Consumption and Investment Booms in the Twenties and Their Collapse in 1930

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1 Interpretations of the Great Depression

Similarities between the financial crisis in September 2008 and the collapse of the financial system during the depression have been widely noted. Yet the similar origins and transmission of the crises have been neglected. The recent downturn, which originated with a widespread and pronounced housing boom and collapse, led to severe household balance sheet problems that were transmitted to lenders and mortgage security investors. Damage to household balance sheets weakened household demand for housing and durable goods, which adversely affected production; as a result of declining demand, employment fell, which reinforced the collapses of consumer durable goods and residential investment. This pattern is not a part of the dominant view of the causes of the depression, but we argue in this chapter that changes in levels of mortgage finance, residential construction, and the broader economy preceding and during the initial phases of the Great Depression shared many features with the recent Great Recession. There are certainly important differences between the two episodes – most importantly the limited response of the Federal Reserve to the financial crisis that began in late 1930 and the resulting monetary collapse from December 1930 to April 1933 – but we argue in this chapter that the origins of the two downturns are remarkably similar.

The interpretation of the depression that Friedman and Schwartz articulated in *A Monetary History of the United States* is probably the most influential view of the cause of the depression. Friedman and Schwartz (1963, p. 300) argued that during the depression the "monetary collapse was not the inescapable consequence of other forces, but rather a largely independent factor which exerted a powerful influence on the course of events." They went on to argue (on p. 301) that "different and feasible actions by the monetary authorities could have prevented the decline in the stock of money – indeed, could have produced almost any desired increase in the money stock." In this chapter we argue – based on the numerous similarities between the pattern of expansion and decline from 1921 to 1930 and from 1997 to 2008 – that a severe recession was probably inevitable in 1930, but that the expansion of the monetary base was too moderate to prevent an ever widening collapse of the financial system and a debt-deflation crisis as

the depression developed.[1] In effect, we argue that in the aftermath of a debt-fueled residential real estate bubble, expansionary monetary policy cannot entirely eliminate the effects of the resulting household balance sheet problems, financial sector losses, and the collapse in mortgage lending. Misallocation of resources and investment losses cannot be reversed by central bank provision of liquidity.

In contrast to the monetary policy explanation of Friedman and Schwartz, the real business cycle (RBC) literature initiated by Kydland and Prescott (1982) contends that economic downturns have their origin in serially correlated negative productivity shocks that reduce aggregate output. Although this view has been influential, in its current form it is implausible. It would be difficult to argue that the collapse of residential investment that began in 2006 resulted from a negative productivity shock. Construction of new single-family and multi-family residences fell 78.7 percent between Q1 2006 and Q1 2011, during a period when the Case-Shiller National Home Price Index fell 35.5 percent. If the contraction of output of residential structures resulted from a shock to productivity that disrupted supply, that should have led to rising prices. The pattern of decline seems

[1] Friedman and Schwartz (1963) argued, and Federal Reserve Chairman Ben Bernanke agreed, that the Federal Reserve caused the Great Depression. At a conference to honor Milton Friedman on his ninetieth birthday, Bernanke (2002) indicated his acceptance of the Friedman and Schwartz interpretation of the depression.

> "Let me end my talk by abusing slightly my status as an official representative of the Federal Reserve. I would like to say to Milton and Anna: Regarding the Great Depression. You're right, we did it. We're very sorry. But thanks to you, we won't do it again."

We argue that their conclusions don't recognize important aspects of economic conditions that contributed to the severity of the Great Depression. The Federal Reserve increased the monetary base 14.6 percent between October 1929 when the money supply peaked and March 1933 when it reached its depression trough. By contrast, during the recession from January 1920 to July 1921, the monetary base contracted 6.4 percent but a robust recovery followed. Between July 1921 and October 1929, the monetary base expanded only 13.5 percent. (See Friedman and Schwartz (1963, Table B-3, Column 1) for these figures on the growth of the monetary base.) The monetary base expanded slightly less during an eight year period of robust growth than it did during three and a half years of rapid contraction. Surely forces outside the control of the Federal Reserve were at play, just as the Federal Reserve has had to contend with strong economic forces of contraction during the recent recession and the slow recovery that has followed it. We argue that financial factors – especially the contraction of mortgage lending during the initial phase of the depression – exerted a strong influence on conditions in the real economy and on the money supply.

much more consistent with a demand shock. A similar inconsistency appears in the market for automobiles: production of automobiles and light trucks fell from 10.47 million units in 2007 to only 5.56 million units in 2009, yet the Consumer Price Index component for new cars and light trucks fell 0.5 percent from 2007 to 2009.[2]

The rapid accumulation of mortgage debt over the past decade, the housing bubble and collapse, its impact on the financial sector up to the time of the collapse of Lehman Brothers in September 2008 and its effect on the broader economy bear a remarkable resemblance to events between the end of the 1921 recession and the collapse of Caldwell and Company in November 1930. The fact that the recent financial crisis and recession didn't lead to an economic calamity anything like the collapse seen during the Great Depression is strong evidence that an aggressive monetary policy response can effectively mitigate the consequences of a financial crisis. On the other hand, the depth and duration of the recent recession and the slow recovery from it suggest that an aggressive expansionary monetary policy cannot entirely compensate for the contraction caused by a residential real estate bubble and collapse; it also suggests that there may have been more to the depression than "a largely independent" monetary collapse, as Friedman and Schwartz argued.

Comparing the events preceding the first banking crisis in November and December 1930 with the events leading up to the financial crisis in September 2008, we offer evidence that supports the hypothesis that a serious recession was probably unavoidable after the residential real estate boom began to unwind in 1926 and infected the consumer and producer durable goods markets in 1930, even if the Federal Reserve had responded as aggressively in late 1930 and in early 1931 as it did starting in September 2008. Our examination of developments between 1921 and 1930 suggests that a serious economic downturn was an inescapable consequence of unsound lending to households.

In the current crisis, the contraction could only be counteracted with an extremely aggressive central bank response. Even so, a severe recession ensued. Many aspects of the Federal Reserve's response to the depression probably exacerbated the economic

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[2] These automobile production figures are taken from http://oica.net/category/production-statistics/. The CPI new car and light truck component series is CUSR0000SS4501A from the Bureau of Labor Statistics.

decline, most notably its failure to counteract the collapse of the deposit-to-currency ratio that began in earnest with the banking panics in the spring of 1931 and continued until six weeks after Britain's departure from the gold standard in September 1931 and also its failure to continue the expansionary open market purchases that it started in April 1932 but discontinued in August 1932. Monetary policy actions at the time exacerbated the developing depression, but even an aggressive monetary policy response, we suggest, would have left a deep and protracted recession. This is indicated in the current crisis in which the unusually severe household and bank balance sheet problems continue to weigh upon the recovery and the full effects of the unusual intervention by the Fed – Bernanke's test of the Friedman-Schwartz hypothesis – are still playing out.

The same pattern of contraction evident in the current crisis – starting with declining expenditures on residential construction followed first by declining house prices and then by declining non-residential fixed investment – was clearly present before the effects of monetary contraction appeared late in 1930 and accelerated in 1931. In fact, the 40.4 percent decline in residential construction from 1925 to 1929 was the largest decline from housing peak to economic cycle peak in any economic downturn between the 1920-21 recession and the 2001 recession.[3] Eventually, every major sector of the economy was affected. The typical recession begins with a downturn in expenditures on residential construction[4], and this directly affects employment and consumption, but if home prices don't decline substantially the problems aren't compounded by households' losses on their real estate assets. In the 2007-09 recession and the Great Depression large house price declines reduced household wealth against fixed mortgage debt liabilities; to the extent that homeowners' equity was wiped out by house price declines, their losses were transmitted to lenders, which damaged the balance sheets of financial sector firms. This in turn amplified the usual downturns in consumer durables expenditures and non-residential fixed investments.

[3] The only larger decline in residential construction between housing peak and economic cycle peak was the 43.9 percent collapse between Q1 2006 and Q4 2007.

[4] See Buchanan, Gjerstad, and Smith (2012) for additional evidence of this from the 1980 and 1981-82 recessions.

In a recession that originates with household losses on debt-financed real estate investments, the decline in household durable goods consumption and declines in purchases of new residential units are unusually large, which accentuates declines in production and investment by firms. Once all private sectors of the economy are drawn into the recession, and households, financial firms, and non-financial firms are engaged in a process of debt reduction, no private sector of the economy can generate a robust recovery until the arduous process of balance sheet repair is completed.

Household debt accumulation and the substantial deterioration of household balance sheets contributed significantly to the onset of the depression and to its transmission into the productive sector of the economy. The research focus over the past half century on the monetary policy deficiencies during the depression has obscured the impact of the mortgage debt-fueled housing bubble and collapse and of the rapid accumulation of durable goods installment debt. One consequence of this focus on monetary policy has been a clearer understanding of the importance of an aggressive central bank response to a developing crisis: the aggressive response to the crisis in September 2008 is evidence of this learning. But another consequence of the focus on monetary factors was a lack of attention to and concern about the developing housing bubble and the precarious build-up of household debt during the recent housing market bubble.

In this chapter we demonstrate that the real estate boom in the twenties began to unwind three years before the general contraction began: households' consumption of durable goods, firms' investments in inventories, equipment, and structures, the stock market, and output all continued to climb for three years after the residential real estate contraction began, and the broader economic collapse coincided with the collapse of credit to households that had supported residential real estate purchases and consumer durable goods consumption.[5] These events preceded the first banking crisis in late 1930 as well as the missed opportunities by the Federal Reserve to try to counteract the

[5] Figure 3 in Section 4 shows that the collapse of mortgage lending was well underway before the serious decline in the money supply occurred, and before the first large failures of financial firms occurred in November and December, 1930 or the serious decline in the money supply began in early 1931. The same was true in the 2007-09 recession: mortgage lending peaked in Q2 2006. By the second quarter of 2008, the net flow of mortgage funds had turned negative for the first time since World War 2.

declining money supply. Although the economy continued to expand after the residential construction began to contract in 1927, we show in the next section that the rate of growth changed substantially after 1926.

