Lessons from the
Great American Real Estate Bubble:
# Florida 1926

Preliminary
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Prior to the 1987 stock market crash the conventional wisdom was that there could never be another 1929 Great Crash. The securities markets had been reformed and investors were better informed, the events of the late twenties seemed at most to be a quaint tale of distant foolishness. Research on market bubbles was a limited and esoteric exercise. The housing market boom and bust the mid-1920s has received similar treatment. It is a forgotten episode, which if discussed, is seen as some madness that descended on Florida. That the housing market boom was nationwide and embodied many of recent housing market bubble's characteristics is unknown. Beginning in 1926, the collapse of the housing market brought about a decline in aggregate investment and a weakening of household balance sheets, with a rising tide of foreclosures that continued through the Great Depression. Bank supervision failed to manage innovation and conflicts of interest that spawned insider lending and bank failures, while monetary policy failed to address the general question of how to manage asset market booms.

The Forgotten Real Estate Boom of the 1920s

Housing was the first part of the 1925-1929 double bubble. Because of strengths elsewhere in the economy, the collapse of the housing market did not derail the economy; however it explains the autonomous drop in investment on the eve of the Great Depression and it seriously weakened the balance sheets of many households and banks. It was the one of a one-two punch.

Figure 1
The Double Bubble
New Housing and New Stocks, 1910-1934
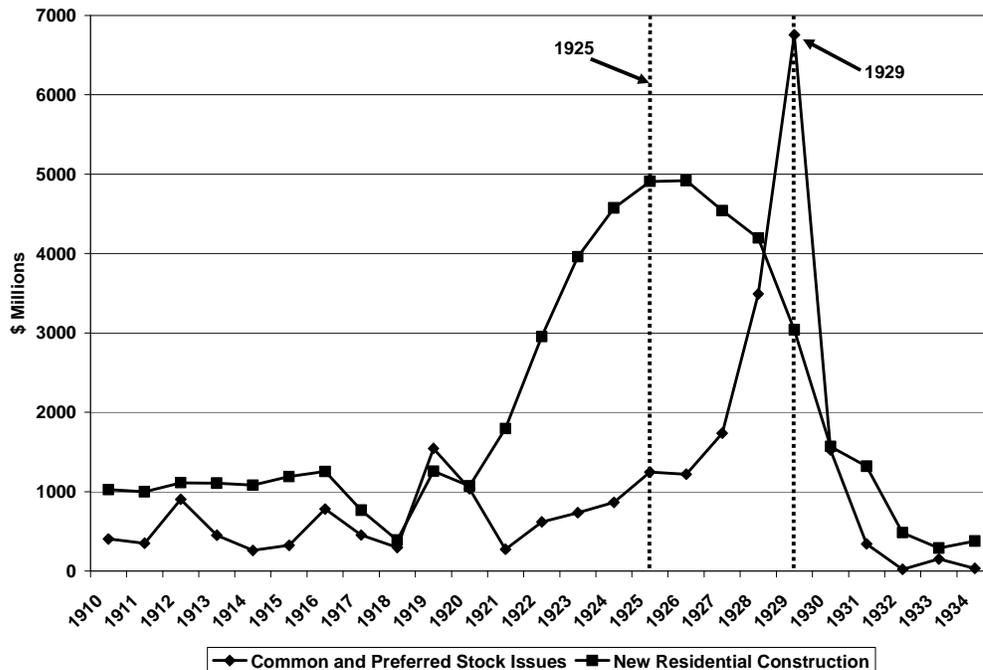
Source: Historical Statistics. New issues of common and preferred stocks, Table Cj837. New Residential Construction, Table Dc261 for 1915-1939 and Grebler, Blank and Winick (1956) Table B-5 for 1891-1914.

There is no established metric for what constitutes a bubble. For the stock market, we would first look to see if there was a dizzying rise in general stock price indices followed by an abrupt collapse. In addition, transactions would soar with turnover, increasing. Typically, there would be a raft of new issues. The first problem with identifying a bubble in the housing market is that until very recently there were few goods measures of movements in housing prices. We have stock indices that go back well into the nineteenth century, but the extreme heterogeneity of the housing market prevented the early development of indices. Similarly, there are no national data on the number of sales to obtain a measure of turnover. However, there are data on the value of new construction, which is comparable to the value of new stock issues. These two are depicted in Figure 1, which give a sense of timing of the two bubbles. The housing market run-ups are typically slower and smoother than in equity markets, but both experienced rapid upswings and quick declines. The peak in housing is 1925 with almost $5 billion in new residential construction. By the time that new stock issues approached $7 billion, the housing construction had fallen to $3 billion.

Figure 2
Total Gross Investment and Construction
1919-1931

Souce: Temin (1976), Table 1, p. 4.

The role of the housing collapse in weakening aggregate investment and thereby the economy has received little attention since Temin (1976) identified it as a key factor leading up to the Great Depression. Figure 2 shows the movement of aggregate investment and construction. Investment's upward trend is slowed by the sharp recession after World War I and the two mild recessions of the 1920s; but it begins a long-term

decline after 1926. Falling construction accounts for the fact that total gross U.S. investment peaked in 1926; even a sustained growth of business investment in the peak year of 1929 could not overcome the abrupt decline in residential construction. Noting that private construction declined by $2 billion between 1926 and 1929 at a time when income was rising, Temin found no easy explanation. He considered the possibility that restrictive immigration laws introduced in 1921 and 1924 might have cut immigration and led to lower family formation and home demand, but he dismisses it as a minor factor accounting at most for one percent of the decline. He found no explanation and concluded simply that there are long lags in this market and temporary disequilibria are not surprising, surmising that a cycle must have been initiated by "events in and around World War I."

While Temin thought that there were some underlying fundamentals that caused the rapid downturn in construction, he did not see a bubble behind the upswing and collapse of residential construction. Galbraith (1954), on the other hand, saw the rise and collapse of real estate as a classic speculative bubble: "The Florida boom was the first indication of the mood of the twenties and the conviction that God intended the American middle class to be rich." (p. 6). Although there were indispensable elements of substance, it was based on the self-delusion that the Florida swamps would be wonderful residential real estate. According to Galbraith, the demise of this bubble was hastened by two hurricanes. In spite of the fact that he viewed the Florida land boom as a bubble and a harbinger of the stock market bubble, Galbraith offered little tease out the consequences of its collapse or to tie them together. How well the real estate boom of the 1920s was forgotten is revealed in Shiller's <u>Irrational Exuberance</u> (2000). Shiller, a believer in the ubiquity of bubbles does not mention the Florida or the twenties. However, in his 2007 presidential address to the Eastern Economic Association, Shiller (2007) shifted his focus from equity to real estate markets. Yet, Florida rates only a brief mention, where he describes the collapse as the result of a change in investor psychology prompted largely by the "surprise" increase in the supply of properties.

Most recently, Field (1992) saw the general building boom of the 1920s as creating major problems for the economy. He identified a residential boom peaking in 1925, "a smaller orgy of apartment building" cresting in 1927, and corporate upswing continuing through 1929. Yet, his emphasis was not on excessive aggregate investment but on the consequences of unplanned and unregulated development that dramatically raised the transaction costs, (given the existing sub-divisions and problems with titles and tax liens) thereby hindering later development.

The more general problem of a collapse of residential investment and housing prices was, however, recognized by contemporaries. For example, Simpson (1933) found that there was an excessive expansion of residential construction in the 1920s, abetted by an unholy alliance of real estate promoters, banks, and local politicians. In Cook County outside of Chicago, he claimed that there were 151,000 improved lots and 335,000 vacant lots in 1928, estimating it would take until 1960 to sell these properties based on future his projection of future population growth. He considered Chicago to be important example, although Florida was the most conspicuous. Yet, beyond bewailing the current conditions, Simpson provided few statistics and tended to confound the problems of the real estate bust with the Great Depression. Early post-World War II research was focused on the recovery from the depression and sustaining growth. Morton (1956) and

Grebling, Blank and Winick (1954) and others did not isolate the collapse of the 1920s from the Great Depression, viewing it as one blur. Their implicit belief was that the New Deal reforms of banking and mortgage finance resolved most of real estate's problems in the 1930s----thus the 1920s as a separate problem did not require special attention.

Given this amnesia, it is necessary to review the big picture and the more well-documented case of the Florida boom to understand the importance of the real estate bubble in the events leading up to the Great Depression.

