CHAPTER Dc
Construction, Housing, and Mortgages

Editor: Kenneth A. Snowden

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Kenneth A. Snowden

Construction is the fabrication of new buildings and structures or the substantial modification of those that were previously built. These activities are ordinary, everyday features of our landscape – houses are built, neighborhood schools are renovated, shopping complexes take shape, industrial plants are erected, and roads are improved. Buildings and structures are familiar because they represent the basic physical infrastructure used to house and to move all persons, goods, and services. The statistics presented in this chapter document the role that construction has played in the American economy for more than a century. The first two groups of tables include series that measure aggregate construction and its major components (Tables Dc1–255 and Dc256–509). In the last two sections of the chapter, the focus is sharpened to residential housing and series that document how we have built, occupied, owned, and financed this most enduring symbol of the American Dream (Tables Dc510–902 and Dc903–1288).

The goal is to present historical series related to construction, housing, and mortgages, and to connect these series to similar data from the modern period. Along these lines, a special focus of this chapter is to connect the official "value-in-place" construction output series that are currently compiled by the U.S. Bureau of the Census to their pre-1964 counterparts that are no longer updated or supported by the Bureau. The last section of this essay provides an overview of this issue.

Construction as Investment

Every society faces a fundamental trade-off: by consuming less of its output today, it can produce and consume more in future periods. The choice arises because some goods that could be produced today, such as machines, houses, or roads, will yield productive services many years into the future. These are referred to as "real" investment goods. When society allocates scarce resources to produce these types of goods, it must reduce the amount of resources it uses to produce goods that will be consumed today. Investment goods that were produced in the past and that remain productive today are collectively referred to as the nation's capital stock. The buildings and structures represented in this chapter comprise the largest single component of the capital stock in the United States.

To appreciate the magnitudes involved, consider that total U.S. output in 1999 was just less than $9.3 trillion (output measured here by gross domestic product, GDP). More than 9 percent of this output – some $0.85 trillion – was invested in buildings and structures. At the end of the year, moreover, the value of the stock of usable buildings and structures was $20.5 trillion, or more than double the value of the total output produced during the year. Importantly, 1999 was not an exceptional year. Between 1929 and 1999 an average of one out of every ten dollars of output in the United States was spent on construction investment. Over the same period, the value of buildings and structures has been, on average, 2.5 times larger than the value of annual output.

Simon Kuznets's (1961) groundbreaking investigation of the history of the American capital stock revealed that investment in buildings and structures represented an even larger share of aggregate activity before 1929. Kuznets's annual estimates of construction output for the 1889–1955 period are presented in Tables Dc78–105; they are shown in Figure Dc-A as shares of total current-dollar output (gross national product, GNP) for overlapping decades that run from 1869–1878 to 1944–1953. These data show that a peak in the relative importance of construction occurred between 1884 and 1908, when nearly one out of every six dollars of output was invested in buildings and structures.

The surge in construction that Kuznets identified suggests that investment in building and structures played a key role in late nineteenth-century economic growth. Not surprisingly, the connection between the two has been an active area of research ever since. A primary focus has been on investments that were made during the period in transportation, communications, and city building. Fogel (1964) initiated a major debate when he measured the broad social benefits that were attributable to investments in railroads, while others compared these social benefits to the costs of the subsidies that were used to encourage their expansion (Fishlow 2000 provides a survey). The reduction in transport costs attributable to the railroad has also been linked to the nation's emerging leadership in manufacturing and to improvements in business organization

Acknowledgments

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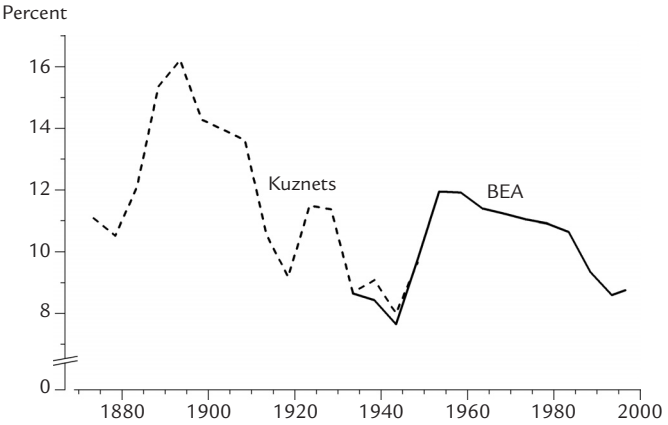

FIGURE Dc-A Gross construction as a share of gross national product: 1869–1999

Sources

Simon Kuznets, *Capital in the American Economy: Its Formation and Financing* (Princeton University Press, 1961), Tables R-11 and R-14, pp. 520 and 524. Data downloaded from the Internet site of the U.S. Bureau of Economic Analysis (BEA), June 28, 2002: Table 1.3, "Gross Domestic Product by Major Type of Product," and Table 1.9 "Relation of Gross Domestic Product, Gross National Product, Net National Product, National Income, and Personal Income."

Documentation

Shares are computed from figures expressed in current dollars. The values displayed are for overlapping decades: 1869–1878, 1874–1883, and so forth, ending with a six-year period for 1994–1999. The midpoint of each period is used to plot the values on the graph.

during the period (Chandler 1959; Atack 1985; Wright 1990). Field (1987, 1992) extends the argument to show that nineteenth-century investments in transportation and communication (for example, the telegraph) improved both financial market efficiency and inventory management practices. Rapid urbanization during the late nineteenth century, meanwhile, required substantial investments in housing, transportation, and facilities for education and public health (Gaspari and Woolf 1985; Snowden 1987; Troesken 1999; see Cain 1997 for a survey). In this chapter, series that measure construction investment for broad sectors and aggregates back to the late nineteenth century are presented in Tables Dc78–131 and Dc510–530.[1]

Kuznets's data have been extended in Figure Dc-A with decadal shares of construction between 1929 and 1999 that have been calculated from official national income statistics. The modern data make the sustained surge in building activity between 1880 and 1910 look even more singular, episodic, and remarkable, as construction claimed 14 percent or more of total output for nearly the entire period. In contrast, investment in building and structures represented an average of 10 percent of output between 1910 and 1990, and wandered above and below this average for extended periods of time.

