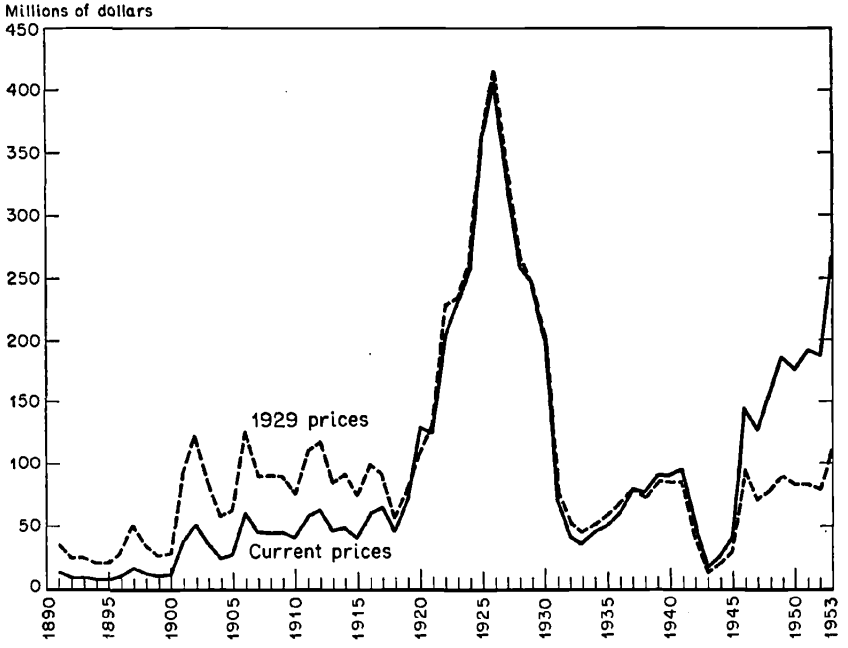
There is less evidence of long cyclical swings in nonhousekeeping than in housekeeping construction. Disregarding short-term fluctuations, which are very pronounced in this segment of residential building, expenditures in current dollars show a gradual rise to the end of the 1910-1919 decade, a more rapid rise to the middle twenties, a decline to the early thirties, some recovery before World War II, a decline during the war, and a more substantial recovery in the postwar period. Both the 1941 and 1953 peaks, however, were substantially below the level reached in the mid-twenties. Deflated expenditures followed essentially the same pattern, except that the level in the 1910-1919 decade was somewhat lower in comparison with that in the preceding decade and the post-1945 rise was far more modest. Deflated expenditures in the postwar period were at about the same level as expenditures in the late thirties and in the 1900-1917 period, and about one-quarter of the level at the 1926 peak (Chart 7 and Table B-5).

As a consequence, expenditures for such facilities since the 1920-1929 decade have declined in importance relative to expenditures for house-

[27] The actual ratios were 13.0 per cent for 1930-1953 and 7.3 per cent for 1915-1929, in current prices, and 14.7 per cent and 7.5 per cent for the same periods, in constant prices.

CHART 7

Expenditures for Nonhousekeeping Residential Facilities, in Current and 1929 Prices, 1891-1953



Source: Table B-5.

keeping dwelling units (Table 10). The decade averages show a rising ratio of nonhousekeeping to housekeeping expenditures over the period 1891-1929 and a declining ratio since the twenties. The ratio for the eight-year postwar period 1946-1953 was lower than that for any decade in this century, and the ratio for the boom period 1949-1953 (1.0 per cent for both current- and constant-price expenditures) was even lower than that for the decade as a whole.

This apparent reversal of trend may seem astonishing in view of the vast amount of construction of such nonhousekeeping facilities as tourist cabins, motels, vacation cottages, and similar accommodations over the last decade and a half, and particularly during the postwar period. But the reversal is largely a result of the shift in the type of nonhousekeeping accommodations built. The former official estimates of hotel construction[28] average about nine-tenths of the current government estimates of total nonhousekeeping construction for the decade of the twenties, about two-thirds for 1930-1934, and only between one-

[28] Made before the more inclusive estimates of nonhousekeeping facilities were prepared.