The Dimensions of the Housing Boom and Bust of the 1920s

The behavior of construction in the twenties is unique among macroeconomic aggregates, peaking in 1925 and collapsing well in advance of the Great Depression. Residential housing was the focal point of the boom. Whereas business construction (other private) in Figure 3 had been the largest component of construction in the prewar era, residential construction surged ahead. Business construction returned to prewar levels, but residential construction greatly exceeded the pre-1914 real levels.
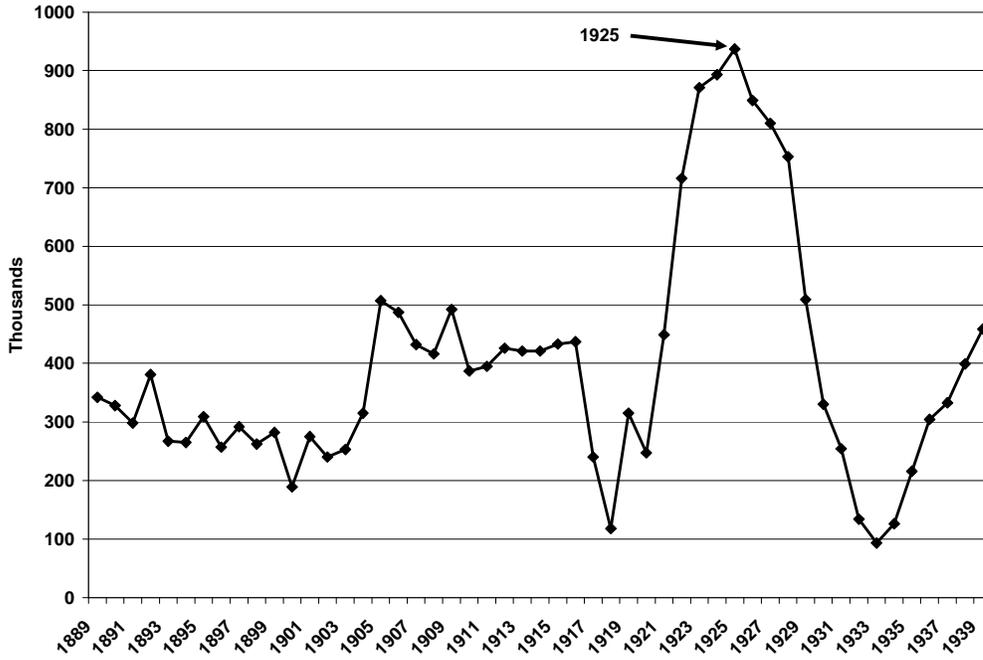
Figure 3
Net Real Construction Expenditures, 1889-1939
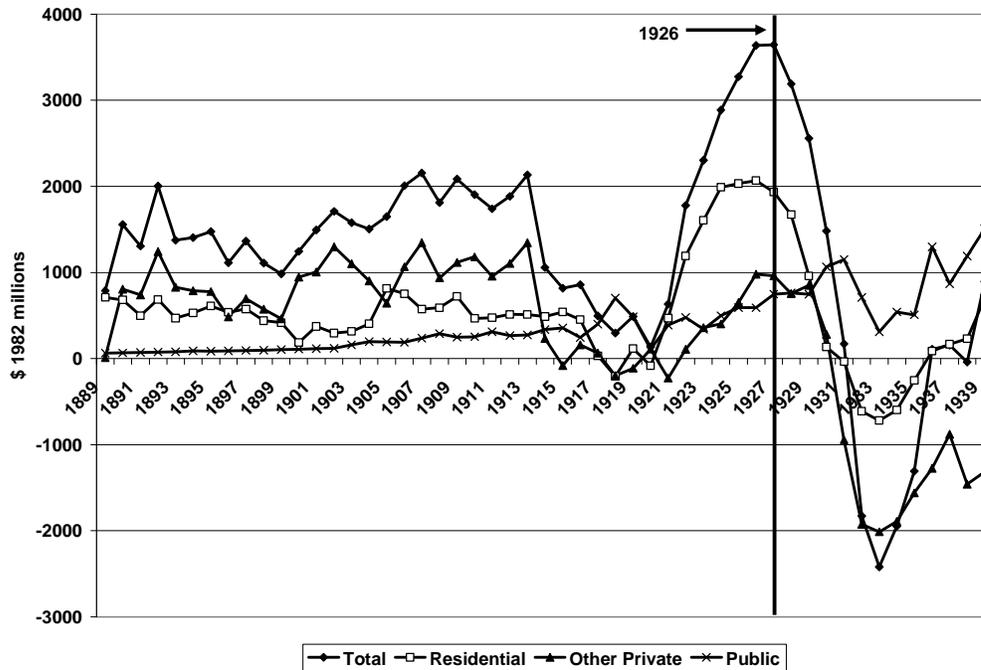
Source: Historical Statistics. Table Dc87-90. Net Construction Expenditures deflated by the wholesale price index (Cc66).

The boom in housing was residential focused in one to four family units, especially in the new suburbs that began to appear as the automobile expanded commuting potential. Housing starts for the units are shown in Figure 4; they attain a peak in 1925 that was not surpassed until 1949.

Figure 4
Residential Housing Starts, 1889-1930

Source: Historical Statistics. Table Dc510. Privately owned, permanent nonfarm housing units started and authorized by permit.

Figure 5
Residential Housing Starts by Region, 1920-1930

Source: Historical Statistics. Table Dc518-521. Privately owned, permanent nonfarm housing units started and authorized by permit.

Real estate booms are far from geographically uniform; some regions are hot and others lag. Case and Shiller (2003) emphasized this regional variance. Examining home prices on the state level between 1985 and 2003, they found that income almost completely explained price increases in the majority of states; but in eight states their model failed and there was significant price inertia. Like more recent housing booms, the events of the mid-1920s had strong regional components, as seen in Figure 5. The boom centered on the South, the Northeast and some cities in the Midwest and West. Although all regions experienced a postwar jump in housing construction, the level of housing starts fell after 1923 in the West and remained relatively stable in the North Central. The real estate boom is most dramatically seen in the construction of vacation facilities, shown in Figure 6, which include hotels, motor courts, tourist cabins,vacation cottages and dormitories. (Grebler, 1956), which nearly quintupled then quickly sank.

Figure 6
**Expenditures on the Construction of "Nonhousekeeping Residential" Structures**
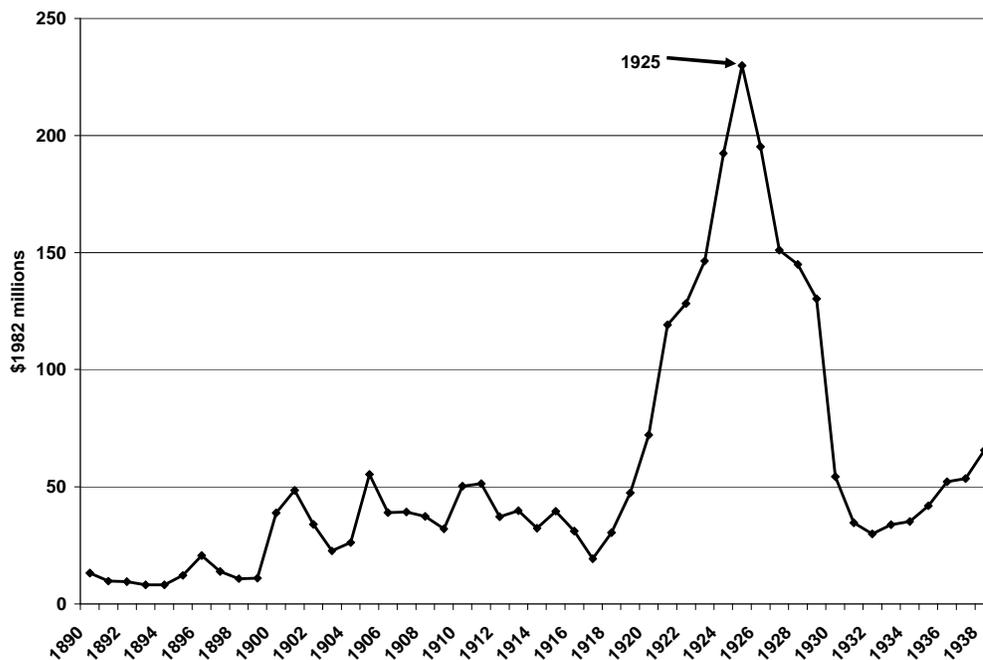
Source: Historical Statistics. Table Dc261 for 1915-1939 and Grebler, Blank and Winick (1956) Table B-5 for 1891-1914. Constructions costs are deflated by the wholesale price index (Cc66).