During the 1930s and 1940s, for example, the construction sector saw its share of total output fall far below its long-term average. This resulted from two sharp collapses in construction expenditure – by a little more than 60 percent between 1929 and 1933, and a little less than 60 percent between 1941 and 1944. The earlier decline has been blamed on the residential construction boom of the 1920s, which, it is alleged, left the economy with an excess supply of housing at the end of the 1920s, and with prospects for only a slow recovery for the remainder of the 1930s (Hickman 1973; Mercer and Morgan 1973). The decline in residential construction, in fact, was staggering. Constant-dollar residential construction fell by 80 percent between 1929 and 1933, and the sector had not fully recovered even by 1939 (see Tables Dc256–271 and Dc510–530). However, the housing sector was not unique. Nonresidential building and public utility construction also decreased by 80 percent between 1929 and 1933, and both recovered more slowly than residential housing (see Tables Dc282–302 and Dc321–338). The collapse in private construction activity during the 1930s was systemic and profound, and is likely to stimulate continued discussion and explanation. The collapse in private construction between 1941 and 1944, on the other hand, was nearly as severe, but was clearly attributable to the exigencies of war.

The decline in the share of total construction in aggregate output between 1929 and 1948 would have been even more severe had public investments in building and structures not increased and partially offset the severe decline in private construction. The impacts of the Great Depression on public and private construction were so different, in fact, that the composition of the nation's stock of buildings and structures changed rapidly and permanently. Figure Dc-B shows the shares of building and structures that were privately and publicly owned (separate shares shown for private residential and private nonresidential). Eighty-five percent of the total was in private hands in 1925, with equal shares dedicated to residential and nonresidential uses. Over the next twenty years the share of publicly owned buildings and structures increased by 10 percentage points while the share of private nonresidential building and structures decreased by the same amount. Although the expansion of military infrastructure during World War II played a role in the transition, most of the change had already occurred during the 1930s. Moreover, after the public share of buildings and structures fell for a few years immediately following the war, it gradually increased throughout the 1950s and 1960s because of increased public investments in highways and educational facilities (see Tables Dc351–509). As a result, by 1975 the publicly

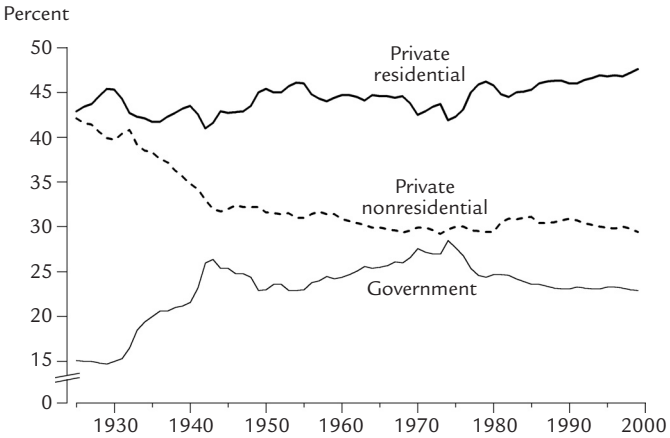

FIGURE Dc-B Composition of the net stock of structures: 1925–1999

Sources

Series Dc55–56 and Dc62.

[1] Those interested in data for more specific types of investments during the period should consult Ulmer (1960) and Lipsey and Preston (1966).

owned stock of buildings and structures had become nearly equal in size to the privately owned stock that was held for nonresidential uses.

The surge in public infrastructure investment during the 1950s, combined with a robust homebuilding industry, produced a postwar "golden age" for the American construction industry. Between 1950 and 1965 investment in new buildings and structures grew apace with real GDP and claimed a share of output that was higher than it had been since the 1920s (refer to Figure Dc-A). During the late 1960s, however, the share of construction in output began to fall, and then declined for twenty-five years. The decrease in the relative importance of construction after 1970 can be measured either in current dollars (as in Figure Dc-A) or in constant dollars (see Table Dc44–53). By either measure, construction activity represented a smaller share of output during the 1990s than it did at any other time in the twentieth century except the 1930s and 1940s.

As the importance of total construction decreased through the 1970s and 1980s, so did the share of buildings and structures that were publicly owned (see Figure Dc-B). The major part of this decline was related to reduced levels of investment in transportation, education, and public health facilities. As we have seen, similar types of infrastructure investments appear to have supported rapid economic growth during the late nineteenth century. Aschauer (1989) reversed the logic for the modern era by connecting the decline in public infrastructure investment that began in the 1970s to a simultaneous slowdown in aggregate productivity growth. His conjecture stimulated a heated discussion about the impact of infrastructure investments on growth that occupied the academic and policymaking communities; Gramlich (1994) reviews this debate and finds that it was inconclusive. However, for a few years construction was once again on center stage.

Construction, Long Swings, and the Business Cycle

John Maynard Keynes argued during the 1930s that changes in the amount of investment spending played a critical role in propagating economy-wide fluctuations in production, income, and employment. Given their own Depression-era perspective, it was natural for investigators in the United States to focus more narrowly on the role that construction investment played in the business cycle. Through their efforts, several indexes of total building activity that reached well back into the nineteenth century were compiled; most are presented and described in Table Dc78–91. One of them is shown in Figure Dc-C for the period between 1830 and 1933. Also shown in the figure is a similar "building index" running from 1920 to 1999 that has been fashioned out of three distinct segments of the Census Bureau's constant-dollar, value-in-place measure of total construction activity. These two series summarize much of what we know about annual fluctuations in aggregate construction activity over the past 170 years.