TABLE 10

Ratio of Expenditures for Nonhousekeeping Facilities to Expenditures for New Private Permanent Nonfarm Housekeeping Dwelling Units, by Decades, 1891-1953

(*per cent*)

Decade	*Current Prices*	*1929 Prices*
1891-1899[a]	1.7	1.7
1900-1909	4.5	4.5
1910-1919	5.3	5.0
1920-1929	7.1	7.0
1930-1939	6.6	6.4
1940-1949	2.8	3.0
1946-1953[b]	1.7	1.8

[a] Nine years.
[b] Eight years.
Source: Tables B-3 and B-5.

quarter and one-third for the years since 1934.[29] The recent growth in nonhousekeeping construction has been largely in facilities whose construction per family unit or per unit of space is much less expensive than hotel construction. If nonhousekeeping construction continues to take this form, as seems most likely, a tremendous increase in construction volume over current levels would be needed for nonhousekeeping expenditures to reach the levels of the 1920's, either in absolute terms or relative to new housekeeping construction.

Gross Capital Formation

Gross capital formation in residential real estate is defined as the sum of expenditures on new housekeeping dwelling units and expenditures on additions to and alterations of existing housekeeping units. Although data on additions and alterations presented in this chapter cover only the period 1915-1950, graphic extrapolation was employed to extend the series back to 1889 in order to derive consistent gross and net capital formation figures for the entire period 1889-1950. Details of this calculation are given in Appendix D.

The estimates of gross capital formation presented here are restricted to the housekeeping segment of residential construction and exclude expenditures for nonhousekeeping residential construction. There are no estimates of additions to and alterations of nonhousekeeping facilities, which are required for the derivation of gross capital formation inclusive of such facilities; and there are apparently no empirical

[29] For estimates of hotel construction see *Construction and Construction Materials, Statistical Supplement*, May 1949, p. 7. For estimates of total nonhousekeeping construction see *Construction and Building Materials, Statistical Supplement*, May 1952, p. 6.

materials on market depreciation rates for nonhousekeeping facilities, which would be required for the derivation of net capital formation. The residential mortgage debt (which will be related to estimates of residential wealth derived from the net capital formation figures) conceptually excludes debt on nonhousekeeping facilities. All wealth estimates derived from census or census-type materials, which are used as a check on the net capital formation series, refer primarily to housekeeping units. Further, the estimates of expenditures on nonhousekeeping residential facilities are far weaker than those for housekeeping facilities, and it seems undesirable to increase the already existing margins of error in the gross and net capital formation series by inclusion of the nonhousekeeping component. The construction of these facilities has been a relatively small segment of residential construction, equal in no decade since 1890 to more than about 7 per cent of housekeeping construction.