While contemporary discussions of the housing bubble all focus on the rapid rise and fall of prices, it is much harder to identify a similar surge in the very limited and biased available housing price indexes. There is one national index constructed by Grebler, Blank and Winick (1956), which is based on a survey of owners in 22 cities in 1934 who were asked what the current value of their home was and what it was in the year of acquisition. There are several problems with this index. Grebler, Blank and Winick recognized that owners did not account for depreciation or additions and repairs. They attempted to treat the bias resulting the absence of depreciation, by adjusted their

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index with a simple depreciation rule. Their two indexes are shown in Figure 7. But there are two other serious problems. First, the volatility in earlier years, compared to the smooth movement after World War I, may be attributable to the relatively smaller number of observations arising from the design of the survey rather than abrupt shifts in prices. Secondly, if foreclosures or abandonment of property occurred among owners who had bought late in the boom at high prices, the peak of the boom would be underestimated. Thus, these indices need to be used with considerable caution. Between 1922 and 1925 the unadjusted and adjusted indexes rose 7 and 11 percent respectively. On the downside, the indexes fell 8 and 3 percent between 1925 and 1929. These are substantial swings but hardly large compared to contemporary housing price movements. On the national level, construction costs were relatively constant for most of the twenties, so as the boom progressed there was no uptick in the cost of production.

Figure 7
**Single-Family House Price Indexes, 1890-1934**
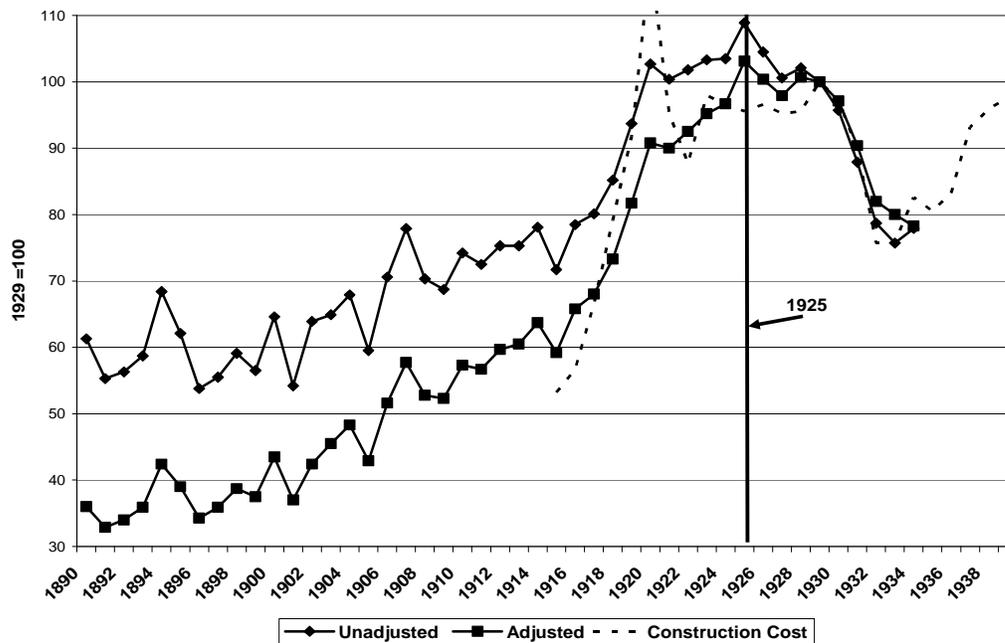
Source: Historical Statistics. Table Dc826-827 for the house price indexes and Dc210 for the cost index for residential construction.
Note: Grebler, Blank and Winick (1956) developed this indexed from the Department of Commerce's Financial Survey of Urban Housing (1937), which provided detained information from a survey of owner occupied housing in 22 cities. The unadjusted index has two biases: losses in value due to depreciation and increases in value from additions and alterations. They argue that the former is more important and the adjusted index is corrected with a simple depreciation rule.

How do the 1920s compare with other real estate booms in the twentieth century? Figure 8 provides a simple graphical comparison. Setting 1920, 1984, and 2001 as the base years for three separate indices, the relative magnitude of each boom can be appreciated. The 1920s is not as big as the current boom, but it was as large as the boom in the 1980s with national housing prices rising 20% before declining over 10%. The eighties was disastrous for real estate in the Northeast, Texas and California, contributing

to the demise of many banks.   Within five years, prices jumped 50% to reach their peak in 2006.   This larger boom is also mirrored in the much larger rise in stock prices that occurred in the 1990s compared to the 1980s and 1920s.

Figure 8
Real Estate Booms Compared
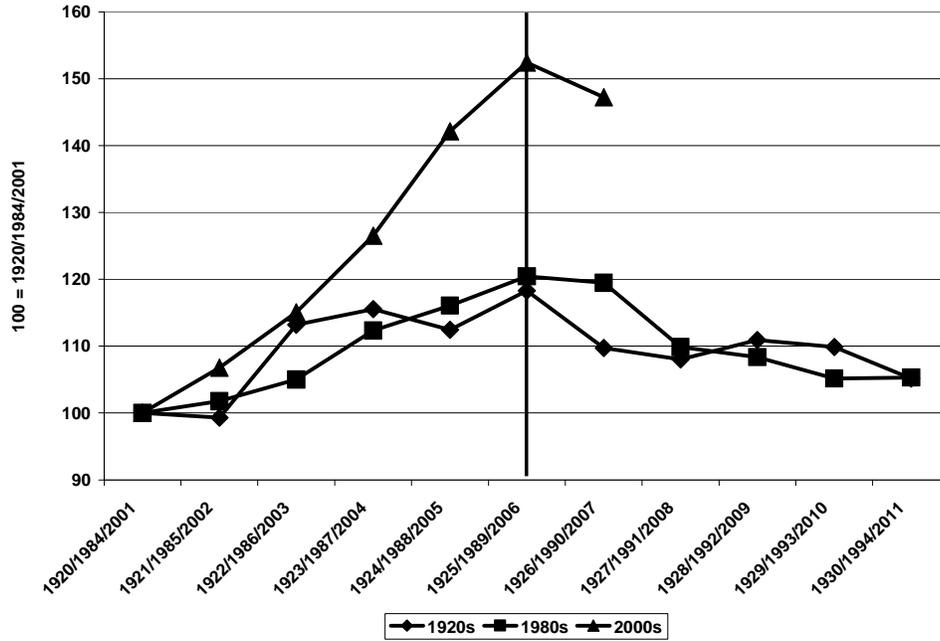

Source: Robert Shiller, webpage

Figure 9
Median Asking Price of Single-Family Home
Washington, D.C., 1918-1939
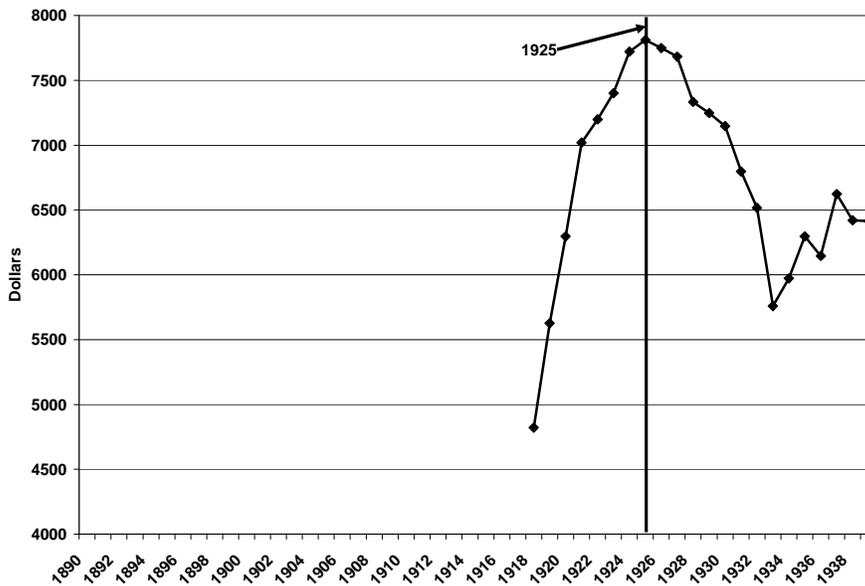
Source: Historical Statistics. Table Dc828.