Quite apart from subsequent failures in monetary policy response, a serious contraction was inevitable once the housing market downturn gathered force in 1929. Temin (1976) argued that the consumption decline in 1930 was much sharper relative to the declines in household income and wealth than it was during the other two interwar recessions in 1920-21 and 1937-38. Friedman and Schwartz argue that a series of monetary policy failures – starting with the failure to provide liquidity during the first banking crisis in November and December 1930 – turned a normal cyclical downturn into an inexorable economic collapse. Temin points to the large consumption decline in 1930 as an important contributor to the severity of the depression while Friedman and Schwartz focus on the pronounced monetary contraction from April 1931 to April 1933. The consumption decline identified by Temin preceded the monetary collapse described by Friedman and Schwartz, which leaves open the possibility that both problems are consistent with the broad course of events. We argue that both the consumption decline and the monetary contraction were consequences of the housing market collapse, just as they have been in the current downturn.[6]

The process of household deleveraging and declining consumption impacted output and equity prices, just as they have in the current recession. The first major casualties of the deteriorating business environment were Caldwell and Company, a Tennessee based banking, insurance, and manufacturing conglomerate, and Bank of United States, a medium sized bank in New York City. Their failures were the outgrowth of the asset value declines that both suffered from during 1930, and from manipulations that both firms had engaged in to conceal their fundamental weakness. The management of Bank of United States guaranteed its stock price and also made loans to affiliates so that they

[6] White (1984, p. 119) makes a similar point, noting that "Friedman and Schwartz argue that the surge of failures was prompted by a loss of confidence in the banking system, while Temin believes that the failures and depression grew out of a downturn in the real sector" and concludes (p. 137) that "depictions of events by Temin and by Friedman and Schwartz are not really in conflict. The weakening of assets and the lack of easy credit put the squeeze on all banks, and many weak ones were doomed."

could purchase Bank of United States shares. These strategies exposed the firm to additional risks and expenses when the firm could least withstand them, after adverse circumstances had already led to a collapse in the bank's stock price.[7]

McFerrin (1939) demonstrates that the failure of Caldwell and Company in November 1930 largely resulted from a precarious business strategy that was characterized by excessive risk taking and cross-dealing between affiliates. Lucia (1985) and O'Brien (1992) argued that the failure of Bank of United States in December 1930 had its origins in risky real estate investments combined with questionable management decisions, including an untenable stock price guarantee and large loans to bank officers and to affiliated firms for stock purchases.

As economic conditions deteriorated in 1930, it is unsurprising that fragile institutions like Caldwell and Company and Bank of United States were the first large ones to fail.[8] Given the poor quality of their assets – and restrictions on the assets that the Federal Reserve could lend on – there is little that could have been done to prevent their failures. The wave of bank failures that followed the collapse of Caldwell and Company could have been mitigated with a more expansionary monetary policy, but failures of similar magnitude had plagued rural banks for a decade without response from the Federal Reserve. For all of these reasons, it is arguable that the monetary collapse that takes

[7] Loans to affiliates for purchases of B.U.S. stock and stock price guarantees are described in Lucia (1985, pp. 405-6). The stock price guarantee committed B.U.S. to an additional outlay of capital (for repurchases of their own stock) when the bank could least afford it: when the bank's stock price had fallen. Its loans to affiliates exposed B.U.S to non-performing loans in the same situation. These risks are similar to those taken by the Financial Products division at AIG, which insured mortgage-backed securities using the AAA rating of AIG as security on the contracts, but with the condition that collateral would have to be provided to counterparties if AIG lost its AAA rating. That was also an unstable situation because loss of its AAA rating precipitated a large outlay of collateral, which added strain when the firm was least capable of meeting it.

[8] McFerrin (1939, p. 117) lists the assets of Caldwell and Company at $497,161,500 at the end of 1929 ten months before its collapse on November 13, 1930. This was approximately 4.8 percent of U.S. GNP in 1929. Lucia (1985, p. 404) lists the assets of Bank of United States at $254,043,000 on September 30, 1930 ten weeks before its failure on December 11. By way of comparison, in its bankruptcy filing on September 15, 2008 Lehman Brothers listed assets of $639 billion as of May 31, 2008. This amounted to about 4.4 percent of U.S. GDP in 2008.

center stage as the depression accelerated may not have begun until early 1931. But even if the demarcation is set in November 1930, we'll see that almost every major sector of the economy was already beginning to contract rapidly by the end of 1930, before the serious monetary contraction took hold. The causes and progression of the current crisis reinforce the notion that the views of Temin and of Friedman and Schwartz can be reconciled. Factors in the real economy can precipitate a serious crisis that effective monetary response can mitigate, though probably never eliminate.

2 Expansion during the roaring twenties

During the 1920s residential and commercial construction, manufacturing, and consumer durable goods production all expanded rapidly, but mortgage and consumer credit were the factors that expanded at an unusual rate. From an objective perspective the growth rate between the 1919 and 1929 peaks is probably a good measure of the increased capabilities of the economy during the period. Balke and Gordon (1989) estimate that real gross national product (GNP) expanded 35.9 percent between a peak in 1918 and the 1929 peak, a rate of about 2.8 percent per year.[9] Romer (1989) estimates that GNP rose 40.8 percent between the post-war peak, which she dates in 1919, and the 1929 peak, about 3.5 percent per year. Somewhat surprisingly, economic growth during the "roaring twenties" wasn't too different from growth over the past 140 years. Neither growth estimate for the twenties differs much from the Balke and Gordon estimate of 3.7 percent annual growth from 1869 to 1929 or the Department of Commerce estimate of 3.4 percent annual growth from 1929 to 2007.[10]

[9] Gross Domestic Product (GDP) has been emphasized as the measure of aggregate output since the 1991 NIPA revision. GDP is the value of products and services produced within the U.S., whereas GNP is the value of products and services produced by U.S. residents and U.S. owned firms. The 1991 NIPA revision only applied to the official Commerce Department estimates from 1929 on. Swanson and Williamson (1972) revised earlier estimates by Kuznets (1961) for 1919 to 1941 so that their expenditure categories conform to the 1965 Department of Commerce definitions. Kuznets (1961) and Swanson and Williamson (1972) use GNP as the measure of aggregate output for 1919 to 1941 – the standard when they compiled their estimates – so we report GNP in our evaluation of the depression.

[10] The Balke-Gordon GNP estimates are series Ca213-215 in the Historical Statistics of the United States, Millenial Edition, edited by Susan Carter et al. (2006). Citations to this data source will be given as HSUS

2.1 The growth rate shift after 1926

The exuberance of the twenties is probably better indicated by examining the growth rate from the trough of the post-war recession that ended in 1921 to the peak in 1929. The Balke-Gordon and Romer GNP estimates both decline after WWI until the trough in 1921. They both increase sharply until 1926 and then moderately until 1929. From 1921 to 1926, the Balke-Gordon estimate rose 36.0 percent (about 6.4 percent per year) and then grew more slowly at 2.9 percent per year from 1926 to 1929. Romer's GNP estimate rose 34.7 percent (about 6.2 percent per year) from 1921 to 1926, and another 2.7 percent per year from 1926 until 1929. Notably, the decline in the growth rate starting in 1926 coincided with the sharp reversal in residential construction that began in 1927. The shift in growth rates after 1926 is worthy of closer examination, because a shift in the growth rates of all major components of GNP immediately followed the decline in residential construction. From 1921 to 1926, the growth rate of GNP less residential construction was 5.6 percent; from 1926 to 1929, the figure fell to 3.6 percent, so either something shifted after 1926 that affected both expenditures on new residential units and other sectors of the economy, or the downturn in construction of new residential units affected growth rates in other economic sectors.[11]

Gross private domestic investment (GPDI) exhibited the same pattern of rapid growth from 1921 to 1926 followed by slower growth from 1926 to 1929. According to Swanson and Williamson (1972, Table 1), from the trough in 1921 to the peak in 1926, GPDI increased 118 percent (from $7.8 billion to $17.0 billion), about 16.8 percent per year. From 1926 to 1929, GPDI fell slightly to $16.2 billion, which again shows that the rate of economic growth changed substantially around 1926. Separating residential real estate investments from other investments shows how investment shifted after 1926. Firms' investments in plants, equipment, structures, and inventories can be obtained by

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series Ca215, for example. Romer's estimates are HSUS series Ca216-218. Department of Commerce growth estimates are calculated from the 1929 and 2007 real GDP figures in Table 1.1.6 from the National Income and Product Accounts.

[11] More contemporary evidence, from Green (1997), supports the latter view. Green shows that changes to residential construction precede changes to GDP (or "Granger cause" GDP movements, but that GDP movements don't Granger cause changes in residential investment.

deducting gross residential capital formation from GPDI.[12] This investment increased at an annual rate of 15.2 percent (from $5.83 billion to $11.81 billion) between 1921 and 1926. Even though investment in residential real estate fell by 40.4 percent between 1926 and 1929, non-residential fixed investment continued to increase between 1926 and 1929, but at the much slower rate of 2.7 percent per year.

Households' durable goods consumption and the construction of new residential units for households both expanded rapidly, but they displayed a different pattern over the economic cycle than the expansion of GNP and expansion of non-residential fixed investment. Expenditures on new residential real estate and consumer durables began to expand one year before the trough of the recession in 1921. Over the six years from 1920 to 1926, combined expenditures on new residential construction and on consumer durables more than doubled, from $6.38 billion in 1920 to $13.39 billion in 1926 (in 1929 dollars), for a growth rate of 13.2 percent per year.[13] Throughout the expansion between 1921 and 1926, residential investment and consumer durable goods expenditures both increased rapidly. Consumer durable goods expenditures rose from $5.10 billion in 1921 to $8.58 billion in 1926, an annual increase of 11.0 percent per year, but the growth rate fell sharply to only 2.4 percent per year from 1926 to 1929. Expenditures on residential construction fell from 1915 to 1918, but by 1921 they had almost recovered to the pre-war level. From 1921 to the peak in 1925, expenditures on new residential construction increased from $1.88 billion to $5.10 billion, which is a remarkable 28.3 per cent increase per year. In 1926, residential investment remained near its 1925 peak but then began a rapid decline.[14]

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[12] Expenditures on new residential units are taken from Grebler, Blank, and Winnick (1956, Table B-3). They are also available as HSUS series Dc81. Total Gross Private Domestic Investment (GPDI) is taken from Swanson and Williamson (1972, Table 1, p.55) adjusted by the Balke-Gordon GNP deflator, HSUS series Ca215.

[13] Consumer durable expenditures are from Swanson and Williamson (1972, Table A1). Residential capital formation is from Grebler, Blank, and Winnick (1956, Table B-3).

[14] For brevity we refer to personal consumption of services and non-durable goods as 'consumption' (C), households' durable goods expenditures as 'durables' (D), expenditure on new single-family and multi-family housing units as 'housing' (H), and non-residential fixed investment as 'investment' (I). Expenditure on new single-family and multi-family housing units is from Grebler, Blank, and Winnick

The rapid growth of personal consumption, especially of housing and durable goods, is not so surprising in light of the rapid growth of personal income. Swanson and Williamson (1972, Table 3) estimate that personal income grew at an annual rate of 5.2 percent between 1921 and 1929, although as with GNP growth and investment growth, the income growth rate was much higher between 1921 and 1925 (6.3 percent) than it was from 1925 to 1929 (3.6 percent).

Over the three years that preceded the onset of the depression, from 1926 to 1929, the growth rate for the sum of consumer durables and residential construction expenditures slowed to only 0.8 percent per year. Even though combined expenditures on residential construction and consumer durables were stalling, firms continued to invest in capacity expansion. Non-residential fixed investment increased 11.2 percent in 1929 before falling off rapidly from 1930 to 1932.

Although the housing boom peaked in 1926, consumers' durable goods expenditures – and the credit to support these expenditures – continued to increase through 1929. Real expenditures on automobiles expanded 98 percent between 1919 and 1926, about 10.3 percent per year.[15] The growth rate of automobile expenditures also fell substantially between 1926 and 1929, from 10.3 percent per year to 5.3 percent per year. The real estate boom was just as pronounced. There were almost twice as many housing units constructed per year between 1922 and 1928 as had been produced annually during the ten years preceding WWI. Household mortgage debt increased by a factor of 3.68 between 1919 and 1929. The ratio of household mortgage debt to household wealth and to income increased rapidly as well.