On the basis of similar evidence, Alvin Hansen (1964) argued that a fifteen- to eighteen-year "building cycle" had been a key determinant of the depth and severity of business cycle contractions in the United States before 1940. He noted, in particular, that all three "super-depressions" during the period (those beginning in 1873, 1893, and 1929) had occurred just after a peak in the building cycle, while four relatively mild contractions (those in 1882, 1907, 1920,

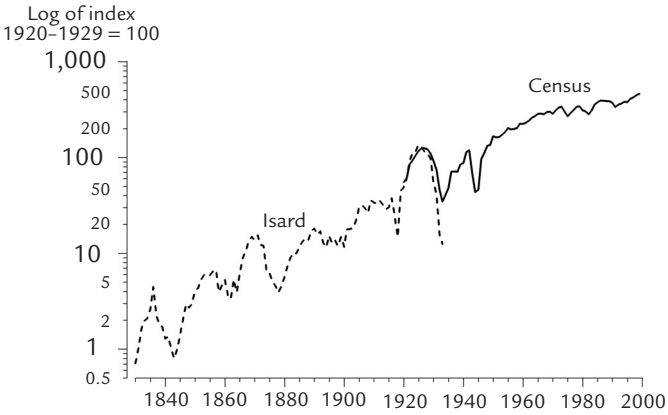

FIGURE Dc-C Indexes of construction activity: 1830–1999

Sources

Isard: 1830–1933, series Dc108. U.S. Census Bureau's value-in-place series: series Dc22 for 1920–1946, series Dc33 for 1947–1963, and series Dc44 for 1964–1999, with the series linked at 1947 and 1964 to form an index with the same base as the Isard series (1920–1929 = 100).

Documentation

See Tables Dc22–53 and Dc106–131 for details. The indexes are graphed on a logarithmic scale.

and 1937) had occurred when building activity was on a long-term upswing. From a broader perspective, Moses Abramovitz (1964, 1968) argued that the historical building cycle had been integral to the "long swing" movement of aggregate growth rates in the United States between 1840 and 1914. Abramovitz described these fluctuations as sequences of short spurts (two to four years) of vigorous growth, followed by seven to eleven years of steady but declining growth during which population-sensitive and transportation-related construction spending reached "towering heights." Each long swing ended with a severe depression in construction that lasted four to seven years and, as Hansen observed, a severe general business cycle contraction.

Hansen and Abramovitz were not alone; the behavior of construction was central to most early thinking about the American business cycle (see also, for example, Clark 1935; Silberling 1943; and, for a critical view, Colean and Newcomb 1952). Nowadays, building cycles and long swings play virtually no role in business cycle theory. The reason for the change can be clearly seen in Figure Dc-C: the building cycle or long swing disappeared after World War II. Abramovitz (1968) attributed its "passing" to changes in the demographic forces that determined residential housing demand (free immigration was shut off in the 1920s), and to changes in the structure of private business investment (the railroads were no longer dominant). Hickman (1973) examined the historical pattern of building starts (presented here in Tables Dc510–553), and found support for Abramovitz's conjecture that immigration restrictions were responsible in part for the disappearance of the long swing in residential housing.

Even though building cycles or long swings have diminished, we continue to examine the impact that changes in broad construction aggregates have on more general macroeconomic conditions. Most notably, Gordon and Veitch (1986) found that changes in building and structures investment between 1919 and 1983 were autonomous shocks that originated within the construction sector, not responses to general business conditions. Green (1997) found that residential construction leads the general business cycle,

whereas nonfarm business construction tends to lag it. It makes sense to focus on the macroeconomic impacts of the homebuilding sector, in any case, because it is the largest component of the construction industry. Investigators in the modern era tend to explain changes in the volume of residential construction activity as a response to changes in the supply, cost, and availability of mortgage credit and, therefore, to monetary policy (Swan 1970; Jaffee and Rosen 1979; Ryding 1990). However, whatever causes them to change, a variety of statistical measures of residential construction activity besides actual expenditures (see Tables Dc256–281) is regularly used to assess general macroeconomic conditions – housing starts (Tables Dc510–565), new house completions and sales (Tables Dc566–652), and housing vacancies (Table Dc810–825).

In recent years, construction statistics have also figured prominently in literature that assesses changes in the severity of the American business cycle over time. Christina Romer (1986, 1989) started this line of inquiry by challenging the evidence that had been used for decades to show that the U.S. economy had become more stable after World War II than it had been before World War I. Balke and Gordon (1989) countered that Romer's argument relied too heavily on a commodity output series and ignored high-quality series that measured output for the construction, transportation, and communication sectors (see Table Dc106–131). Balke and Gordon used these data to derive a new historical GNP series that supported the conventional view that aggregate output was more volatile before 1929 than after World War II (see Series Ca213-215). Particularly important, it turned out, was the reduction in the volatility of construction after World War II that was described earlier in this essay. Stock and Watson reached a similar conclusion for the modern era. They report evidence that a discrete reduction in general macroeconomic variability that occurred around 1985 was attributable in part to a marked reduction in the variability of construction around the same time (Stock and Watson 2002).