A national index will, of course, show less extreme movement than regional indices. Unfortunately, there is only a little bit of data on individual cities. Figure 9 shows the median asking price of a single-family home in Washington, D.C. In the years 1922-1925, it increased 8.5%, falling 7.2% between 1925 and 1929. Three year moving average prices---which flatten the boom----for Cleveland and Seattle are reported in Figure 10. Cleveland appears to follow the national norm, rising 12% over the three years. However, Seattle appears to be more of a boom town, with a peak in 1924, and the three year run up, hitting 36%. Its collapse it also more dramatic falling 15% by 1929 compared to Cleveland's drop of 3.5%, Washington's fall of 7%, and the unadjusted index's drop of 8%.

Figure 10
House Price Indexes, Cleveland and Seattle
**1907-1930**
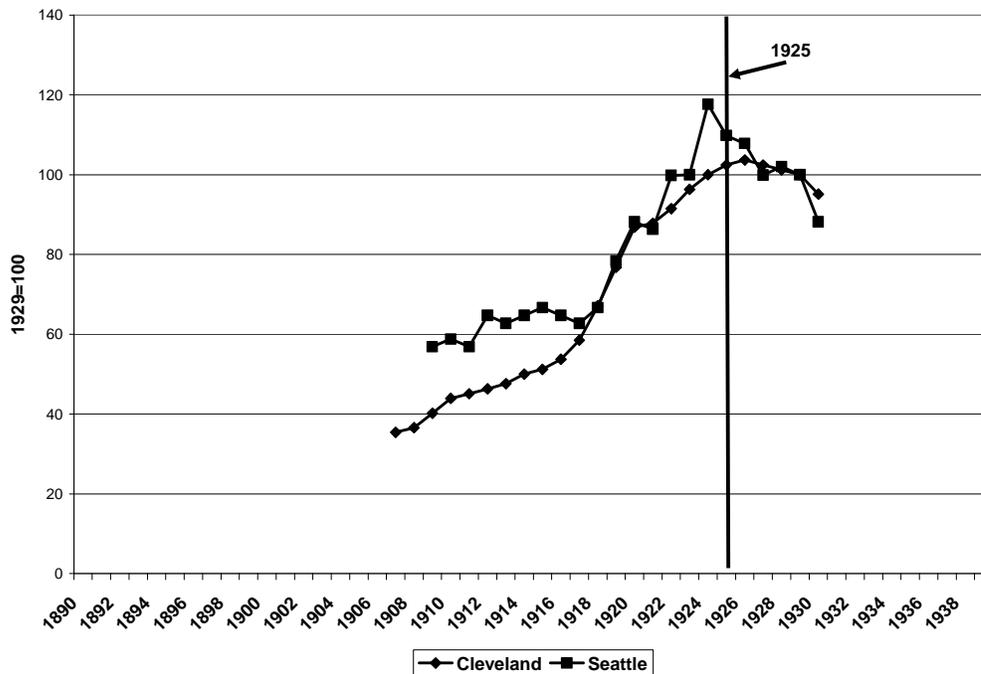
Source: Grebler, Blank and Winick (1956) Table C-2, p. 350. Indexes derived from three-year moving averages of prices paid for new six-room frame house and lot.

Another important feature of many housing booms is an easing of credit conditions for borrowers. One change in the twenties' boom was a shift to greater mortgage financing, as seen in Figure 11. Mortgage funding which had accounted for less than 45% of residential contraction finance before World War I rose to nearly 60% at the height of the boom. Accounting for why mortgage financing became more important is much more difficult, given the limited national information. One feature is clear is that there was a shift in the sources of finance. Non-institutional lending---friends, family and private local individuals---had been slowly declining since the turn of the century when it had accounted for over half the market. By the early 1920s, it provided just over a third of the funds to home buyers. During the boom years of 1922-1925, overall mortgage lending increased 55% and non-institutional lending grew only slightly less at

51%. The largest traditional institutional lending with 23% of the market, mutual savings banks did not keep pace, expanding at only 40%. The most aggressive lenders were those who had considerably smaller market shares: the commercial banks, the insurance companies and the savings and loans, which grew at 76%, 79% and 62% respectively.[1]

Figure 11
Sources of Funding for Residential Construction, 1911-1939
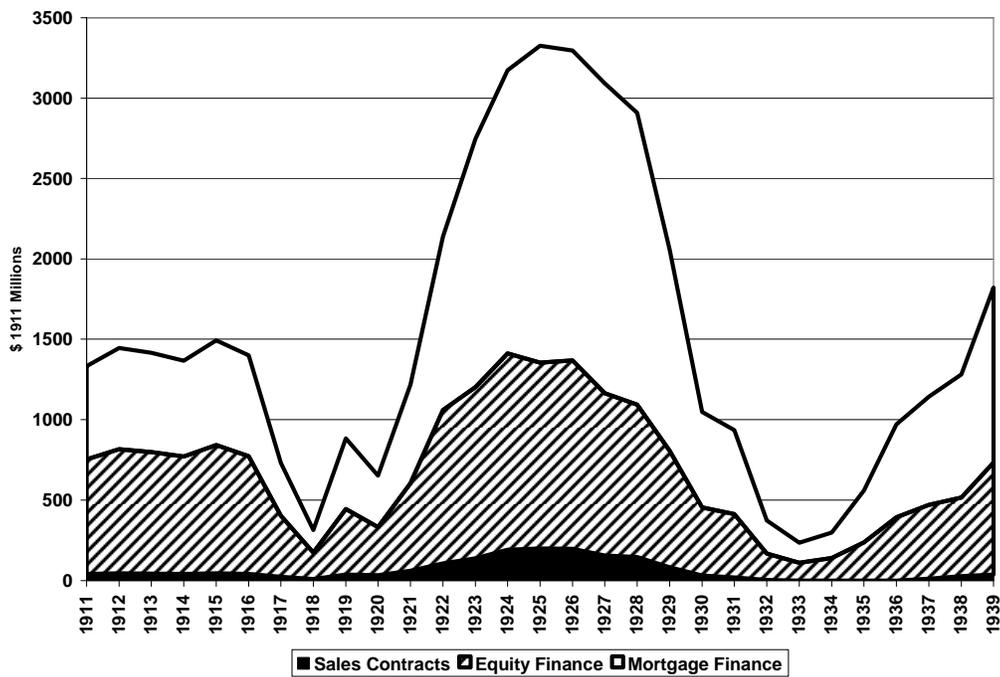
Source: Grebler, Blank and Winick (1956) Table M-1.The value are deflated by the consumer price index Historical Statistics Cc1.

Fortunately, the lending practices of these more aggressive institutions were surveyed. Figures 12, 13 and 14 are on a national sample of loans from insurance companies, commercial banks, and savings and loans reported in Morton (1956). They report average contract lengths, loan-to-value ratios and contract interest rates. The representativeness of this data is uncertain. In the mid-1920s the number of new loans sampled for commercial banks and savings and loans varied between 100 and 200 and were over 300 for insurance companies. However, these represented a small number of institutions; and perhaps more conservative ones that were willing to report to the survey. Given that caveat, this limited data shows very modest nationwide innovations---a surprising feature given the sharp rise in mortgage funding.

Before reviewing this data, it is important to note that the long-term fixed interest amortized mortgage that became a standard in the post-World War II era was uncommon before the Great Depression. The characteristics of the loans were remarkably heterogeneous. During the 1920s, amortized loans dominated only the portfolios of

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[1] Information on the sources of mortgage funding is found in <u>Historical Statistics</u> Dc903-928.

savings and loans associations, constituting 94.9% of the mortgages sampled in one study (Grebler, et.al. Table 66. p. 231). The contract lengths were almost all under 15 years, with a mean contract length of 11 years seen in Figure 12 and 68% of loans between 10 and 14 years (Morton, 1956, Table A-12).   The S&Ls also had the highest loan-to-value ratios as seen in Figure 13.   During the boom years, there is a slight shortening of the contract length and an increase in the loan-to-value ratio, which could be interpreted as an easing of the terms of credit, though at 60%, this implied a very high average equity at closing of nearly 40%.   The average contract rate of interest for S&Ls was stable and then declined slightly, again a very mild indication of easier credit terms.