(1956, Table B-3); consumption and durable goods expenditures are from Swanson and Williamson (1972, Table A1); investment is from Swanson and Williamson (1972, Table A2, Column 3) minus expenditure on new housing units from Grebler, Blank, and Winnick (1956, Table B-3); and GNP is from Swanson and Williamson (1972, Table 1). All series are converted from nominal to real figures by dividing by GNP deflators from Balke and Gordon (1989, Table 10); the Balke-Gordon GNP deflators are HSUS series Ca215.

[15] Figures on automobile sales are from HSUS series Cd412.

2.2 Housing units constructed and expenditures on new housing units

In the ten years preceding U.S. entry into WWI, newly constructed housing units ranged from a minimum of 387,000 to a maximum of 492,000 units, with an average of 426,000 units. During and immediately after the war, housing construction fell to an average of only 230,000 units between 1917 and 1920. Housing construction recovered sharply in 1921 to 449,000 units. During the housing construction boom from 1922 to 1928 the average number of units constructed reached 833,000 units per year.

Construction of residential housing units peaked in 1925 at 937,000 units. It fell steadily over the next three years by a total of 19.6 percent to 753,000 units. Then the precipitous decline began. Construction fell 32.4 percent in 1929 to 509,000 units and another 35.2 percent in 1930 to 330,000 units. Over the next three years, from 1931 to 1933, the number of new units constructed fell 71.8 percent to only 93,000 units, less than 10 percent of the figure eight years earlier.[16]

The number of residential units constructed had fallen 64.8 percent from its 1925 peak by the end of 1930. During the first three years of declining residential construction, from the end of 1925 to the end of 1928, the money supply expanded 10.1 percent. During the period from 1925 to 1928, expenditures on new residential units fell 14.6 percent but the net flow of mortgage funds increased slightly. From December 1928 to December 1929, the money supply fell 1.3 percent. From December 1929 to December 1930, the money supply fell 2.1 percent.[17] The rapid decline in residential construction during a period of expanding money supply and then during a period of a slowly declining money supply suggests that some factor other than monetary contraction was involved in the collapse.

Expenditures on new residential real estate also peaked in 1925, at $5,104 million (in 1929 dollars). It was almost unchanged in 1926, but then began a slow decline that accelerated with a decline of 30.5 percent in 1929 and an even larger decline of 47.0 percent in 1930. By 1930, residential construction expenditures had fallen 68.5 percent from their 1925 peak. In the ten years before WWI, expenditures on new residential units

[16] Housing unit data are from Grebler, Blank, and Winnick (1956, Table B-1) and HSUS series Dc510.

[17] These figures on changes to the money supply are calculated from data in Friedman and Schwartz (1963, Table A-1, Column 9).

averaged $2,026 million; during the peak of the housing boom from 1922 to 1928, expenditures averaged $4,489 million.[18] By the time of the trough in 1933, real expenditures on new housing units stood at $381 million (in 1929 dollars), only 7.5 percent of the peak expenditures in 1925.

2.2 Changes in output by sector

Changes in output by sector in the Great Depression are uncharacteristic of recessions primarily in their magnitudes, but also by the fact that there was a large decrease in consumer spending on non-durable goods and services. With the single exception of the 2001 recession, consumer durables, residential construction, and investment all declined in every post-war recession, but their percentage declines have never matched the declines during the depression.[19] During the Great Depression, durable goods expenditures declined 49.2 percent, investment declined 68.6 percent, and housing declined 92.5 percent. In the average of eleven post-war recessions from 1948 to 2007, the corresponding declines were 11.4 percent (durables), 11.8 percent (investment), and 32.5 percent (housing).[20]

In the depression, real GNP declined 27.7 percent and every major component of output declined: even non-durable consumption fell by 17.3 percent – a figure dramatically larger than the decline in consumption of non-durable goods and services in any downturn since then.[21] Figure 1 shows the movement of GNP and several of its

[18] Expenditure data are available in Grebler, Blank, and Winnick (1956, Table B-3) and HSUS series Dc81. Housing or "Dwelling units" includes multifamily structures which fell by 46 percent in 1929 (Table B-2).

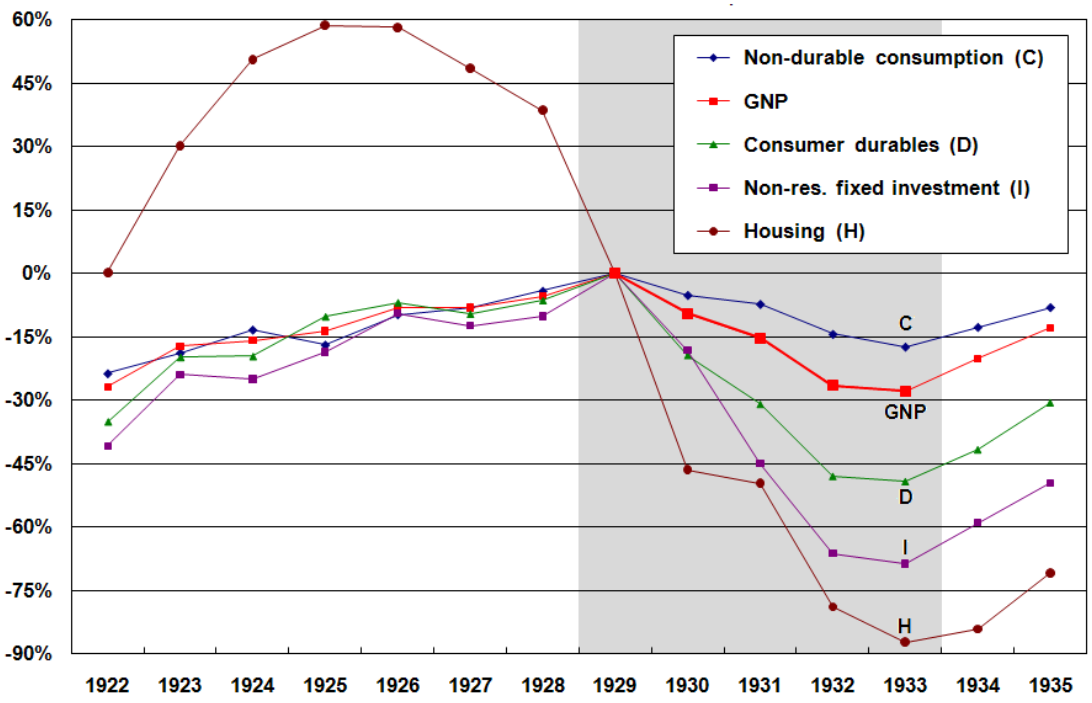
[19] In the 2001 recession, non-residential fixed investment was the only sector that declined. This has only happened once before in the past 92 years, in the 1923-24 recession. In the 1923-24 recession, a downturn in consumption was averted by large infusions of mortgage credit, just as in 2001.

[20] In Gjerstad and Smith (2012, pp. 56-62) we evaluate movements of all these component of GDP in the 1973-75 recession and in the 1980 and 1981-82 double-dip recessions. On pages 66-72 in the same chapter we evaluate movements of these GDP components for the 2007-2009 recession. In all of these recessions, and in most others in the post World War 2 era, construction of residential structures has fluctuated most.

[21] Real expenditures on non-durable goods and services have fallen in only three post-war recessions (1980, 1981-82 and 2007-09), and the only year-over-year decline in households' consumption of non-durable goods and services between 1934 and 2010 was the 1.4 percent decline in 2009.

major components between 1922 and 1935. Each series measures the difference between the value of the series in each year and its level at the peak of the economic cycle in 1929. For example, residential construction was 30.3 percent higher in 1923 than it was in 1929; it was 46.4 percent lower in 1930 than it was in 1929. In Figure 1 housing peaked in 1925 at a level 58.7 percent higher than its 1929 level. Other major components of GNP – and GNP itself – all continued to rise until 1929. Every major component of GNP fell in 1930, but none fell as much as housing. By 1933, housing was only 12.5 percent of its 1929 level and a paltry 7.5 percent of its peak level in 1925.

Figure 1: Percentage changes to GNP and its major components relative to their 1929 levels



3 Residential mortgage debt boom and collapse

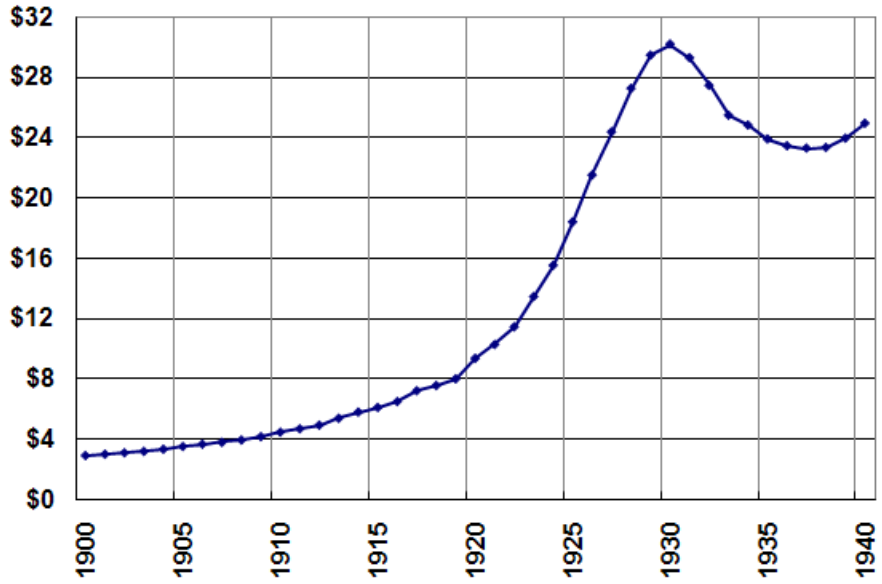
Mortgage debt increased fairly steadily from 1896 to 1922.[22] The rapid decline in foreign lending after the first world war combined with the pent up demand for housing led to a surge in residential mortgage finance starting in 1922. From 1919 to 1929, nominal residential mortgage debt rose from $7,998 million to $29,440 million, an

[22] Grebler, Blank, and Winnick (1956, Table L-6) report residential mortgage debt outstanding from 1896 to 1952.

increase of 268 percent. Mortgage debt outstanding grew rapidly from 1923 to 1928 and then slowed in 1929 and 1930. From 1931 to 1937, total mortgage lending outstanding fell in every year. Figure 2 shows nominal mortgage debt outstanding from 1900 to 1940.

The nominal declines in mortgage debt outstanding between 1931 and 1937 were remarkable in view of the historical record of mortgage lending in the U.S. Residential mortgage debt increased every year from 1897 to 1952 except the period from 1931 to 1937 and during the war years 1942 to 1944. Combining the Grebler, Blank and Winick annual data from 1896 to 1952 with the Federal Reserve Flow of Funds quarterly data from 1952 on, mortgage loans outstanding increased in every reporting period from 1944 until Q1 2008.