Housing Trends and Patterns

The first enumeration of dwelling units in the United States was conducted within the Population Census of 1890; in that year 12.7 million units were occupied by slightly fewer than 63 million persons. By 1990 the population had nearly quadrupled, but the number of occupied housing units had increased sevenfold to nearly 92 million. In the first decadal Census of Housing (1940), the Census Bureau began to collect information about the characteristics of housing units in addition to just counting them. We learned in that year, for example, that 64 percent of the nation's housing units were detached, single-family homes – that share increased to nearly 70 percent by 1960, before falling back to 60 percent by 1999 owing to the increasing importance of multifamily units and mobile homes. Largely because of the efforts of the Census Bureau, our knowledge about the places we call home has increased steadily, especially over the past century.[2]

Tables Dc653–669 and Dc683–696 provide national and regional totals of the number and types of occupied and vacant housing units over the past century. More detailed information about characteristics of the housing stock is available in the decadal Censuses of Housing Data and in the biennial American Housing Survey that has been conducted by the U.S. Department of Housing and Urban Development since 1973. A sample of the information available about the housing stock is shown in Table Dc-D. During the half-century covered in this table, the nation's housing units became less crowded, were heated with safer and cleaner fuels, and almost universally came to offer modern plumbing and communication facilities.

TABLE Dc-D Housing characteristics: 1940–1990

	Percentage of households				
Year	Lacking complete plumbing facilities	In crowded units (more than one person per room)	In single-person household	Heating with fuel oil, coal, or wood	Without a telephone
1940	45.3	20.2	7.7	87.5	—
1950	35.5	15.7	9.3	67.2	—
1960	16.8	11.5	13.3	48.8	21.5
1970	6.9	8.2	17.6	30.2	13.0
1980	2.7	4.5	22.7	22.0	7.1
1990	1.1	4.9	24.6	16.7	5.2

Source

U.S. Census Bureau, "Housing: Then and Now – 50 Years of Decennial Censuses," U.S. Census Bureau's Web site, accessed May 2003.

The quality of a housing unit is determined by many more of its characteristics than those shown in Table Dc-D – it also depends, of course, on the attributes of the property, the neighborhood, and the general locale where the unit is situated. In the housing market, the value of all of these characteristics is captured in a single number – the market price of the housing unit (Kain and Quigley 1970; Kutty 1999). This feature of housing prices must be kept in mind when using or interpreting the single-family home price indexes that are included in this chapter (Tables Dc826–878). These series measure national or regional trends in average home prices for both new and existing homes, but they are not all designed to capture the same information. Indexes such as series Dc829 and Dc863 measure changes in the average prices of homes that were actually built or sold within a given year; these indexes capture changes in both the characteristics of the average home and the implicit market price of these characteristics. Other indexes, such as series Dc597 and Dc869, capture only changes in the prices of characteristics by tracking the price of homes whose characteristics do not change.[3]

However they are measured, general movements in single-family home prices have a profound impact on households throughout the economy. Changes in home prices could affect some households as they decide whether to rent or buy a home; for many others, a change in home prices affects the amount of wealth they hold in the form of residential property. In this chapter, residential wealth series are presented for 1889–1953 (Table Dc879–888) and for 1925–1999 (Table Dc889–902). The stakes are large when residential wealth changes – during the 1990s residential wealth represented nearly 60 percent of the nonfinancial wealth of households and more than 30 percent of their total wealth (Aizcorbe, Kennickell, and Moore 2003). Because it is so large in amount and so widely distributed, residential housing wealth has recently been examined

[2] To read more about the historical development of housing statistics in the United States, refer to Colean (1944), Housing and Home Finance Agency (1948), Grebler, Blank, and Winnick (1956), and Beyer (1965). For the modern era, refer to Simmons (2001).

[3] More detailed information concerning the appropriate interpretation and uses of the home price indexes presented in this chapter can be found in the table documentation, and in Wallace (1996) and Englund, Quigley, and Redfearn (1999).

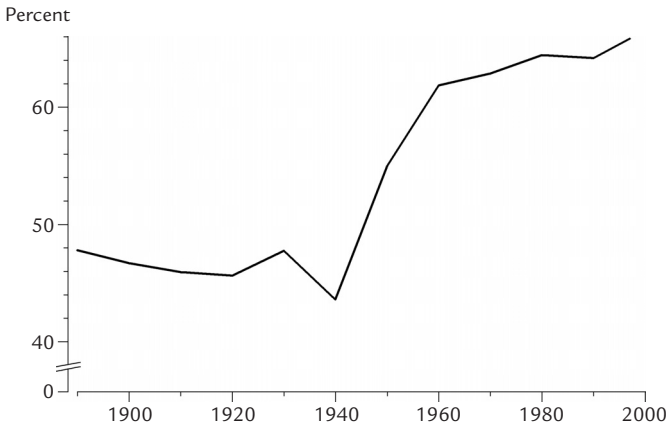

FIGURE Dc-E Homeownership – owner-occupied units as a percentage of all occupied housing units: 1900–1990

Sources

Series Dc729 expressed as a percentage of series Dc713.

as a determinant of household decisions concerning consumption, saving, and retirement planning (Haines and Goodman 1993; Skinner 1996; Hoynes and McFadden 1997; Moore and Mitchell 2000). Changes in residential wealth have even been investigated as a determinant of household demand for corporate equity and, therefore, stock market prices (Case, Shiller, and Quigley 2001).

One must own a home to hold residential wealth, of course, and no other benchmark of economic and social well-being represents the aspirations of households in the United States better than homeownership. The proportion of households that owned their home is shown for each decade in the twentieth century in Figure Dc-E. The data reveal a surge in homeownership that begins in the middle decades of the century. Prior to 1940, between 45 and 50 percent of all households owned the dwelling in which they lived, but by 1960 the share of owner-occupants jumped to more than 60 percent, and from there gradually increased to just under two thirds by 1990.