Figure 12
Average Contract Length
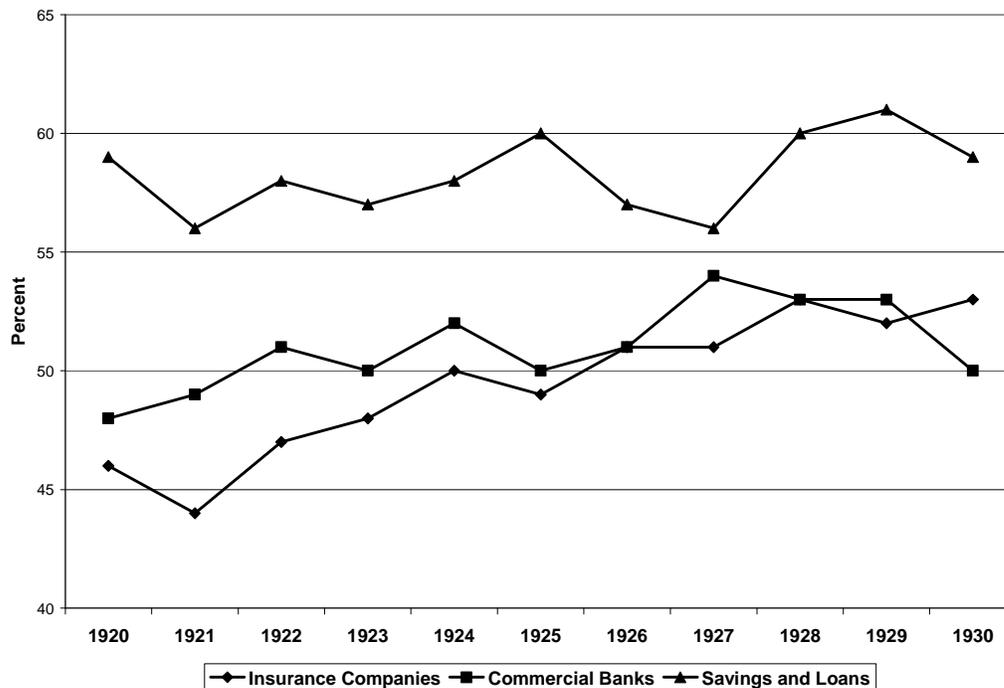**Nonfarm Home Mortgages, 1920-1939**
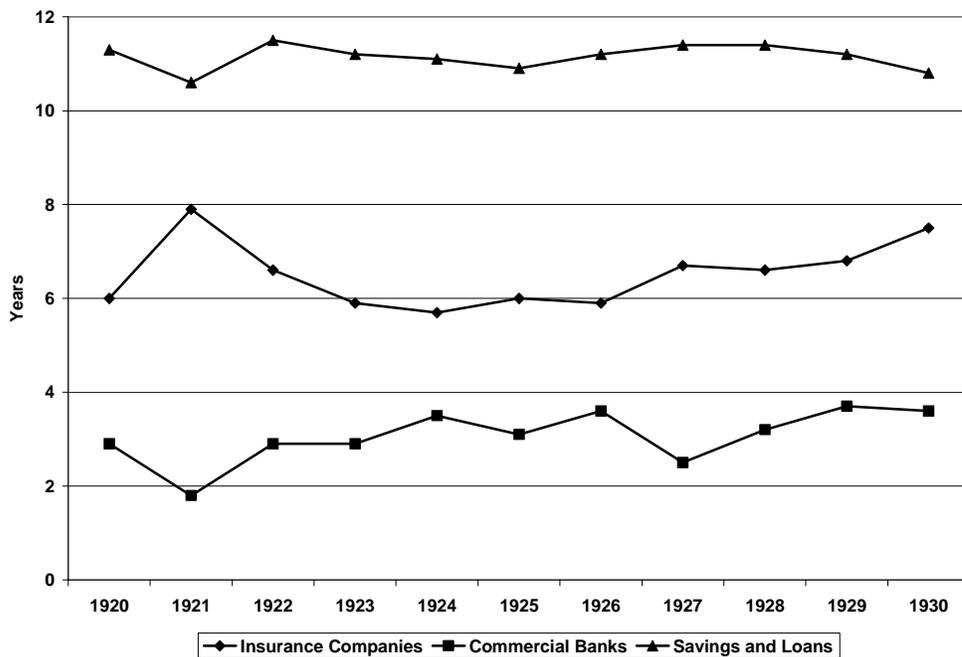
Source: <u>Historical Statistics</u>. Table Dc1198-1200.

Amortization of loans was less common for commercial banks and insurance companies. For commercial banks, nonamortized loans actually increased from 41% to 51% between 1920-1924 and 1925-1929 with the share of fully amortized dropping from 14.9% to 10.3%   As seen in Figure 12, the contract length for mortgages from commercial banks hovered around 3 years and 68% were between zero and four years (Morton, 1956, Table A-12), and loan to value ratios averaged just above 50% in Figure 13. The contract rate interest rate in Figure 14 of interest also registered a very mild decline on average. Thus, the most common loans at commercial banks were "balloon" mortgages, non-amortized loans of short duration. These loans were increasing, although with such high loan-to-value ratio, the risks from a decline in housing prices would appear to be small. What is unknown is the number of second or third mortgages that could ratchet up the risk.

Like their competitors, the insurance companies slightly lowered their contract rates of interest. They offered a more varied mix of loans that either S&Ls or commercial banks. Insurance companies gave 19.7% nonamortized loans in the first half of the decade and 24.1% in the second half. However, less than 20% of all mortgages were fully amortized, with most only partially amortized (Grebler, 1956, Table 66, p. 231). Contract length for loans from insurance companies were averaged 6 years but had greater variance than other institutions with 20% lasting 0 to 4 years, 51% 5 to 9 years, and 26% 10 to 14 years.

The overall picture is that average terms of mortgage contracts were eased somewhat. Whether this easier credit substantially increased the number of risky borrowers is unclear. Loan-to-value ratios on these new loans remained high by modern standards and seem to have provided an ample cushion from any drop in housing prices.

Figure 13
Average Loan-to-Value Ratio
Nonfarm Home Mortgages, 1920-1939

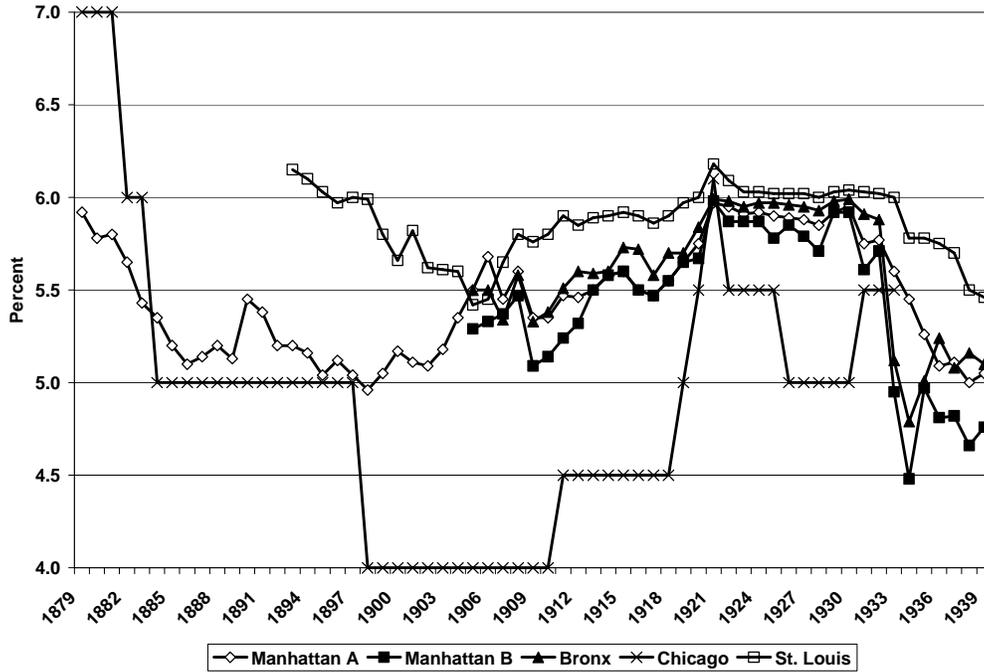Source: Historical Statistics. Table Dc1198-1200.