Figure 2: Nominal mortgage debt outstanding, 1900 – 1940

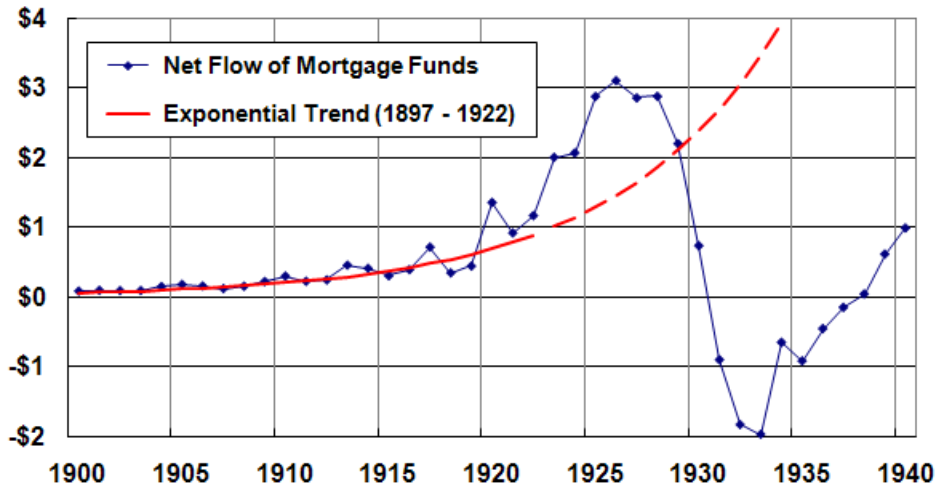


Mortgage credit growth over this period was much higher than during any other period over the past 110 years. Mortgage debt nearly tripled between 1921 and 1929, with an annual growth rate of 14.1 percent. This rapid buildup of mortgage debt increased residential construction, which supplemented household income, and the increased income then circled back to generate additional demand for housing and durable goods.

Mortgage bonds financed large construction projects to a greater extent than at any previous time, with results that ultimately proved very costly to investors. Losses on Chicago residential apartment building bonds began before 1929. More than 10 percent

of apartment building bonds were in default by the end of 1929 and 35 percent of them were in default at the end of 1930. Almost every indicator in the residential real estate market turned down before the stock market bubble began in 1928. Sales, prices, the net flow of mortgage funds, and residential construction all peaked in 1925 or 1926, but the net flow of mortgage funds continued at an elevated level in 1927 and 1928 while house prices, housing sales, and new residential construction were all falling.

Figure 3: Net flow of mortgage funds, 1900 – 1940 (in billions of dollars)



The roles of debt-fueled construction and durable goods booms were mentioned in the early literature, but received limited attention in subsequent accounts of the depression. Persons (1930) attributed the boom to excessive lending on real estate and consumer durables, and Fisher (1933) outlined a theory of the impact of deflation on debt, but during sixty postwar years of relatively stable domestic financial markets their concerns faded away. Now that the pattern has been repeated several times over the past twenty years in developed countries such as Japan, Finland, Sweden, and most recently the U.S., U.K., Spain and several other European countries, it is easier to appreciate the impact on the economic cycle of residential construction and durable goods booms that are based on unsustainable mortgage and consumer credit expansion. This allows economic developments from 1920 into the 1930s to be reexamined with a fresh perspective.

4 Housing sales and house price declines, 1926 – 1933

The pattern of housing market decline during the late twenties was similar to the pattern from 2006 to 2009. A broad measure of sales volume compiled by the Federal Housing Agency (FHA) peaked in 1925 and then fell in each year from 1926 until 1933. In a pattern that we've seen in the recent downturn, home prices began to fall after the sales volume decline.

4.1 Housing sales decline

Fisher (1951, pp. 157-162) describes a project devised by the Division of Research and Statistics at the Federal Housing Administration to make a complete survey of deed recordings in the District of Columbia and eight U.S. counties.[23] The series begin in 1895 in six of the nine jurisdictions and commences by 1898 in all of them. The series extend through 1935 in all nine jurisdictions and through 1946 in four of them.

The areas covered are the District of Columbia and eight U.S. counties. The counties and their principal cities are San Francisco (San Francisco, California); Ada (Boise, Idaho); Washoe (Reno, Nevada); Essex (Newark, New Jersey); Burleigh (Bismarck, North Dakota); Cuyahoga (Cleveland, Ohio); Allegheny (Pittsburgh, Pennsylvania); and Salt Lake (Salt Lake City, Utah). Figure 4 shows a three month moving average of the monthly aggregated deed recordings for these nine jurisdictions from 1916 through 1940.[24]

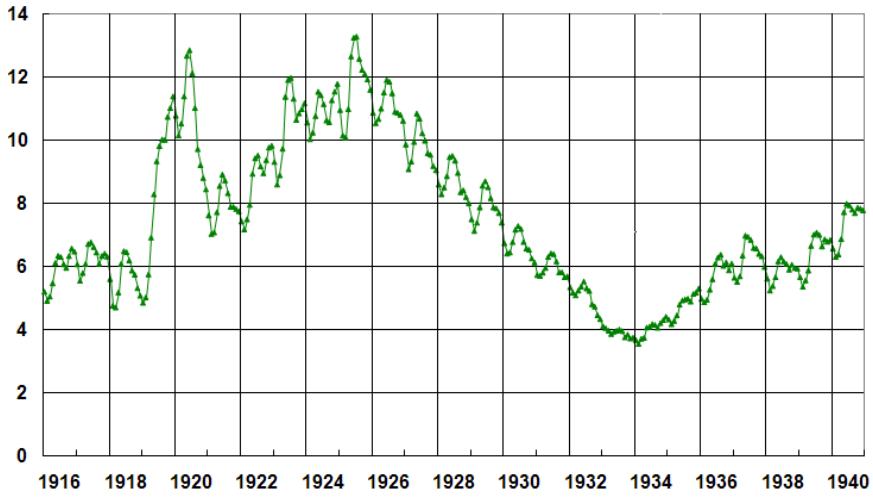
Aside from regular seasonal variation, the series declined sharply from its peak in July 1925 until it bottomed out in February 1934. Annual deed recordings fell 64.8 percent from their peak in 1925 to the annual trough in 1933. Although annual peaks varied from one location to another, in six of the nine locations, annual peaks took place in 1924

[23] The survey methodology is described in Works Progress Administration (1935). A deed recording is the formal record of ownership transference, whether by sale, inheritance, foreclosure, or a voluntary conveyance of property to a lender.

[24] The graph in figure 4 extends beyond 1935. Fisher estimates deed recordings for several counties. These are Ada and Burleigh (1936–40), Allegheny (1937–40), Washoe (1939–40), and Salt Lake (1940). See Fisher (1951, Tables A1 and A2).

(Allegheny, PA), 1925 (San Francisco, CA; Cuyahoga, OH; and Salt Lake, UT), and 1926 (Essex, NJ and Washington, D.C.).

Figure 4: Three month moving average of deed recordings in eight counties and Wash., D.C.

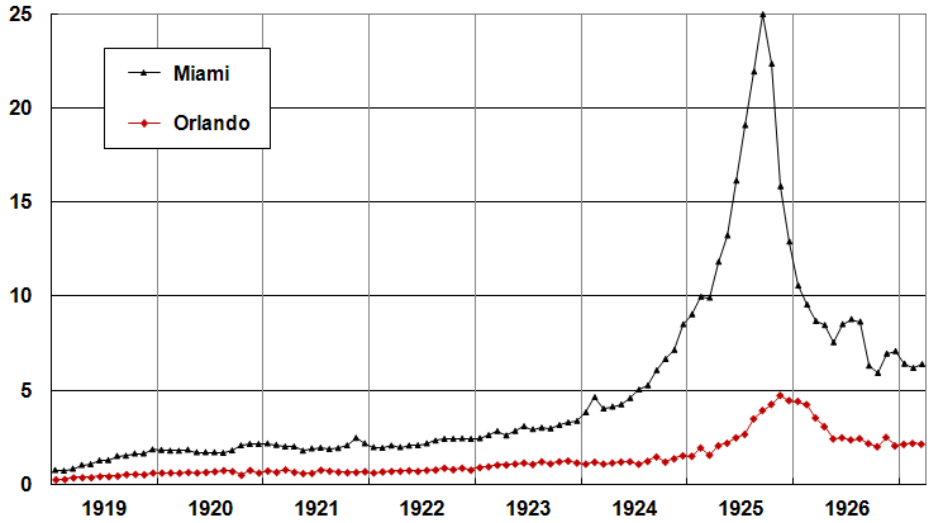


Several years before the FHA data were collected and evaluated Vanderblue (1927b) examined the number of real estate transfers and conveyances in Miami, Orlando, and Jacksonville, Florida.[25] Real estate transfers in all three cities exhibit a similar pattern of gradual but strong growth from 1919 on that reached a feverish pitch in the last three months of 1924 and the first nine months of 1925. The peak in Miami was reached in September 1925; real estate transfers had collapsed 75 percent by the time the September 1926 hurricane devastated Miami. The patterns of real estate transfers in Orlando and Jacksonville were similar: Jacksonville peaked in October 1925 and Orlando peaked in November 1925. The Florida real estate boom was an amplified version of the more general boom throughout the country, much as the recent booms in Las Vegas, Phoenix, and Miami were amplified versions of similar booms around the country. Figure 5 shows that real estate transactions in Miami increased by a factor of five in only 14 months, from $5 million in July 1924 to $25 million in September 1925. Although the increase was remarkably rapid in Miami, its peak differed by only one month from the peak for the average of nine widely dispersed jurisdictions shown in Figure 4.

[25] Vanderblue (1927a) describes general economic conditions in Florida from the nineties through 1926.

If the data in Figure 4 are indicative of trends in real estate sales for the U.S. as a whole, then in combination with the mortgage data in Figure 3 in the previous section, this is suggestive of a developing problem by 1928. The net flow of mortgage funds was almost identical in 1925 and 1928, but home sales had fallen 27.2 percent. Table A-4 in Fisher (1951) shows that mortgages recorded fell 31.4 percent between 1925 and 1928. But in the next section, we'll see that home prices fell less than ten percent between 1925 and 1928. From this evidence it appears that mortgage financing was playing a larger role even as the housing market was starting to unravel. There are two problems that this points to. One is that the market was supported by mortgage financing and would have fallen sooner if the fraction of equity financing had remained at its earlier level. Another problem is that the extensive and unusual level of mortgage financing extended in 1927 and 1928 must have created a lot of risk for the lenders, since mortgage finance appears to have been propping up the housing prices in 1928, just as it did in 2005 and 2006.

Figure 5: Real estate transfers and conveyances in Miami and Orlando, Florida (seasonally adjusted, in thousands per month)



4.2 House price movements, 1926 – 1933

In this subsection we review four price series and two rental series. Although these house price and rent data were obtained by a variety of methods from diverse geographical areas, most show a similar temporal pattern and similar magnitudes of their declines. House prices peaked in 1926, fell moderately for at least two years, and then

began a sharp decline before reaching a trough in 1933. As in the current housing cycle, the sales volume turned down sharply before the prices declined.