Changes in the aggregate rate of homeownership such as these need to be interpreted carefully. The overall rate can change either because the proportion of homeowners has changed for specific groups within the population or because the relative importance of the specific groups has changed. The apparent stability of the aggregate homeownership rate between 1900 and 1930 shown in Figure Dc-E provides an interesting case in point. During this period the proportion of nonfarm households that owned their homes increased throughout the United States. At the same time, however, there was a decrease in the share of households living on farms. Because rates of homeownership were generally higher among farm households, the two developments had offsetting influences on the aggregate homeownership rate (Snowden 2003). Rates of homeownership are presented in Tables Dc697–809 for different regions, for farm and nonfarm families, for urban and rural areas, and for groups of different ages, races, ethnic background, and marital status.[4]

There is a well-established literature that investigates the causes of changes in homeownership rates over time and of differences in homeownership rates across groups. Most of these studies examine household-level data so that tenure status can be explained by income, age, marital status, labor market experience, and race, among many other influences. Haines and Goodman (1992) tackle the issue for the late nineteenth century, for example, with survey data that were collected from urban industrial workers in 1889. Collins and Margo (2001) examine racial differences in homeownership rates across the entire twentieth century using household-level data that were drawn from the Integrated Public Use Microdata Samples of the decadal censuses; they also used these data to calculate the homeownership rates by racial group that appear in Table Dc761–780. Examinations of homeownership patterns for the modern era are too numerous to list here, but most attention has been spent trying to explain the persistent differences in rates of homeownership across racial groups and between native and immigrant households (Wachter and Megbolugbe 1992; Painter, Gabriel, and Myers 2001; Borjas 2002).

Government policy is generally acknowledged to have pushed homeownership rates higher in the United States during the twentieth century through favorable tax treatment of home mortgage interest paid by homeowners and the "rental" housing services that they receive (Martinez 2000). In recent years academicians and policymakers have confronted an interesting but difficult question: Do the social benefits that can be attributed to the increased rate of homeownership in the twentieth century justify the social costs of the related housing subsidies?[5]

The Residential Mortgage Market

Thirty-seven percent of nonfarm homes were owner-occupied in 1890, and fewer than three out of ten of them were mortgaged. By 1990, the homeownership rate had increased to 65 percent, and two thirds of these homes were mortgage-financed. Homeownership and the residential mortgage market have grown together in the United States over the past century – we have learned to live the American dream by borrowing it. The series in Tables Dc903–1288 document three distinct phases in the institutional development of the American residential mortgage market over the past century.

During the first phase, from the late 1800s to 1930, financial intermediaries displaced individual investors as the predominant source of residential mortgage finance. Mutual savings banks and building and loan associations were the first important institutional home mortgage lenders in the United States. Together, they held one third of the outstanding residential mortgage debt in 1900, but this still represented only two thirds of the amount held by individual investors. By 1930, the combined share of mutual savings banks and building and loans equaled that of noninstitutional investors (about 40 percent each), and all financial institutions taken together held 60 percent of the nation's residential mortgage debt. Mortgage lending shares before 1930 for a variety of institutions can be found in Table Dc903–928. Other annual series of mortgage holdings are available for this period but were not included in this chapter because they focus on particular institutions or groups of intermediaries.[6]

[4] Refer to Chevan (1989) or Bostic and Surrette (2001) to see how group-specific rates like these reveal important patterns and trends in homeownership over the past century.

[5] For a brief review, see Coulson (2002).

[6] See Lintner (1948), Payne and Davis (1956), and Olmstead (1976) for mutual savings banks; Zartman (1906) for life insurance companies; and Bodfish (1931) for building and loans.

We have access to detailed benchmark data from the historical mortgage market because the federal government conducted a series of national surveys of homeownership and indebtedness (in 1890 and 1920), of building and loan associations (in 1893), and of all outstanding mortgages (in 1890). These data provide snapshots of what Lance Davis (1965) identified as a segmented national mortgage market. Davis documented substantial variations in mortgage loan rates across regions of the country, and attributed the differences to legal and information-related barriers that restricted the geographic movement of funds. As a result, mortgage rates were low in the savings-rich East, and high in the South and West, where mortgage loan demand was strongest. Davis focused on segmentation in the farm loan market, but it turns out that the barriers between local and regional markets were even greater in the residential mortgage market (Snowden 1987, 1988, 1997).

The second phase in the development of the residential mortgage market, 1930–1970, can itself be broken into two segments. During the first fifteen years, the market was rapidly, and nearly completely, federalized; over the next quarter-century the new federal structure financed the greatest surge in homeownership in the nation's modern history. Federal involvement began early in the Depression when building and loan associations (B&Ls) advocated for the establishment of a Federal Home Loan Bank (FHLB) system to discount their mortgage loans and to act as a "lender of last resort" just as the Federal Reserve System did for commercial banks. B&Ls needed a separate facility, they argued, because they held long-term (ten- to twelve-year), fully amortized mortgage loans. Other lenders issued short-term mortgage loans that matured, and were rolled over, every three to five years. Nearly all members of the new FHLB system were B&Ls when it began operations in 1932. Soon thereafter, most of these institutions converted into savings and loan associations (S&Ls) that were federally regulated and issued federally insured deposit contracts, which became the predominant institutional home mortgage lenders in the post–World War II era (Snowden 2003).

The FHLB system figures prominently in this chapter because it produced a wealth of statistical data about the residential mortgage market. Its estimates of home mortgage loans held by institutional lenders between 1925 and 1950, for example, are embedded in Table Dc903–928. The FHLB also produced annual estimates of new residential mortgage loans made by each major group of institutional mortgage lenders – the earliest systematic record of mortgage loan originations that is available (see Table Dc983–989). Both data series were discontinued in 1950 when the Federal Reserve began to assemble more comprehensive estimates of outstanding residential mortgage debt (see Tables Dc929–982). However, the FHLB system continued to compile annual series on nonfarm mortgage loan recordings until 1964 (Table Dc990–995), and a nonfarm mortgage foreclosure index until 1975 (Table Dc1255–1270). Finally, beginning in 1963 the FHLB system established its Monthly Interest Rate Survey (MIRS), which remains the most comprehensive source of information on new, conventional mortgage interest rates and loan terms (Table Dc1210–1254).