Figure 14
Average Contract Interest Rate
Nonfarm Home Mortgages, 1920-1939
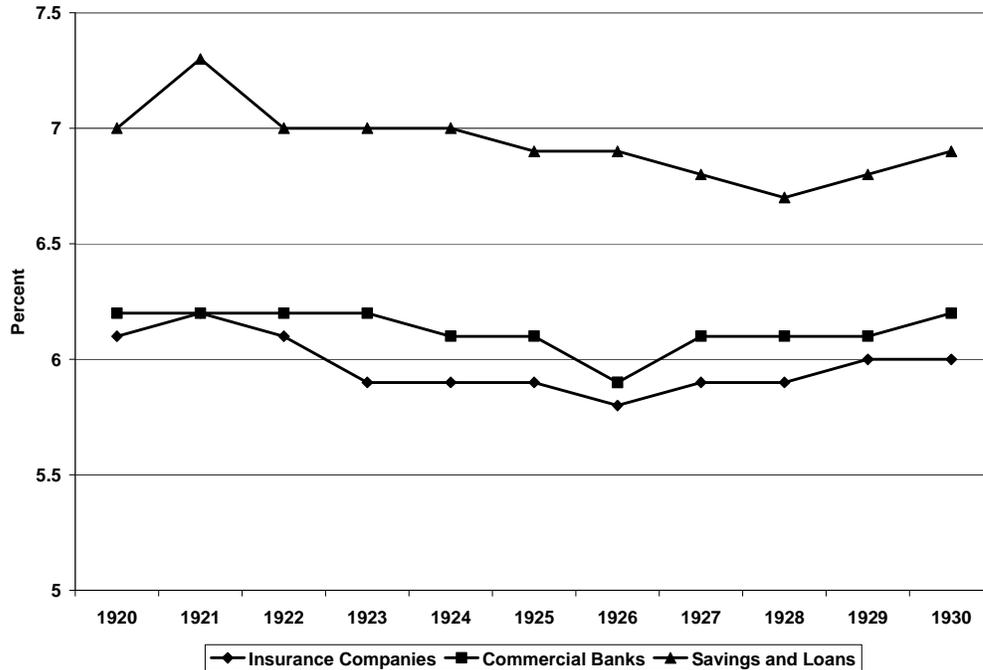
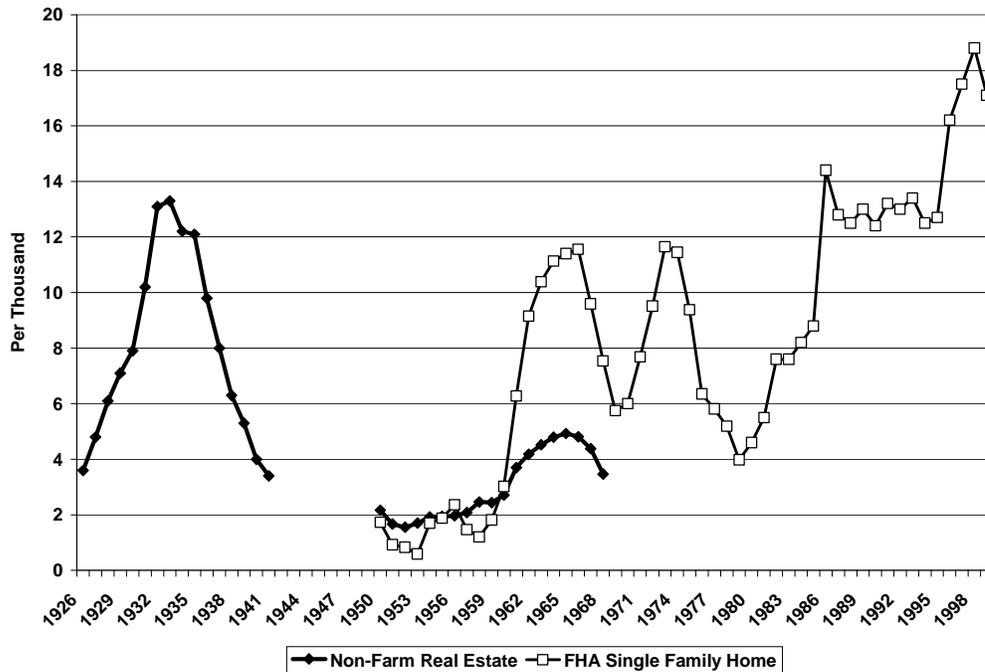Source: <u>Historical Statistics</u>. Table Dc1195-1197.

      While there is very little regional data on contract length and loan-to-value ratios, there is more information on interest rates. Most observers noted that interest rates for mortgage were relatively "sticky" moving very little over long periods of time, in comparison to other long term interest rates, such as bond yields (Grebler, 1956, Chapter XV). Grebling, Blank and Winick (1956) provide some data on interest rates by cities shown in Figure 15. The first series for Manhattan was taken from the <u>Real Estate Analyst.</u> The author composed the second series from the <u>Real Estate Record and Guide</u>, where the interest rates are weighted by the dollar value of all reported loans for March, July and November. Similar data was available for the Bronx, which they considered to be almost entirely residential real estate and hence a better reflection of that market. The Chicago series, they took from the graphs in Homer Hoyt's <u>One Hundred Years of Land Values in Chicago</u>, which they regarded as a crude approximation for property in the central business district. Lastly, the authors compiled the St. Louis series from the <u>Real Estate Analyst </u>and the<u> St. Louis Daily Record</u>, which they believed is primarily for one to four family home mortgages. Excluding the questionable series from Hoyt, three facts emerge from this graph.   First, St. Louis rates are higher, perhaps reflecting high regional premiums. Secondly and most importantly, rates were relatively more volatile in the years before the founding of the Fed, a fact which is consistent with the behavior of short-term rates as discussed below. The 1920s appear to be remarkably stable with very little movement in Manhattan, the Bronx or St. Louis. Third, the mild decline in rates shown in the national sample contract data in Figure 14 is also present for the city level data in Figure 15.

Figure 15
Mortgage Rates by City, 1879-1939

Source: Grebler, Blank and Winick (1956) Table O-1.

Figure 16
Real Estate Foreclosures

Source: Historical Statistics. Table Dc1555 and 1557

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The effects of the collapse of the housing market on homeowners should show up in the foreclosure data. But again, unfortunately, there appear to be no national foreclosure statistics before 1926. Figure 16 reports the number of foreclosures per thousand of residential homes. After the market dropped, foreclosures steadily rose, a clear signal of a distressed market. While this cannot be compared to the crucial years before 1926, foreclosures can be compared to later periods. They appear to be as severe as any peak up until the current crisis, however this may not be a fair comparison. FHA insurance may have induced households which were greater risks to take on mortgages.

The Extreme: Florida

In Florida we have climate with a capital C. Elsewhere they have weather. If the historians did not insist otherwise, I would feel inclined to believe the Garden of Eden might have been somewhere in this land of flowers. I was born in Michigan and developed enough sense to move to Florida……Florida's future is before her. She is a sleeping giant just beginning to stir. Her population will double in five years and will treble in ten years.

Florida realtor W.E. Bolles (1922)

Among the many cockeyed optimists promoting Florida in the early 1920s, Bolles was not far off the mark. Florida's population did not double or treble but it did grow from 968,740 in 1920 to 1,468,211 in 1930. His forecast of Florida's prosperity and the long-term demand for property was certainly on the mark. Before 1920, Florida's share of the U.S. total population was under one percent. Since then, it has grown steady so that by 2007, it contained over 6% of the total. The result is that Florida has become an increasingly densely populated state. As Figure 17 reveals, population density in the U.S. has only crept up in the last century relative to rapid change in Florida.

Already in the late nineteenth century, the attractions of Florida's winter climate were known and the wealthy began to build winter homes; but much of the state remained inaccessible, lacking roadways and railroads. One key figure in the early opening of Florida to development was Henry Flagler, a former official in the Standard Oil Company who recognized the need for coordinated investment and was instrumental in beginning Palm Beach (Vickers, 1994; Frazier and Guthrie, 1996). His approach, which might be termed the "Flagler System," was later mimicked by subsequent developers. He set up the Florida East Coast Railway, which linked Jacksonville with West Palm Beach (1884), Miami (1896) and Key West (1912). The railway brought tourists to hotels operated by his Florida East Coast Hotel Company, while his Model Land Company sold them property. Additional transportation was provided by a steamship line, his utility companies provided power and newspapers promoted his ventures. Yet, vast regions of the state remained just underwater; and in 1905 the state created the Everglades Drainage District to build drainage canals. Slowly opportunities beyond citrus and phosphate mining opened for southern Florida.