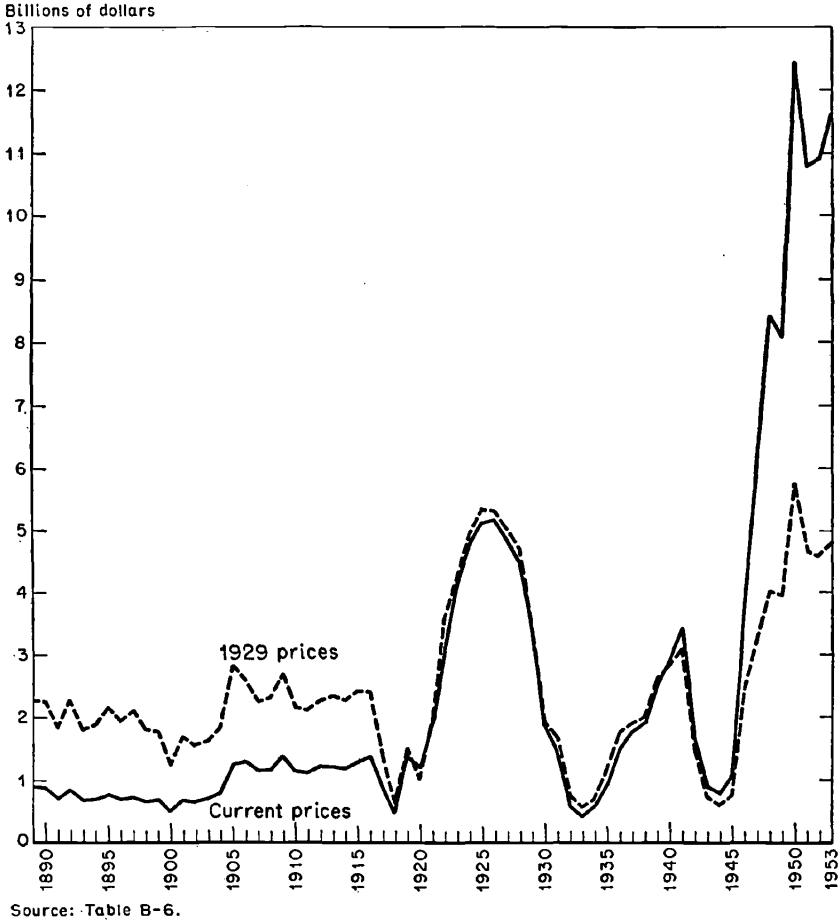
Since expenditures on new housekeeping dwelling units since 1889 have run at a level between five and fifteen times that of additions and alterations, the behavior of the gross capital formation series is dominated by, and largely shares the characteristics of, the series on expenditures for housekeeping dwelling units (Chart 8 and Table B-6). The same cycles are traced out in both sets of series, and the identical turning points are found in the corresponding series (see Table B-7).

Decade averages for gross capital formation in current prices indicate a rising trend for the first three decades, a sharp decline during the thirties, and a recovery almost to the level of the twenties in the 1940-1949 decade (Table 11). Annual average gross capital formation in 1946-1953 was more than twice that in the twenties. As in the case of housekeeping expenditures, deflated averages for the first three decades of the sixty-year period show little variation, and the deflated average for 1940-1949 was at a much lower level than that of the twenties. However, annual average gross capital formation in constant prices in the postwar period 1946-1953 was slightly higher than in the 1920-1929 decade. The somewhat greater rise in gross capital formation than in housekeeping expenditures was a result of the increasing importance of additions and alterations over the last twenty or thirty years relative to housekeeping expenditures, which was discussed earlier.

Five-year averages also show that about the same physical amount of residential construction was put in place in the twenties and in the post-World War II boom. These twin peaks were the highest of the last six decades. Although average gross capital formation in current prices in 1949-1953 was more than double that in 1924-1928 ($10.8 billion as against $4.9 billion), in 1929 prices the post-World War II

CHART 8

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



Source: Table B-6.

period was within 6 per cent of the peak period of the twenties ($4.8 billion as against $5.1 billion).

Long-cycle averages for gross capital formation are presented in Table 12. In current prices the movement of the cycle averages approximates that of the cycle averages for housekeeping expenditures, but in terms of constant prices there is a minor difference. Unlike the housekeeping expenditure averages, the 1925-1950 cycle average of deflated gross capital formation was slightly higher than the second cycle average (about 1 per cent). Again, this difference can be attributed to the greater importance of additions and alterations in recent years.

The measures of the increasing amplitude of long cycles in gross

TABLE 11
Annual Average Gross Capital Formation in Residential Real Estate, by Decades, in Current and Constant Prices, 1890-1953
(*millions of dollars*)

Decade	*Current Prices*	*1929 Prices*
1890-1899	723	1,982
1900-1909	954	2,070
1910-1919	1,130	1,942
1920-1929	3,839	3,975
1930-1939	1,374	1,516
1940-1949	3,726	2,318
1946-1953[a]	9,040	4,188

[a] Eight-year average.
Source: Table B-6.