Fisher (1951, p. 55, Table 7) reviews evidence from a sample of three percent of urban mortgage loans in New York, New Jersey, and Connecticut compiled by the Home Owners' Loan Corporation (H.O.L.C.). This survey compared appraisal values for homeowners who were refinancing their homes in 1933 and 1934 to the purchase prices in 1925 – 1927. The median price decline between 1925 and 1933-34 was 31.0 percent. For homes purchased in 1926 and 1927 the median decline to 1933-34 was 26.9 percent.

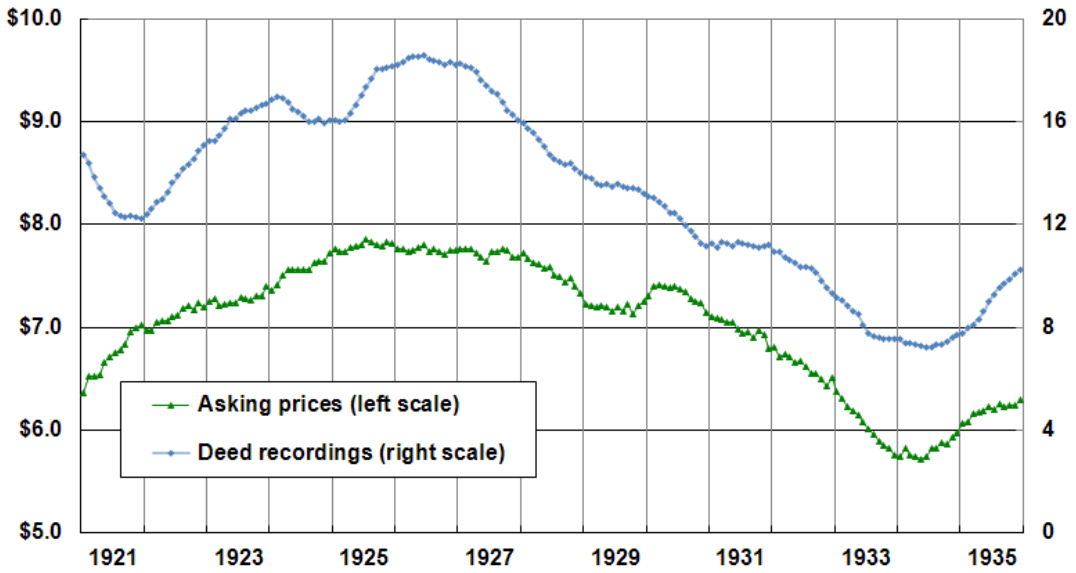
The National Housing Agency used newspaper ads to compile asking prices for homes in Washington D.C. for the period from 1918 to 1948. Figure 6 shows a one year moving average of these prices from 1920 through 1940. Both the 3 month and the 1 year moving average of the monthly series peaked in June 1926, eleven months after the 3 month moving average of sales peaked.[26] The 1929 average asking price was 7.2 percent below the 1925 average asking price; by 1933 the average asking price was 26.3 percent below the 1925 average asking price. Figure 4 shows that, across nine jurisdictions, deed transfers fell substantially for three years before the significant decline in house prices began and for four years before the stock market crash in 1929. Badgley (1936) published the monthly series on deed recordings for Washington D.C. from the FHA study that Fisher (1951) summarized. Figure 6 shows a one year moving average of both the asking price series from Fisher (1951) and the deed recording series from Badgley (1936). The deed recording series turns down quite sharply well before the house price series turns down.

Grebler, Blank, and Winnick (1956, pp. 345-49) summarize the results of a survey conducted in 22 cities by the Department of Commerce in 1934 and published in Wickens (1937). The survey was based on interviews of property owners who were asked (1) the current value of their property, (2) the year it was purchased, and (3) the original purchase price. The median price of single-family owner occupied homes was determined from these survey data and this median price was used to develop an index of house prices for each year from 1890 to 1934. This series had its peak value in 1925. By

[26] The Washington, D.C. monthly ask price series is provided in Fisher (1951, p. 53, Table 6). Annual averages for the series are provided in HSUS Series Dc828.

1929 it had fallen only 8.2 percent, but by 1933 it had fallen 30.5 percent from its 1925 peak.[27]

Figure 6: One year moving average home asking prices and deed recordings in Washington, D.C.



All three of these price series show similar declines from annual peaks in 1925 to 1933. The Washington, D.C. asking price series is the only monthly series, and it shows a peak in June 1925. By June 1928, deed recordings had fallen 20.7 percent from their peak two years earlier, but sales prices were only 3.4 percent below their peak. The two series that include 1929 prices also display similar declines from the peak to 1929. Overall, given the widely different geographical coverage of these indices, and a variety of methodologies, the resulting measures of house price peaks, troughs, and percentage declines are surprisingly similar, and portray a situation in which large household home equity losses must have been widespread and severe. The price declines also demonstrate the potential for serious losses on residential mortgages.

Wickens (1941) uses census data to estimate the prices (Table A 10) in 1930 and in 1934 for 50 U.S. cities and also to estimate the value of the housing stock (Table A 2). He estimates that the average value of a house fell 32.9 percent from $6,619 in 1930 to $4,439 in 1934. His estimate of the total value of the housing stock in 1930 was $122.58

[27] The survey is described in Appendix C, pp. 345 – 348 in Grebler, Blank, and Winnick (1956). It is also available as HSUS series Dc826.

billion, with owner occupied homes valued at $64.68 billion and rented housing units valued at $57.90 billion. Table A 8 shows the value of owner-occupied housing in 1934 at $42.42 billion, and the value of rental housing as $36.75 billion. Rental unit value dropped 36.5 percent between 1930 and 1934 and owner occupied unit value dropped 34.4 percent between 1930 and 1934. The total value of residential units fell 35.4 percent between 1930 and 1934 according to Wickens' estimates.

Figure 7 reproduces cost of living and rent indices for 1914 to 1941 from Colean (1944, Table 41, p. 421). Rental price movements tracked house price movements over the course of the boom and decline, but the magnitude of the decline in rents was larger than the decline in any of the four price indices reported in this section.

Figure 7: Cost of living and rent indices, 1914-1941

TABLE 41

COST OF LIVING COMPARED WITH AVERAGE RENTS, 1914-1941

(*Monthly Average 1923 = 100*)

Year	Combined Index of Cost of Living	Rent	Year	Combined Index of Cost of Living	Rent
1914	61.3[a]	57.7[a]	1928	100.6	93.7
1915	61.0[a]	57.7[a]	1929	100.1	92.0
1916	65.4[a]	58.6[a]	1930	96.7	89.5
1917	77.6[a]	60.6[a]	1931	87.2	82.4
1918	94.2[b]	67.9[b]	1932	77.9	72.4
1919	102.3[c]	74.7[c]	1933	74.9	63.8
1920	118.2	89.2	1934	79.4	64.8
1921	102.3	97.7	1935	82.2	70.3
1922	97.4	95.9	1936	84.1	77.9
1923	100.0	100.0	1937	87.8	86.5
1924	101.3	106.3	1938	85.7	87.0
1925	103.7	104.1	1939	84.5	86.3
1926	104.3	101.3	1940	87.0	86.9
1927	102.0	97.8	1941	89.0	88.5

Source: Compiled by National Industrial Conference Board and republished in *Survey of Current Business*, 1940 Supplement, p. 11, issue of January 1941, p. 18, and subsequent monthly issues. Annual indexes shown are averages of monthly figures, except as indicated in footnotes below.

a. Indexes are for month of July only.
b. Indexes are averages of the two months, June and November.
c. Indexes are averages of the three months, March, July and November.

Rent dropped 13.5 percent in nominal terms between 1924 and 1929; it dropped another 30.7 percent in nominal terms between 1929 and 1933. The cumulative nominal rent decline was 40.0 percent between 1924 and 1933. In real terms rent dropped 12.4

percent between 1924 and 1929 and it dropped 7.3 percent in real terms between 1929 and 1933. The cumulative real rent decline was 18.8 percent between 1924 and 1933.

Hoyt (1933, p. 377) finds a broadly similar pattern of rent price movements in Chicago between 1915 and 1933. His index increased from 100.0 in 1915 to 205.6 in 1925 with almost all of the increase coming between 1919 and 1924. From 1925 to 1929, the index fell 12.3 percent. It fell 39.7 percent between 1930 and 1933 to a level almost identical to its 1919 level.

It is worth noting that the nominal rent decline during the depression period would have hurt a landlord who purchased a property with a mortgage before the property value and the rental income fell. At the same time, real rents fell less during the depression than real income, so that renters were also hurt between 1929 and 1933.

5 Mortgage bond defaults, foreclosure, and unemployment

Mortgage bonds grew rapidly as a source of financing for apartment buildings and other commercial structures in the 1920s. After their spectacular rise, they had an even more spectacular collapse. In the last section, we saw that rent and residential real estate prices were falling before the general decline in 1930. It's also apparent from the data we review that rental prices fell earlier and further than purchase prices. Colean's rent index fell 11.6 percent and Hoyt's Chicago index fell 12.3 percent between 1925 and 1929. If these rental price strains were felt by the property owners that borrowed on mortgage bonds, then the early collapse of these bonds is understandable. The rapid accumulation of debt also had adverse consequences for households when the mortgage market collapsed from 1929 to 1931 and house prices collapsed along with it. In this section we examine the performance of mortgage bonds and the foreclosure record as indicators of the distress in the residential real estate market. We also examine the extent of unemployment because of its role in the collapse of demand for housing and durable goods.

5.1 Mortgage bond defaults

The record of real estate bond issues provides a useful indication of real estate market trends.[28] Bond issues increased rapidly, especially after 1921. The rapid growth of bond issues, their poor performance, and the pattern of early deterioration of residential mortgage bonds followed by later deterioration of commercial mortgages are all characteristics that are familiar from the current real estate downturn. A number of studies of these developments were carried out during the depression.

Data from the Commercial and Financial Chronicle analyzed by Johnson (1936a) show that by 1925 new real estate bond issues reached $695.8 million and accounted for 22.9 percent of corporate bond issues. As with many other series on real estate activity, the growth rate declined sharply after 1925. In 1928 real estate bonds were 1.7 percent below their peak in 1925, but then real estate bond issues began a precipitous fall. In 1929 real estate bond issues fell 51.2 percent to $333.9 million. Declines of 48.8 percent in 1930 and 32.8 percent in 1931 were followed by a virtually cessation of new issues in 1932 when newly issued bonds fell 96.8 percent. In the data that Johnson compiled, total real estate bond issues between 1919 and 1933 amounted to $4,114.9 million.[29] For the period from 1919 to 1931, Johnson found data on 1224 bond issues that exceeded one million dollars. Johnson was able to find information regarding the performance of 1090 of these bonds, with a total issuance of $2,684 million. He then evaluated the performance of the bonds by year of issue. Bonds fell into one of three categories: called, matured, and outstanding. Bonds outstanding in 1936 were further separated into those that were current and meeting all obligations and those that were not meeting obligations (i.e., defaulted).