**Figure 17**
Population Density: U.S. and Florida, 1880-2007
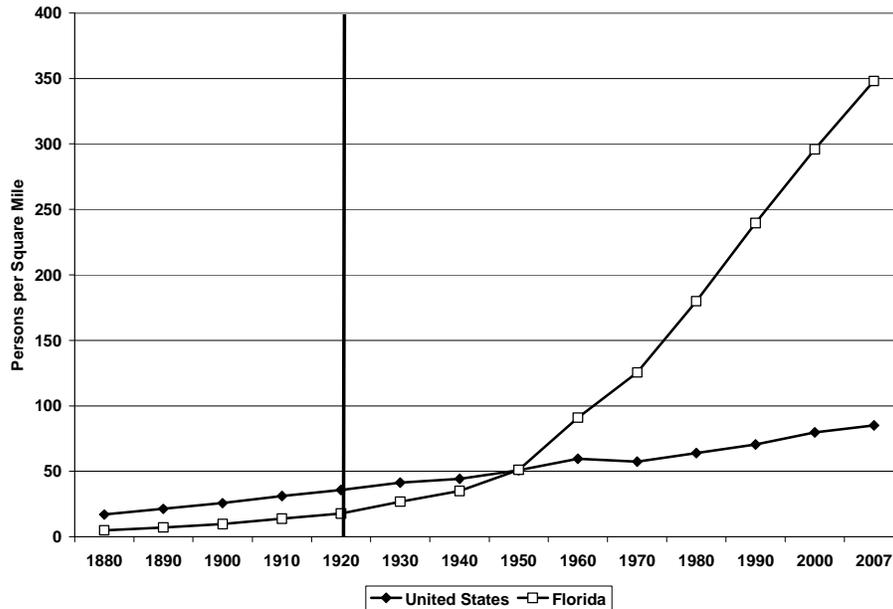
Source: Historical Statistics and U.S. Censes

These developments brought to a halt during World War I and the recession that followed. While the draining of the Everglades began anew in the 1920s, the advent of the automobile helped to change the fundamentals, giving greater access to the middle class. Just as the automobile allowed for suburban expansion and the real estate boom in the North and Midwest, so too did it allow the increasingly mobile population to see new vacation spots. The road network had begun to expand just on the eve of the First World War, led in part by private efforts. Carl Fisher, a millionaire headlight manufacturer who established the first automobile dealership in the U.S. and organized the Indianapolis Motor Speedway, was instrumental in building the highway system. In 1913, he conceived of the first East-West U.S. highway---the "Lincoln Highway." The next year he promoted the formation of the "Dixie Highway," linking existing roads from Indianapolis to Florida and in 1916 he led the first "caravan" to Miami. After the war, the Federal Highway Act was passed in 1921. It promoted the harmonization of state road systems, and designated U.S. Highway 1 to run from Maine to Key West, which absorbed part of the Dixie Highway. The state of Florida contributed by passing a gasoline tax in 1923 that set aside two-thirds of the revenue for the State Road Department, thereby providing the means to expand the state road system. Combined with the growth of the railroads, which were still the major means of passenger transportation and vital to the movement of goods, these underlying fundamentals improved the prospects for real estate.

Miami was the center of the boom. In 1920, it had not been ranked among the top 100 cities in new construction; but in 1925 it clenched the ninth position with $60 million. The abrupt boom and crash in Miami and the lesser one in Tampa, measured in terms of building permits is shown in Figure 18. These fluctuations are more extreme but they are what underlie the national trends. Florida was, indeed a special case, but in spite

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of the impression given in the literature, the $60 million peak in new construction for this state cannot alone drive the national peak of $5 billion.

Figure 18
Value of Building Permits, 1919-1938
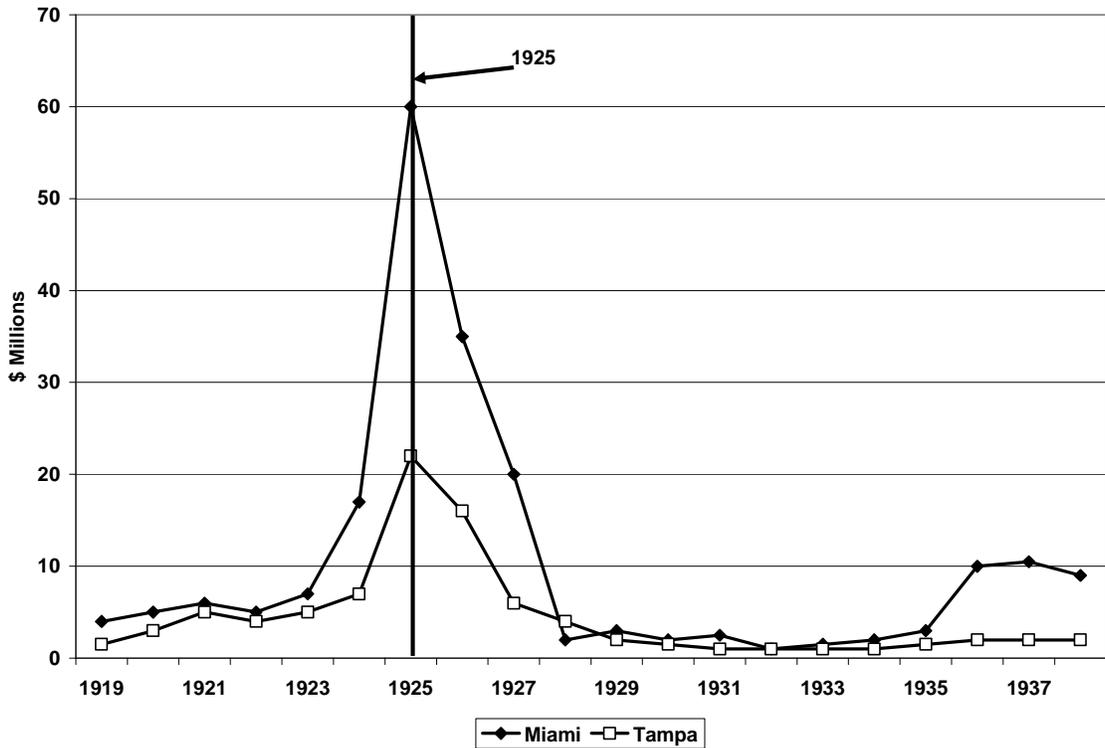
Source: Frazer and Guthrie, p. 37.

One of the most humiliating charges of critics was that the foolish public in the 1920s bought "water lots," literally property under water. However, the purchase of "water lots" was rational. The large sums required to make the initial investment to drain huge areas could only be obtained if the public were convinced that they would be viable. Thus, entrepreneurs in the twenties followed the Flagler system of coordinated development to ensure that all the pieces were in place and the public would be willing to invest. Developers such as Carl Fisher in Miami Beach, George Merrick in Coral Gables, and Addison Mizner in Boca Raton set up ventures that combined drainage, transportation, land companies, hotels, finance and marketing through interlocking companies(Vickers, 1994; Frazier and Guthrie, 1996). Fisher started by filling in the mangrove swamps of Miami Beach by dredging sand from Biscayne Bay. Will Rogers commented: "Fisher was the first man to discover that there was sand under the water…that could hold up a real estate sign. He made the dredge the national emblem of Florida."

Merrick started as a county commissioner who pushed to have a highway connected to Coral Gables. His land company the Coral Gales Corporation obtained 10,000 acres of pine and citrus and began to build a Mediterranean "city beautiful" of wide boulevards and golf courses. In 1925, he contracted with the American Building

Corporation to build 1,000 new homes and established the University of Miami. Already in 1923, he had a nationwide network of 35 real estate offices to promote his venture. No marketing ploy for these entrepreneurs was too modest. Billboards in New York's Times Square boasted "It's June in Miami." In Miami Beach, Fisher promoted carnivals, casinos, speed boat races and bathing beauty contests. Not to be outdone, Merrick hired William Jennings Bryan at $100,000 a year, half in cash and half in real estate, to sell Coral Gables. By then Bryan was a fixed of Miami's winter season with his Tourist Bible Class, and he became an enthusiastic civic booster. He hailed Florida as having "what people must have…God's sunshine," although he also declared that Miami "was the only city in the world where you can tell a lie at breakfast that will come true by evening."

While many of these projects eventually prospered, there were many that failed. A key problem was asymmetric information and a lack of transparency that made it difficult for an investor to determine the true financial status of any of these enterprises. Even contemporary locals felt a vague queasiness as they succumbed to investing in the building boom. Slowly seduced by "the charm of the canals when planted with coconut or royal palms, with pink or scarlet hibiscus and the astounding royal Poinciana," Gertrude Shelby (1926) observed the sand-suckers dumping dredge onto submerged land until it rose "to the point where it might have optimistically been called dry." She noted that if you did not build your house too soon it would not crack and you could dock your boat at your landing and travel along the rivers or intercoastal waterway.