The FHLB system was not established to collect data, of course. Its main focus was to regulate member institutions and to support them by making loans, which were called advances. FHLB advances provided S&Ls with liquidity in times of crisis, but were more regularly used as a roundabout secondary market – S&Ls could borrow against mortgages they had previously made and use these funds to make new mortgage loans. These advances were then repaid when new funds flowed into the S&L from the savings deposit market. A more straightforward secondary market was established in 1938 in the form of the Federal National Mortgage Association (FNMA). FNMA bought and sold residential mortgage loans (only federally insured or guaranteed loans; see the next two paragraphs) from qualified institutional lenders – most FNMA business involved banks, life insurance companies, and mortgage companies that were not members of the FHLB system. A third federally financed secondary mortgage market facility was established in 1933 to serve an important, but temporary, function. Between 1933 and 1937 the Home Owners Loan Corporation (HOLC) bailed out financial institutions of all kinds by "buying" billions of dollars of mortgages from them. It did so, and saved many institutions from failure, by agreeing to refinance their weakest mortgage loans. The "secondary market" activities of each of these agencies – FHLB, FNMA, and HOLC – are presented in Table Dc1138–1153.

The federalization of the residential mortgage market during the 1930s also involved a change in the basic residential mortgage loan contract. The Federal Housing Authority (FHA) was established in 1933 with the authority to insure individual mortgage loans on single- and multifamily residential mortgage structures. FHA insurance required that the residential property securing the loan meet minimum safety, construction, and zoning standards. In this way the program sought to improve the quality of the nation's residential housing stock. Importantly, FHA-insured loans were structured quite differently from most conventional residential mortgage loans. They could be written for much higher loan-to-value ratios (so down payment requirements were reduced), for terms of twenty years or more (so monthly payments were reduced), and with full amortization (so that borrowers gradually paid off the principal of the loan). Prior to FHA, only B&Ls and S&Ls had regularly used fully amortized mortgage loan contracts. Soon after FHA began lending, however, the familiar modern mortgage contract became popular even in the noninsured, or conventional, mortgage market (see Table Dc1192–1209).

FHA-insured loans also proved popular in the secondary mortgage market. This was particularly important for loans on multifamily structures, loans on single-family structures that were built in large developments, and loans on properties located in areas of the country with insufficient local supplies of mortgage credit. In all of these cases, the provision of mortgage credit normally involved two or more institutions that specialized either in financing housing projects during construction or in permanently financing the home for the owner. Veterans Administration–guaranteed loans were also used extensively in these complex mortgage transactions after being introduced soon after World War II. Finally, by the mid-1960s a private mortgage insurance industry emerged to provide similar services in the conventional mortgage market. The activities of both the government and private mortgage loan insurance programs are shown in Tables Dc1105–1137.

The federalization of the residential mortgage market provided liquidity and lowered lending risk for financial institutions, liberalized mortgage lending terms for borrowers, and stimulated the development of a secondary mortgage market for home mortgage loans. Over the next two decades the rate of homeownership increased from 43 percent in 1940 to 62 percent in 1960 (refer to Figure Dc-E). The magnitude and rapidity of the change were impressive: the number of occupied housing units increased by 18.1 million between 1940 and 1960, and 17.6 million of these, or

97 percent, were owner-occupied (see Table Dc697–760). Many factors – such as pent-up demand for housing, postwar increases in income, and the development of large, suburban developments – played a role in doubling the number of owner-occupied housing units in the United States between 1940 and 1960. However, for any of these influences to operate, mortgage loans had to be made. The new federalized residential mortgage market was up to the task.

Those interested in the post–World War II residential mortgage market will find a wealth of information, analysis, and comment available beyond the statistical series presented in this chapter. Most noteworthy is a series of ten monographs produced under the auspices of the National Bureau of Economic Research that chronicles the development of the postwar urban mortgage market (see especially Colean 1950; Morton 1956; Klaman 1961). More detailed annual and monthly statistics of residential mortgage lending activity during the period are available in the *Savings and Home Financing Source Book* (published by the FHLB system) and the annual *Fact Books* of the U.S. Savings and Loan League.

The third phase of development in the residential market – between 1970 and 1999 – was ushered in under some troubling signs. After performing so impressively in the 1950s, some cracks had appeared in the residential mortgage system during the 1960s. Early in that decade, Jones and Grebler (1961) argued that the formal secondary market – by then largely controlled by FNMA – was failing to provide sufficient liquidity and marketability to lenders, and had not yet fully mobilized residential mortgage funds across regional and sectoral lines. After a surprisingly severe downturn in residential construction in 1966, moreover, the FHLB system commissioned a wide-ranging examination of the S&L industry that pointed out several important shortcomings with the federal structure (Friend 1969). Matters took a turn for the worse in the 1970s when institutions holding fixed-rate mortgage loans, especially savings and loans, saw profits disappear as inflation lowered the real return on their existing mortgage loan portfolios. A movement to save the S&L industry by deregulating it led to a disastrous wave of failures in the 1980s that exhausted the industry's deposit insurance fund and resulted in the dismantling of the FHLB regulatory system (Kane 1989; Barth 1991; White 1991).

The S&L debacle of the 1970s and 1980s was a visible manifestation of a more fundamental change within the nation's residential mortgage market. The federalized structure of the post–World War II era was dominated by financial institutions that originated mortgage loans and held them until they were paid off. Mortgages are now regularly bundled into packages after they have been originated, and then used as security for mortgage-backed bonds that are issued and traded in the formal capital market. As the underlying mortgage loans are paid off, so are the security holders.[7]

Mortgage securitization is arguably the most important financial innovation of the late twentieth century – it hardly existed at all in 1970, but financed 60 percent of all outstanding residential mortgage loans by 1999 (see Table Dc950–982). The securitization movement has redefined the role of all institutions that operated in the residential mortgage market before 1970, and has encouraged new types of institutions to enter the market since then. That process is documented in this chapter in two sets of tables. Changes in the mix of institutions that originate mortgage loans can be examined with the data in Tables Dc996–1104. These annual series were taken from the Survey of Mortgage Lending, which was sponsored by the U.S. Department of Housing and Urban Development before being discontinued in 1997. The activities of institutions that create, market, and sell mortgage-backed securities are documented in Tables Dc1154–1191. Chief among these are three government-sponsored enterprises that dominate the market – FannieMae and GinnieMae, entities that were created out of the old FNMA, and FreddieMac, a privately owned entity that was created under the auspices of the FHLB system. See the documentation for these tables for a more detailed description of the functions performed by these most important institutions.