According to Johnson (1936b), New York accounted for 36.3 percent of the bonds issued; 25.9 percent were issued on Chicago real estate. Koester (1939a, 1939b) evaluates the performance of Chicago real estate bonds issued between 1919 and 1930. The market

[28] For an interesting history of real estate bonds, see Boysen (1931), who discusses the development of real estate bonds issued on Chicago apartment buildings starting in 1901.

[29] Goldsmith (1955) estimates that total real estate bond issues reached $6,500 million in 1931. The basis for his estimate though is not nearly as sound as the analysis provided by Johnson. Goldsmith's estimate is available as HSUS Series Dc904 and it is also provided in Grebler, Blank, and Winnick (1956, Table L-2).

grew rapidly from the first issue for $1 million in 1919, doubling approximately every year until 1925, when the growth slowed and eventually peaked at $109,305,000 in 1928. Koester examined 338 mortgage bonds compiled by Moody's that amounted to $546,983,500. Detailed information was available on 302 of these bonds with a total issue amount of $536,478,500.[30] Of these 302 issues, 285 issues totaling $497,391,000 had a corporate structure with bonds and equity. Koester restricted her analysis to this pool with a homogeneous legal organization. Some moderate losses on these bonds appeared between 1925 and 1928. In 1929, losses reached a significant level. By the end of 1930, more than one fifth of the bonds were in default.

Year	Number of defaults	Amount (thousands)	Cumulative defaults	Percent defaulted
1925 – 28	7	$8,275	$8,275	1.66%
1929	22	$29,320	$37,595	7.55%
1930	50	$64,095	$101,690	20.42%
1931	104	$162,116	$263,806	52.97%
1932	67	$146,725	$410,531	82.54%
1933	20	$38,003	$448,534	90.17%
1934	5	$22,706	$471,241	94.74%

Table 1: Defaults on Chicago real estate bonds, 1925 – 1934

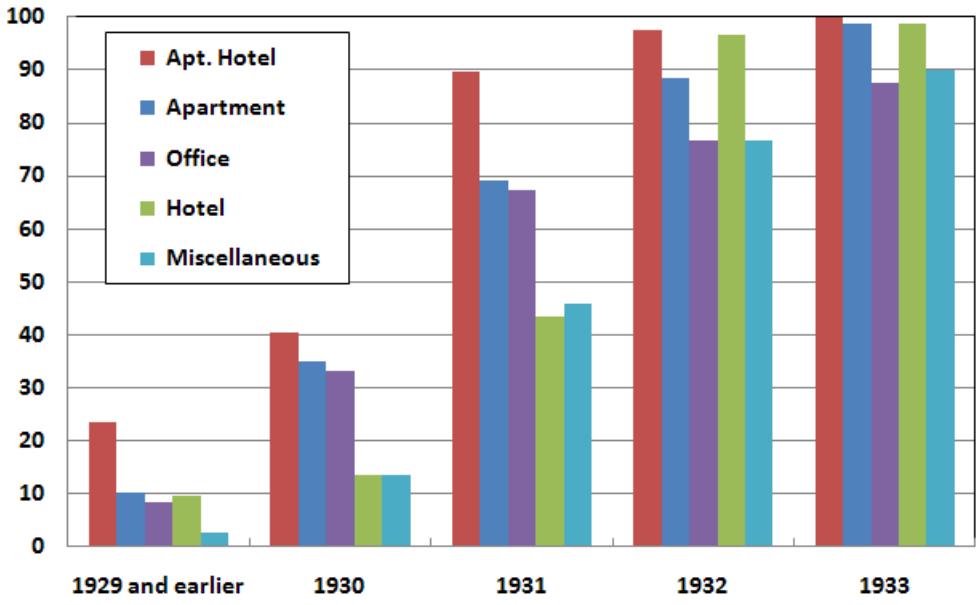
Apartment and apartment hotels defaulted earlier than hotel and office buildings. Office bonds had the best record, yet even their record was terrible: 87.7 percent of the office building bonds were in default by the end of 1934. The cascade of defaults on these bonds, from apartments to commercial real estate is consistent with other aspects of the transmission of the downturn from households to businesses.

Koester (1939b) examined prices for these Chicago real estate bonds and found that the basic price patterns conformed to the pattern of defaults through much of the downturn. Prices of bonds on apartment hotels fell earliest and furthest; apartment and hotel bonds fell almost as much. Commercial property bonds and office building bonds

[30] All of the excluded issues were under $475,000. Public price and performance data on these bonds were incomplete, probably because the bonds were closely held.

fell least, but even so, the declines were dramatic. When apartment hotel bonds reached their minimum price in July 1933, they traded at 8.2 cents on the dollar. Apartment bonds reached their minimum of 11.4 cents on the dollar in January 1934. Office bonds fared the best of the five categories, but even they traded at only 13.0 cents on the dollar at their minimum in January 1934. Recovery of bond prices was limited even by the end of the price series Koester evaluated in January 1939. Between July 1933 and January 1939, the highest average price for any of the categories was 31.9 cents on the dollar for commercial buildings in January 1937. The high level of defaults and the low prices indicate extensive losses on the Chicago real estate bonds.

Figure 8: Cumulative percentage of defaulted Chicago real estate bonds



Johnson (1936b) analyzed the performance of bonds issued between 1919 and 1931 in nine cities, including Chicago. His sample of Chicago bonds differed only slightly from the sample analyzed by Koester. He found that in 1936 the recoverable value of Chicago real estate bonds was 39.0 cents on the dollar.

5.2 Foreclosure

Foreclosures increased steadily from the first year in the series, 1925, through 1933 and then began to decrease at a rate comparable to the rate of increase from 1926 until 1933.[31] Foreclosures began to rise sharply before the period of rapidly falling house prices and rapidly increasing unemployment began in 1930.

Year	Total Foreclosures Dc1255	Foreclosures per 1000 mortgaged structures Dc1257
1926	68,100	3.6
1927	91,000	4.8
1928	116,000	6.1
1929	134,900	7.1
1930	150,000	7.9
1931	193,800	10.2
1932	248,700	13.1
1933	252,400	13.3

Year	Total Foreclosures	Foreclosures per 1000 mortgaged structures
1934	230,350	12.2
1935	228,713	12.1
1936	185,439	9.8
1937	151,366	8.0
1938	118,357	6.3
1939	100,410	5.3
1940	75,556	4.0
1941	58,559	3.4

Table 2: Foreclosures and foreclosure rate, 1926 – 1941

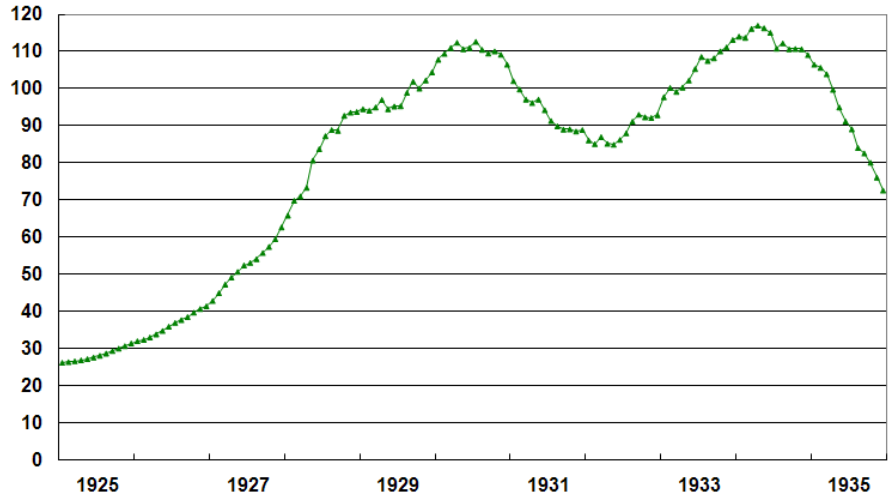
Foreclosure statistics underestimate homeowner distress, since many homeowners surrendered their homes before the foreclosure process was undertaken or completed. Fisher (1951, p. 48), citing Hoad (1942) notes that "during the eight-year period, 1931-38, 10.1 percent of all single-family homes in the [Toledo] area were foreclosed, and 9.6 percent were surrendered in lieu of foreclosure."

Badgley (1936) developed an index of real estate transfers, including transfers by foreclosure, for Washington, D.C. from January, 1893 through August, 1936. The data from 1925 through 1935 are shown in Figure 9. Comparison of this figure with figure 6 in Section 5 shows that foreclosures were rising rapidly as house prices peaked (and before unemployment increased). This is similar to the pattern that occurred in 2005 and 2006, when serious mortgage delinquency began to rise as house prices reached their peak. This suggest that the reason for delinquency and foreclosure may have been weak

[31] Foreclosure statistics are taken from the HSUS series Dc1255 and Dc1257.

underwriting standards, since the borrowers couldn't maintain their loans in good standing even before house prices declined and unemployment increased.

Figure 9: Number of foreclosures per month in Washington, D.C.e



The incidence of farm foreclosures was even greater than non-farm foreclosure. Alston (1983) reports farm foreclosure rates from the U.S. Department of Agriculture for 1926 to 1940 for the U.S. and for eleven states. In 1929 the foreclosure rate for the U.S. was 14.7 per thousand farms; by 1933 the rate reached 38.8 per thousand farms. The highest rate that Alston reports was 78.0 foreclosures per thousand mortgaged farms in South Dakota in 1933.

5.3 Unemployment

Foreclosures escalated in 1927. By 1929, the rate of foreclosures had nearly doubled since 1926, yet the unemployment rate in 1929 was lower than in any other year in the twenties. This result would be puzzling, but the experience of the recent housing bubble suggests a possible reason for rising foreclosures in a time of rising income, expanding employment, and rapidly increasing mortgage debt. It is possible or even likely that during the mid to late twenties, underwriting standards had eroded and as house prices began to decline in 1927 and 1928, an increasing number of homeowners were unable to meet their obligations, even before the general downturn began.

Unemployment increased by over six percentage points in 1930, in 1931, and again in 1932. The first two of these large annual increases in unemployment were followed by

large increases in the foreclosure rate, from 7.9 per thousand mortgaged structures in 1930 to 13.3 in 1932.