TABLE 12
Annual Average Gross Capital Formation in Real Estate within Long Cycles, in Current and 1929 Prices, 1889-1950 and 1892-1950
(*millions of dollars*)

Period	*Current Prices*	*Period*	*1929 Prices*
1889-1909	826	1892-1905	1,846
1909-1926	2,063	1905-1925	2,465
1926-1950	3,022	1925-1950	2,495
1926-1941	2,244	1925-1941	2,546
1941-1950	4,319	1941-1950	2,406

Source: Table B-6. Terminal years weighted one-half.

capital formation conform closely to the corresponding measures of expenditures for new housekeeping construction (Table 13). In the three-cycle framework the amplitude of gross capital formation in current prices almost doubled between the first and the second cycle and more than doubled again between the second and the third cycle; the amplitude of the constant-price series increased almost 100 per cent from the first to the second cycle and by more than one-third from the second to the third cycle. When the third cycle is divided into two, gross capital formation in current prices, unlike the equivalent housekeeping expenditure series, shows a small decline in amplitude from 1926-1941 to 1941-1950. However, the amplitude of the 1941-1950 cycle is still significantly higher than that of either the first or the second cycle. Gross capital formation in constant prices even on the four-cycle basis shows a continuous increase in cycle amplitude. The percentage rise and fall per year in gross capital formation in both the current- and the constant-price series also shows a consistent increase.

TABLE 13

Amplitude of Long Cycles in Gross Capital Formation in Residential Real Estate, in Current and 1929 Prices, 1889-1950 and 1892-1950

(*per cent*)

CURRENT PRICES			1929 PRICES		
PERIOD	*Total Rise and Fall*	*Rise and Fall per Year*	PERIOD	*Total Rise and Fall*	*Rise and Fall per Year*
1889-1909	154.4	7.7	1892-1905	143.7	11.1
1909-1926	272.4	16.0	1905-1925	283.4	14.2
1926-1950	554.1	23.1	1925-1950	400.2	16.0
1926-1941	344.7	23.0	1925-1941	288.3	18.0
1941-1950	330.2	36.7	1941-1950	319.2	35.5

Source: Table B-6.

Summary

The secular trend of residential construction from 1889 to 1953 can be described as one of arrested growth in physical volume of output. This trend is evident from analysis of the three long swings that occurred during these years and from comparisons of the boom periods in the twenties and after World War II.

Long swings are found in all of the measures of housekeeping residential building, e.g. new dwelling units started, expenditures for such units, and gross capital formation in residential real estate. Expenditures in current prices registered a continuous rise over the three cycles. In each of the physical measures of volume, however, a rise in the level of construction activity between the first and the second cycle was followed by a small or zero increase between the second and the third cycle. A small or zero increase is also found when the average level of deflated expenditures or gross capital formation for the eight-year period 1946-1953 is compared with that for the decade of the twenties and when the five-year peak periods in the housing booms following both World Wars are observed. The number of dwelling unit starts has shown a somewhat larger increase over the same periods.

In general, the long swings have been characterized by increasing amplitude regardless of whether amplitude is measured in terms of total percentage rise and fall over the cycle or in terms of percentage rise and fall per year.

The composition of new residential construction has undergone substantial changes. Over the last twenty years the proportion of dwelling units in single-family houses has been at a much higher level than in earlier years. The proportion of units in two-family and multi-family structures rose from 1890 to the late twenties. There has been a per-

ceptible increase in the ratio of expenditures for additions and alterations to expenditures for new dwelling units. Finally, the ratio of expenditures for new nonhousekeeping residential facilities to expenditures for new housekeeping construction declined over the last two decades, following a rise in the four decades before 1930.