[7] For a concise, readable introduction to modern mortgage securitization, see Kendall and Fishman (1996).

Appendix: A Guide to the Value-in-Place Series

The Value of Construction Put in Place series that are produced by the Manufacturing and Construction Division of the U.S. Bureau of the Census are the most comprehensive and reliable statistical record of construction activity in the United States. These series are produced using data on building permits and housing starts, a national database of construction contract awards, and direct reports by federal agencies on their construction activities. The value-in-place program is a clearinghouse, in effect, for all of the construction-related data that are generated by public and private agencies within the United States. For this reason, the value-in-place series are featured prominently in Tables Dc1–240 and Dc256–509.

These two sets of tables have been designed as a general reference to the historical value-in-place series. The Census Bureau determined during the mid-1970s that it would no longer revise or update value-in-place estimates for years before 1964 when it introduced new methods and procedures. Some twenty-five years later, substantial discontinuities now appear between the value-in-place estimates that the Census Bureau currently produces going back to 1964, and earlier value-in-place estimates for the years 1915–1964. In addition to these breaks in the statistical series, however, a break in documentation also occurred: no source explained how the post-1964 value-in-place series differ from their pre-1964 counterparts. The table documentation in this chapter is intended to serve as a reference guide that links these two extremely rich, but now disconnected, segments of construction statistics. The remainder of this discussion provides general information about the value-in-place series to provide context for the more detailed and technical material included in the table documentation.

What Are They?

The value-in-place series were designed and first assembled for the 1915–1937 period by the Construction and Real Property Section of the U.S. Commerce Department's Division of Economic Research (Chawner 1938). The data and methodology used to compile the series have evolved continually since then, but the six principal categories of construction activity have remained the same:

Private construction

1. Residential
2. Nonresidential building
3. Nonresidential farm
4. Public utility

Public construction

5. Federal
6. State and local

Except for the nonresidential farm category, each of these series is an aggregate of separate subcomponents that estimate specific types of construction activity – seventeen for the private sector and eighteen for the public sector. Each subcomponent, in turn, is estimated from different types of primary data using one of several different methods of estimation. The unifying feature of all of these estimates is that they are designed to measure either construction or the value of construction put in place:

Construction – defined as new buildings and structures (including mechanical, electrical, heating, and plumbing systems and some types of fixed equipment), additions and alterations to existing buildings and structures, and the preparation of the construction site. Construction excludes maintenance and repairs, land acquisition, the costs of purchasing and installing most types of production machinery and equipment, and the drilling of oil and gas wells.

Value of construction put in place – a measure of the value of construction installed or erected during a given month, quarter, or year. For a given project this includes the cost of materials installed and labor used, the profits of contractors, fees paid to architects and engineers, and the overhead costs, interest, and taxes paid during the construction project. Total value-in-place for a given period is the sum of the value of work done on all projects currently underway in the United States regardless of when the project was started or will be completed, or whether payment for the work has been made to contractors.

How Are They Compiled?

Direct measures of total construction activity, as defined above, would be prohibitively expensive to collect for the hundreds of thousands of construction projects that are ongoing in the United States at any one time. The value-in-place series, in fact, are a set of estimates of the value of work performed that the Census Bureau assembles for nearly forty separate categories of construction activity. The data and methodologies that are used to compile these estimates vary across these many categories, but can be thought of as falling into three broad groups. More specific details about estimates for particular components can be found in the table documentation and in the sources cited at the end of this essay.

Residential housing construction is the largest of the six major value-in-place categories (46 percent of the 1999 total), and forms a methodological category of its own. Included here is work on new single- and multifamily housing units, and improvements to existing residential structures. Each of these is estimated from survey data that are collected by the Census Bureau. The Survey of Construction (SOC), for example, collects information directly from residential home builders on housing starts, completions, and sales for a sample of residential projects that are chosen from the Census Bureau's Building Permits Survey. These data are used to estimate the total value of single-unit residential projects that are started each month. This total value is then allocated as work performed for each of the next twelve months. Monthly estimates of work performed on multifamily residential projects, on the other hand, are estimated directly from construction progress reports that are collected each month for a sample of the two-or-more-unit residential projects that are identified from the SOC data. Finally, the value-in-place estimate for residential improvements on owner-occupied units is derived from data collected in the Consumer Expenditure Survey, while information on improvements on rental units is collected in a separate follow-up survey.

The second broad methodological category encompasses the value-in-place estimates for eight types of nonresidential buildings (26 percent of the 1999 value-in-place), nine separate categories of state and local government construction activity (21 percent of the 1999 value-in-place), and a very small "all other private construction" category. All eighteen of these series are derived from data gathered in monthly construction progress reports that are submitted by project owners (or the responsible government agency) for a sample of projects. The samples in these cases are drawn from a comprehensive list of nonresidential projects authorized by permit or begun each month that is compiled from data supplied by the F. W. Dodge Corporation (see Tables Dc132–156) and a Census Bureau canvass of projects located in non-permit-issuing places and Hawai'i.