Year	Unemployed (thousands) Ba474	Unemployment rate Ba475
1920	2,132	5.16
1921	4,758	11.33
1922	3,636	8.56
1923	1,875	4.32
1924	2,341	5.29
1925	2,115	4.68
1926	1,321	2.90
1927	1,808	3.90
1928	2,235	4.74
1929	1,383	2.89
1930	4,340	8.94

Year	Unemployed (thousands)	Unemployment rate
1931	7,721	15.65
1932	11,468	22.89
1933	10,635	20.90
1934	8,366	16.20
1935	7,523	14.39
1936	5,286	9.97
1937	4,937	9.18
1938	6,799	12.47
1939	6,225	11.27
1940	5,290	9.51
1941	3,351	5.99

Table 3: Unemployed workers and the U.S. unemployment rate, 1920 - 1941

6 Bank deleveraging

We've seen in Section 3 (Figures 2 and 3) that lending on residential real estate increased very rapidly through the expansion. Bank lending increased substantially throughout the twenties and a sizable fraction of bank lending was lending on residential real estate. Loans of all banks amounted to $20.7 billion in June 1920; by June 1929 they had reached $41.6 billion. Grebler, Blank, and Winnick (1956, Table L-3) estimate that between 1920 and 1929 total outstanding non-farm residential mortgage credit expanded from $9.35 billion to $29.44 billion. Some of that mortgage credit came from outside the banking system, but the figures indicate that mortgage credit in the twenties was a sizable fraction of all outstanding credit, just as it is now, so the contraction in mortgage lending had a significant effect on the total level of credit in the economy.

Among the banks that experienced serious problems, we have some evidence that they were heavily exposed to residential real estate. According to Lucia (1985, p. 405) and O'Brien (1992, p. 378), Bank of United States had 45 percent of its assets in real estate in 1930, compared to an average of 12 percent for other New York City banks. The final banking crisis from January to March 1933 originated in Detroit with the Guardian Union Group and Detroit Bankers Group. Union Guardian Trust had $30 million in real estate

assets at the end of 1930, and it had 72 percent of its assets in real estate at the end of 1932 six weeks before it failed. According to Wigmore (1985, p. 437) "Within the Guardian Group as a whole approximately one-third of its total assets were in loans or investments related to real estate at the end of 1932." The other main bank in the Guardian Group was the Guardian National Bank of Commerce. That bank's deposits of $198 million in December 1930 had fallen to $108 million when it was closed (p. 441). Wigmore (1985, p. 438) also notes that "The banks in the Detroit Bankers' Co. had over 40 percent of their assets in real estate loans or investments at the end of 1932, although their emphasis on individual home mortgages had produced a more sound portfolio." The largest bank in the Detroit Bankers' Group was the First National Bank of Detroit, which had deposits of $373 million when it closed. In Senate hearings in late January 1934, Ferdinand Pecora quotes from the bank examiner's report of September 25, 1931 on the condition of the First National Bank of Detroit.[32]

> "This report reflects a very unsatisfactory condition, showing classified loans and doubtful paper aggregating approximately the surplus and profit of the bank, without taking into consideration a large amount of slow assets. This condition has been brought about by two major causes, namely, the general business depression, and the shrinkage in the inflated value of real estate, and poor management.
>
> "In the first instance Detroit has suffered along with other large cities from the depression, and more particularly because of the slowing down of the motor industry. The city has a large floating population, relying to a great extent on this one industry for its income. When this source of income is materially reduced, all other branches of business are to some extent affected.
>
> "This condition has been reflected to a very marked degree in the value of real estate. Real estate values of 2 years ago have been cut in half, with little activity on this basis. Large buildings have not shown any market whatever. Foreclosures and receiverships are numerous."

[32] See U.S. Senate (1934, p. 5242).

From this quote it appears that the First National Bank of Detroit was also heavily invested in real estate, so the two largest banking conglomerates in Detroit, where the final banking panic in early 1933 incubated, were both fragile institutions with large real estate portfolios.

Mortgage debt outstanding peaked in 1930 at $30.2 billion. It then fell for seven consecutive years until it reached a low of $23.3 billion in 1937. This is remarkable in view of the fact that mortgage debt outstanding in the U.S. has fallen during only three periods during the past 115 years: 1931-1937, 1942-1944, and the second quarter of 2008 through the present (the last quarter of 2012). All classes of mortgage lenders – commercial banks, life insurance companies, mutual savings banks, and mortgage companies – reduced their portfolios during the depression, but none reduced as much in percentage terms as Savings and Loan Associations.

In 1929, Savings and Loan Associations had more residential mortgage loans outstanding than any other type of institution, and they had a larger fraction of their total assets in residential mortgage debt than any other lender class. Over the course of the depression, they shed a larger percentage of their residential mortgage debt than any other type of mortgage lender.[33] Like all other lender classes, over the course of the depression they shifted their portfolio away from residential mortgage debt toward other assets.

	1929	1932	1935	1936
Non-farm mortgages	$6,182	$5,020	$3,301	$3,257
Assets	$8,695	$7,737	$5,857	$5,772
Mortgages/Assets	71.1%	64.9%	56.4%	56.4%

Table 4: Assets and mortgage debt of Savings and Loan Associations in selected years

Consumer durables financing

Consumer credit went through a rapid expansion between 1923 and 1929 and then an even faster contraction between 1929 and 1933. Nugent (1939, Table 10, p. 116)

[33] Savings and Loan Association assets are included in HSUS series Cj382 for 1900 to 1989. Savings and Loan mortgage assets are included in Grebler, Blank, and Winnick (1956) table N-2.

examined consumer credit expansion by a variety of lenders for a range of consumer products. Aggregate consumer installment lending increased at an annual rate of 11.1 percent per year from $4.4 billion in 1923 to $8.2 billion in 1929 before it contracted at an annual rate of 12.5 percent to only $4.8 billion in 1933. These figures are fairly substantial considering that GNP in 1929 was only $103.6 billion (according to NIPA). New credit extended was adding to purchases of consumer goods up until 1929, but after 1929, consumers were paying down previously incurred credit balances from rapidly declining income.[34]

Total bank lending

Total bank lending grew steadily from a recession low of $27,627 million in June 1922 to a peak of $41,861 million in December 1929. Over the first six months of 1930, lending fell only $364 million, but starting in the second half of 1930, lending began to decline more rapidly. Lending fell $2,445 million in the second half of 1930. By June 1935, total bank lending had fallen 51.7 percent to $20,213 million. Commercial bank loans fell even faster than overall bank loans: from a peak $35,966 million at the end of 1929 commercial bank loans fell 58.5 percent to $14,909 million at the end of the first half of 1935. [35]

Residential mortgage lending on one- to four-family homes suffered a less extensive decline across almost all classes of lenders than commercial bank lending. Residential mortgage lending fell 20.9 percent from a peak of $29,440 in 1929 to $23,284 in 1937. Among institutional lenders, the decline of Savings and Loan Association mortgage loans was the most rapid in both percentage terms and in the total decline in lending. Their loans peaked in 1929 at $6,182 before collapsing 47.3 percent over the next seven years to a depression low of $3,257 in 1936.[36] Residential mortgage bonds decreased rapidly as well, from $2,439 million in 1929 to $1,360 in 1937. Although residential mortgage

[34] In Section 7.4, we examine the course of income declines.

[35] Total bank lending data are from Board of Governors of the Federal Reserve System (1943, Table 2, p. 18). Commercial bank lending is from Table 3, p. 19 in the same source.

[36] Figures on residential mortgage lending come from Grebler, Blank, and Winnick (1956) Table N-4.

lending fell less than bank lending, this is in part because mortgage loans have longer terms than commercial loans.

7 Channels of contraction

There are five primary channels through which the construction and consumer credit booms and their collapses accentuated the economic cycle. The first and most direct was reduced residential construction. The second channel was the damage to household balance sheets from the fall in home prices, and the negative impact from damager to household balance sheets on household demand for consumer durables and non-durables. The third channel was the reduction in firms' inventories, production, and fixed investment that resulted from the household consumption decline. The fourth channel was the feedback effect from declining household income, which then circled back to affect each of the first three factors. The fifth factor was the damage to banks' balance sheets, which accentuated the troubles of both firms and households when loans could not be extended or rolled over due to the desire of banks to deleverage.

7.1 Reduced residential construction

In the peak year of 1925, residential construction amounted to 5.3 percent of GDP. Between 1921 and 2010, residential construction as a percentage of GDP has exceeded 5 percent in four years. These were 1924, 1925, and 1926 and later in 1950 when the stock of housing was depleted from the low level of residential construction during WWII. Even during the recent boom, residential construction reached a maximum level of only 3.8 percent of GDP in 2005. The excess supply of structures constructed during the boom had to be absorbed before the construction industry could revive, so the decline in residential construction was the first and most direct channel by which the residential real estate downturn affected economic activity.

7.2 Damage to household balance sheets

Housing market data show that real estate prices peaked in 1925 and 1926, and then began a slow decline that gathered momentum from 1929 to 1932. Many households borrowed when house prices were at or near their peak. Referring to Figure 3 (in Section 3), we see that in the years 1925 to 1928 the net flow of mortgage funds held steady near

its peak of about $3 billion per year. As prices slid, household wealth fell while total debt burdens remained high while incomes fell. For households with much of their total wealth consumed by their down payment, the house price decline wiped out their accumulated wealth, or worse. Short loan terms were a structural feature of the mortgage market, not only in commercial bank lending, but also in residential lending. These short contract terms probably created an additional source of contraction in mortgage lending and an additional source of downward pressure on housing prices when loans that came due were not rolled over.[37] In addition to their short term, many mortgages at that time were either non-amortizing (i.e., interest only as in the current crisis) or partially amortizing (i.e., balloon payments if not rolled over). For the period 1925-29, about 14.3 percent of mortgages issued by life insurance companies were fully amortizing; in the same period, about 10.3 percent of mortgages issued by commercial banks were fully amortizing. Figure 9 shows that from 1920 to 1934 unamortized loans and partially amortized loans comprised between 85 and 90 percent of residential mortgage portfolios of commercial banks.[38] Savings and Loan Associations commonly issued fully amortizing loans: 94.9 percent of their loans between 1920 and 1929 were fully amortized.

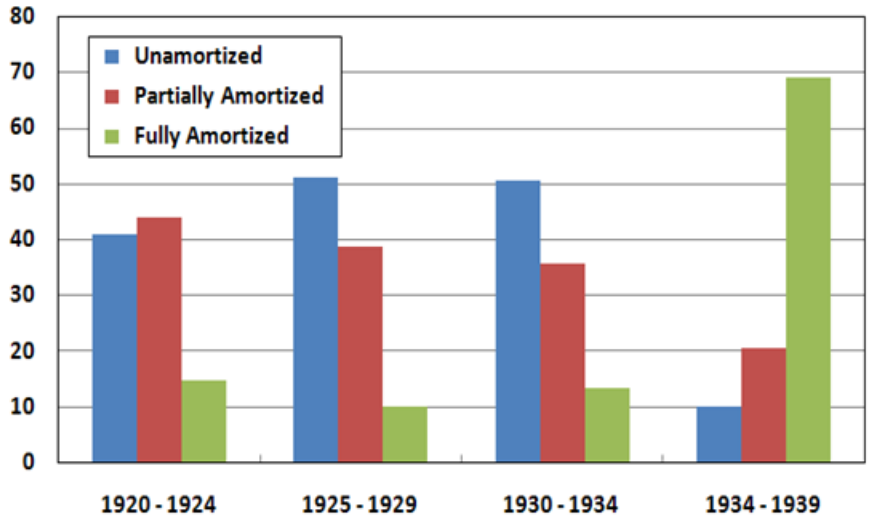
The combination of short loan terms and the use of non-amortizing loans must have exacerbated the distress of both homeowners and lenders as the depression developed. A large fraction of borrowers would have faced the necessity to refinance sometime between 1930 and 1935, when credit market conditions were stringent. When a borrower tried to refinance after prices had fallen, lenders either had to extend a new loan with a higher loan to value ratio, or reduce the loan. As foreclosures were rising and prices were

[37] Grebler, Blank, and Winnick (1956, Table 67) list average lengths of mortgage contracts for life insurance companies, for commercial banks, and for savings and loan associations from 1920 through 1947. For the period from 1920 to 1934 the average contract length for commercial banks was only 3.0 years. The averages for life insurance companies and for savings and loan associations were slightly longer at 6.8 and 11.2 years. But these figures are the average contract length when the loan was issued, so the average length remaining on the loan when the banking troubles began would have been significantly shorter and many borrowers would have been affected when banks tried to retain liquid assets by declining to roll over loans.

[38] Data on amortization are reported in Grebler, Blank, and Winnick (1956, Table 66, p. 231).

falling after 1926, this was an unattractive proposition for lenders, even before credit market conditions began to seriously deteriorate in 1930. The need to refinance during a period of falling home prices must have led to distress sales when homeowners were unable to find new lenders upon expiration of their existing loans. Since many loans were not amortizing, lenders risked losses on a loan when the value of a home fell below the homeowner's equity. Lost equity and the prospect of a distress sale would naturally create uncertainty among households and lead to increased precautionary savings and reduced consumption. Estimates of personal savings in Swanson and Williamson (1971, Table 3) reinforce this impression: the average level of personal savings between 1929 and 1931 was 97.5 percent higher than the average level for 1926 through 1928.

Figure 9: Distribution of mortgage loans of commercial banks by amortization status



An increase in precautionary savings due to household balance sheet problems leads to declining household consumption, especially of durable goods. This in turn leads to reduced production levels and reduced employment. As reduced employment adds to household distress, it reinforces both the decline in durable goods consumption and the frequency of mortgage default and distress sales of housing. Reduced consumption from lost homeowner equity, its effect on production and employment, and the contribution of reduced employment to homeowners' mortgage distress is the second channel though which a downturn in the housing market affects economic activity.

7.3 Reduction of firms' inventories, production, and fixed investments

As demand for consumers' durables collapsed, firms reduced inventories, but when demand failed to recover quickly, demand for producers' durables also began to fall. Investment decline impacts producers of raw materials and production equipment more than any other sector.[39] The decline in the demand for residential housing and for consumer durables leads to a desire by firms' to reduce inventories, production, and employment. Reduced production then leads to a decline in demand for producer durables (plants, equipment, and structures). The large collapse in consumer durable goods demand that resulted from household balance sheet problems generated the third transmission channel into the real economy when producers' durable goods investment collapsed.

7.4 Feedback effect on households' incomes

All of these effects have a pronounced impact on production, which feeds back to cause additional problems in the labor market. Labor market problems in turn circle back to cause further problems in the housing market and reduce consumer durable goods expenditures. Compensation to employees and proprietors' real incomes fell 11.3 percent from 1929 to 1930, whereas real GNP fell only 9.5 percent. At the same time the uncertainly associated with employees' compensation grew rapidly as unemployment rose from 2.89 percent in 1929 to 8.94 percent in 1930. In 1931 the plight of employees and proprietors grew considerably worse: their income fell 16.6 percent, far in excess of the 6.3 percent decline in real GNP. In 1932, the gap between the decline in employee compensation and proprietors' incomes grew even larger: their real income fell 24.9 percent, while real GNP fell 13.3 percent. As their incomes fell in 1931 and 1932, employees faced increasing uncertainty as the unemployment rate increased to 22.89

[39] Raw material and capital equipment output declined precipitously. Steel production (HSUS series Dd399) fell 75.5 percent between 1929 and 1932 and locomotive production (HSUS series Dd429) fell 96.4 percent from 1,770 in 1926 to 63 in 1933. Many consumer non-durables declined much less than overall economic activity. Production of refined sugar (HSUS series Dd369) fell 17.1 percent between 1929 and 1934. Production of women's dresses (HSUS series Dd383) fell 10.8 percent between 1929 and 1933.

percent. The brunt of the depression fell on households, and their rapidly declining incomes led inevitably to a rapid collapse of demand for the products of industry.

7.5 Damage to banks' balance sheets

The fifth transmission channel runs from households and investors to bank balance sheets. Once housing equity losses among some households reach the critical threshold where their equity is exhausted and borrowers default with inadequate collateral, banks begin to accumulate losses. Distress among mortgage holders was not limited to owner occupants; it also included rental property owners and mortgage bond holders. In the 1920s, a large fraction of residential property was rented. Rental prices fell slightly more than property values, and the average loan term on rental properties was shorter than on loans to owner occupants. Real estate bonds issued in the 1920s on large apartment buildings, hotels, office buildings, and commercial properties accounted for an increasing share of real estate financing in the 1920s, and their performance was extremely poor. Transmission of losses into banks came from all sectors of the real estate market.

All classes of lenders deleveraged sharply during the course of the depression. There are at least four reasons that banks reduce their private lending during a severe downturn. When bank capital declines as a result of losses, deleveraging is the simplest and most direct way for a bank to increase its capital to asset ratio. When lending declines, the bank's assets are reduced but its capital isn't directly affected. This improves its capital to asset ratio, even in the absence of direct capital investment. A second reason for a lending reduction is that when a loan is called or not rolled over, the funds obtained can be invested in liquid assets such as Treasury securities or excess reserves with the Federal Reserve Bank which provide protection against illiquidity in the face of depositors' demands. A third reason for deleveraging is that borrowers are scrutinized much more carefully in a downturn, since loan collateral might decline in value and investments will produce an inadequate return during a downturn much more frequently than during a boom. A fourth – and very significant – reason that bank lending will decrease is outside of the control of the banks: many sound borrowers don't have solid investment opportunities, so borrower demand for loans declines. All four of these forms of bank deleveraging have been particularly characteristic of domestic developments from August

2007 into 2012 creating much uncertainty as to the strength and sustainability of the economic recovery. Bernanke (1983) focused on a related transmission channel from failed or suspended banks to borrowers. He argued that businesses that had established relationships with a failed bank faced reduced access to capital markets. While this is true, even solvent and surviving banks reduced their lending during the depression.

In his discussion of the consumption decline of 1930, Temin (1976, pp. 82 - 83) argues that he "has no satisfactory explanation. It may have been related to the fall in construction … to the stock market crash … and it may have been related to the sharp decline in farmers' income … but these arguments are pure speculation. The fall in consumption must be regarded as purely autonomous, which in this case means also unexplained." Temin argues convincingly that the consumption decline in 1930 was large relative to declines in wealth and income, especially when compared to consumption declines in the other two inter-war recessions in 1920-1 and 1937-8. The unemployment rate shot up from 2.9 percent in 1929 to 8.9 percent in 1930. The foreclosure rate increased from 3.6 per thousand mortgaged non-farm homes in 1926 to 7.1 per thousand in 1929 and 7.9 per thousand in 1930. Surely the fear of losing first a job and then a home could readily lead to a sharp decline in expenditures on housing and durable goods. As household expenditures fell, production, investment, and employment fell too, and the cycle of collapse was underway.

The accumulating household balance sheet stress after 1926 did not have a visible impact on corporate profits or the value of corporate equities even as late as October 1929, as McGratten and Prescott (2004) demonstrate. They evaluated Irving Fisher's pronouncement on October 15, 1929 that the stock market was not overvalued.[40] Based on corporate profits and the value of corporate capital, McGratten and Prescott agreed with Fisher's assessment that the stock market was not overvalued in 1929. Fisher (1933) himself soon revised his views, emphasizing the role of debt and deflation in the depression. The capacity of households to buy the goods and services that industry produced was augmented by debt accumulation during the boom, and the capacity of households to absorb more debt was limited, hence the profits that industry had been

[40] See "Fisher Sees Stocks Permanently High," *New York Times*, October 16, 1929, p. 8.

earning would soon collapse and the value of the capital that industries had accumulated would be limited by the collapse of household demand.

During the depression, the decline in expenditures on new residential units plus the decline in consumption accounted for 72.9 percent of the total decline in GDP.[41] This figure is striking, but it must understate the contribution of households to the contraction. Consumer durables sales fell 49.3 percent in real terms between 1929 and 1933. With such a dramatic decline in consumer durables sales, investment in plants and equipment collapsed almost completely. Non-residential fixed investment declined 68.6 percent, which was a precipitous collapse especially in comparison with the average decline of 11.8 percent during post-war recessions and the maximum decline of 22.5 percent during the 2007–09 recession.[42]

8 Conclusions

The evidence presented in this chapter on the Great Depression, combined with the evidence from Buchanan, Gjerstad, and Smith (2012) on the Great Recession, indicate that our two most severe financial crises and our two most persistent economic downturns of the past century both followed large declines in the value of residential real estate prices. It's possible that some other factor caused the downturns in residential real estate prices, the financial crisis, and the prolonged recession, but we've also described a direct transmission channel by which residential real estate losses are transmitted to the financial sector, and we've indicated why the losses to households suppress consumption, especially of durable goods, and how suppressed consumption reduces capacity investment by firms.

In the Great Depression, as in the Great Recession, the deterioration of the residential real estate market preceded the peak of the economic cycle and the broader downturn by two to three years; in both cases the damage to household balance sheets originated in

[41] This figure is calculated from NIPA Table1.1.6, comparing 1929 and 1933 figures for GDP and for residential investment and personal consumption expenditures.

[42] The figure for the decline in non-residential fixed investment during the depression is calculated from data on fixed investment in Swanson and Williamson (1972, Table A2) less residential investment in Grebler, Blank, and Winnick (1956, Table B-3). Declines in non-residential fixed investment in post-war recessions are taken from Gjerstad and Smith (2010).

residential real estate losses, and much of the damage suffered by financial sector firms resulted from transmission of households' real estate losses to them.

This begs the question "Why are losses on residential real estate so pernicious?" There are at least three primary reasons. Residential real estate is illiquid, especially in a downturn when sales begin to decline. It is often highly leveraged, and in the depression we saw that mortgage credit was growing while sales and construction of new homes were falling, so leverage was increasing toward the end of the boom as prices began to fall. Another reason is that residential real estate assets are a large portion of national wealth and a large fraction of the wealth of many households, so that a downturn in residential real estate values has a substantial impact on household balance sheets and on their consumption levels, especially of durable goods and new housing assets. Finally, housing assets are immobile, so that there is no geographical redistribution of overbuilding in one area to other areas. For many real assets, redistribution is almost immediate, as with ships, airplanes, or locomotives. Even overbuilding of production capability, such as factories, would lead to a revaluation of the assets but they would often remain utilized for export. Residential real estate is unusual in that few alternative uses arise when it is overbuilt. For all of these reasons, policies related to development and financing of residential real estate should be carefully considered. Government or private policies that lead to a rapid expansion of residential construction or to rapid increases in residential real estate prices frequently appear as risk factors for financial crises and severe economic downturns, in the U.S. and around the world.

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