The third methodological approach is the most direct: value-in-place estimates are assembled from reports of actual expenditures made on construction projects during a given year or month. This method is used to derive the value-in-place series for all privately owned public utilities except telephones, and for all federal government construction activities. The expenditure data for the utilities groups are reported by trade associations, while federal expenditures on construction are reported to the Census Bureau by the relevant agencies. Also directly reported to the Census Bureau are estimates of nonresidential farm construction expenditures that are compiled independently by the U.S. Department of Agriculture. Taken together, the components that are directly reported to the Census Bureau represented the remaining 7 percent of total volume of construction in 1999.

Why Are They Reported Here in Two Discontinuous Segments?

Historical value-in-place estimates for the United States are available back to 1915. In this chapter, however, all current-dollar value-in-place series are reported separately in two segments: from 1915 to 1964 and from 1964 to 1999 (see below for an explanation of an additional break in 1947 in the constant-dollar series). For these statistics to be used appropriately for historical analysis, users of these series must take account of these breaks in the series.

Prior to 1959, the value-in-place series were compiled jointly by the Department of Commerce and the Department of Labor, but on July 1 of that year the Bureau of the Census assumed full responsibility for the series. Over the ensuing four decades new methodologies and revised data series have regularly been introduced to improve the accuracy and reliability of the estimates. Until 1974, these revisions and new methods were regularly carried back to 1946, or in some cases to 1958, in order to maintain historical continuity. Since then, revisions to all value-in-place series have been carried back only to 1964, so significant breaks now appear in many of the value-in-place series.

When assembling the value-in-place tables that are presented in this chapter, the last published value-in-place estimate was used for each year between 1915 and 1999. The value-in-place estimates shown for the 1915–1964 period, therefore, are identical to those

that appeared in the 1980 supplement cited below (C30-80S). For the 1964–1999 period, on the other hand, the data were taken from the May 2000 value-in-place publication (C30-00-5) and the Census Bureau's Internet site (see the sources for Table Dc12–21). The two segments for each series are shown separately in the chapter, although one year of overlap (1964) is presented for each series so that the breaks in the series can be identified. No attempt has been made here to eliminate the 1964 breaks in any of the affected subcomponents.

Four types of revisions are responsible for nearly all of the 1964 breaks in the value-in-place series. The simplest occurred when an external agency revised its own data on construction expenditures that it had been reporting directly to the Census Bureau. Most of these revisions were undertaken by federal agencies or public utilities trade groups at the request of the Census Bureau; after 1980 these organizations were no longer encouraged to carry the revisions back further than 1964. A second, and more infrequent, type of revision occurred when the Census Bureau reassigned a particular type of project to a new value-in-place subcomponent. The most important revision of this kind occurred in 1968, when projects began to be assigned to value-in-place subcomponents on an establishment basis rather than a building-type basis. The detailed information that would have been required to perform a similar revision on pre-1964 estimates was not available.

The most important type of revision that has created breaks in the value-in-place series occurred as the Census Bureau gradually replaced the "indirect" methods of estimation on which the program relied before 1959. During these early years, estimates for residential housing, nonresidential buildings, and state and local government construction were formed by applying fixed patterns of monthly construction progress to a set of projects that had been identified in surveys of building permits and reports of construction contract that had been awarded. Value-in-place estimates for all of these categories are now based on field survey data and actual monthly progress reports. The implementation of these improvements (for single-family and nonresidential buildings in 1964; for multifamily residences in 1974; and for state and local construction projects in 1975) is responsible for breaks in 1964 for each of these important subcomponents of the value-in-place estimates.

The fourth type of revision involved changes in the procedures that are used to convert current-dollar value-in-place estimates to constant-dollar series. The most important revision of this kind occurred in 1974, when the Census Bureau adopted new cost indexes for many value-in-place subcomponents. Particularly important at this time was a revision of the Census Bureau's own cost index for new single-family homes. Variants of the new indexes were used at the time to revise the constant-dollar value-in-place series back to 1947, but these estimates have not been updated since. As a result, the constant-dollar value-in-place series presented in this chapter are reported in three separate segments: for 1915–1947 (in 1957–1959 dollars), for 1947–1964 (in 1967 dollars), and for 1964–1999 (in 1996 dollars).

The value-in-place estimates that appeared in *Historical Statistics of the United States* (1975) were reported as continuous series for the 1915–1970 period (except for breaks in several current-dollar series in 1946). When these data were assembled, revisions were still being carried back to years before 1964 to preserve historical continuity. The existence of this longer continuous span of data suggests a solution that could be used when breaks in the series presented here are particularly inconvenient: an investigator could use the older, continuous version of the value-in-place series that was assembled before revisions created breaks in the series. This approach could be used to employ continuous value-in-place estimates that begin in 1915 and end in 1957, 1966, 1974, or 1980. These opportunities are identified in the table documentation.

Where Can One Find More Information?

To prepare the documentation that appears in the value-in-place tables, many different sources were relied on. For the 1915–1964 segment, the technical notes from the 1975 edition of *Historical Statistics* (Chapter N) were used extensively and amended, where required, by information drawn from the U.S. Bureau of the Census, *Construction Reports Supplement* titled "Value of New Construction Put in Place 1964 to 1980" (series C30-80S), July 1981. For the series that span the 1964–1999 period, documentation was drawn from the U.S. Bureau of the Census, *Construction Report* titled "Value of New Construction Put in Place: May 2000" (series C30/00-5), July 2000.

These sources provide "snapshots" of the data and methodologies that were used at different points in time to assemble the Value Put in Place series. They do not tell the full story, however, about the historical development of the series. To trace this process in detail, refer to the following sources: Chawner (1938); Lipsey and Preston (1966); U.S. Department of Commerce and U.S. Department of Labor (1956); U.S. Department of Commerce (1964); U.S. Bureau of the Census (1975); U.S. Bureau of the Census (1967); U.S. Bureau of the Census (1981); and U.S. Bureau of the Census, *Construction Reports* (series C30), various years since 1980.

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