This surge in construction was fueled by innovative finance that skirted around legal and political obstacles. The case of Merrick's operation is instructive (Vickers, 1994). His Coral Gables Corporation was large financed by the system of 108 chain banks in Florida and Georgia that had been assembled Wesley D. Manley and James R. Anthony, Jr. Their collaboration brought together a skilled Atlanta banker and a shrewd Florida political operator that enabled the chain to overcome resistance to penetration of the market from established Florida bankers. No new national charters had been approved in Florida by the Office of the Comptroller of the Currency between 1907 and 1921. But, this changed when Anthony persuaded Florida Senator Fletcher to intervene with the Comptroller on their behalf. A Congressman and partner of another developer, Addison Mizner, pressured the Comptroller to permit their tied bank to issue more stock. It was effective and as approval was given before receipt of the application. At the state level, Anthony developed close ties to Florida Comptroller Ernest Amos who offered charters, easy supervision and later control of receiverships in exchange for campaign funds and unsecured bank loans employed in real estate speculation. Insider lending was substantial and often exceeded legal limits. For example, Anthony took out loans from his new Palm Beach Bank and Trust Company equal to 45% of the bank's capital. State examiners winked at these activities, national bank examiners' objections were overruled by their superiors and the public was kept in the dark.

Figure 19
National and State Bank Deposits and Loans
1919-1929
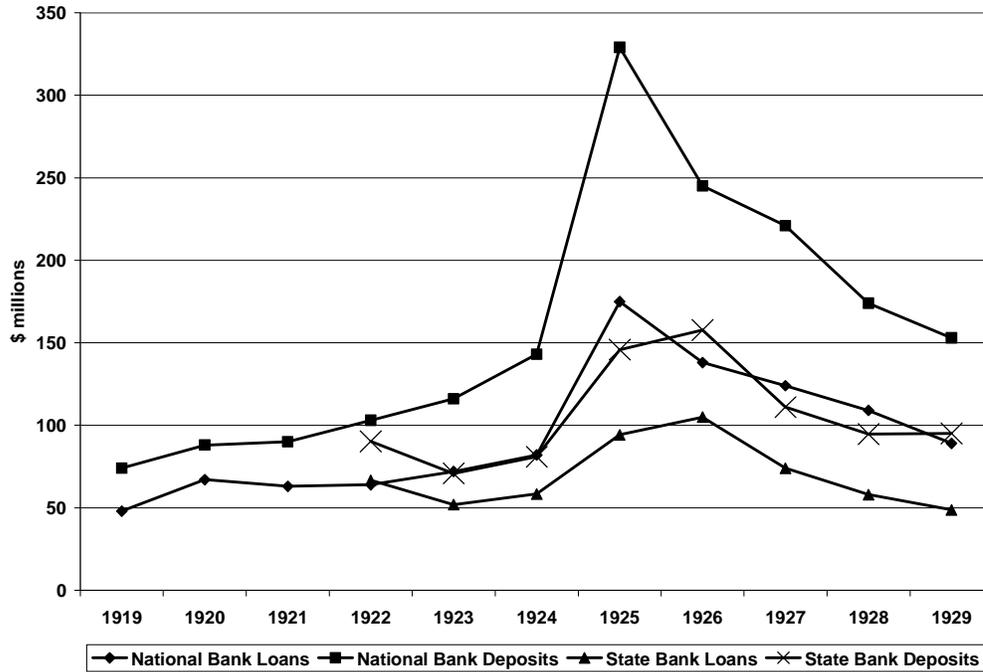
Source: U.S. Comptroller of the Currency, <u>Annual Reports</u> 1919-1929.

By 1925 Anthony and Manley operated a chain of 61 national and state banks in Florida with $120 million of deposits. The Anthony-Manley banking chain was not the only aggressive banks. Deposits were drawn from the Northeast and the Midwest, leading to a major expansion of the banking system, viewed in Figure 19, reaching its zenith in 1925. Although the U.S. banking system steadily expanded in the 1920s, its growth was eclipsed by Florida as seen in Figure 20, where the growth of loans is indexed to 1919. The rapid demand for loans in Florida in 1924 and the surge in supply in 1925 may help to explain the positive shock to interest rates in 1924 and the negative shock in 1925 that Landon-Lane and Rockoff (2007) detected generally in the South.

Figure 20
Relative Growth of U.S. and Florida Bank Loans
1919-1929
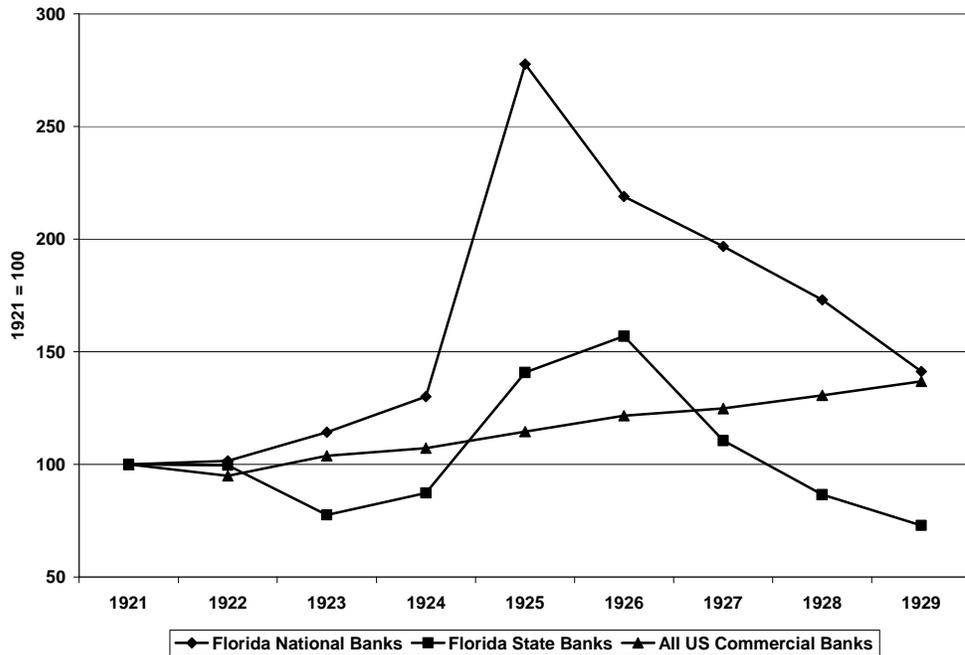
Source: U.S. Comptroller of the Currency, <u>Annual Reports</u> 1919-1929.

Contemporaries slowly became convinced that there was a bubble in the Florida land market. People bought and came down to Florida to build a house, but there was also speculative trading. Binders on the purchase of land were traded as options. This market was described by Walter C. Hill of the Retail Credit Company of Atlanta:

> Lots are bought from blue-prints. They look better that way…most of the lots were sold predevelopment……When a subdivision opens, it is often sold out the first day. Reservations were accepted but the buyer must pay 10% of the announced price of the lot….The reservations are numbered consecutively. As the reservations were called, the buyer steps up and gets a "binder" describing the lot and "sold" is stamped on the blue print. Within the next 30 days, the buyer is obliged to pay 25% of the purchase price…The balance was payable with one, two or three year notes (quoted in Vanderblue, 1927, pp. 282-283).

It was reported that many buyers expected to sell their binders for a profit. Almost all lots were immediately for resale and many were listed at real estate offices. Transfer of title did not hinder this market and lagged far behind any transaction. A local historian (George, 1986) explained that "Binder boys worked right on the street holding the receipt books and the pencil in hand, calling off the acreage and amount of 'binder' required, obtaining deposits from people, who bought lots without having any idea how far in the woods of Florida they might be." Apparently, everyone joined in and John Jackson Bennett, a longtime Miami resident recalled that "everything went kind of crazy…I'd

leave home in the morning and tell my wife, 'How much money do you want me to bring home'…I'd come up town, and it wasn't so long for I'd have a deposit on a piece of property. Maybe a few hundred dollars. In forty-eight hours you'd sell it and make several thousand dollars." (George, 1986)

There was also some outride fraud. No less a celebrity than Charles Ponzi raised money from investor by issuing notes that promised a 200% return in 33 months. His Charpon Land Syndicate bought land at $0 an acre. He divided each acre into 23 lots offered at $10 each to the public. Certificate holders would get $30 for each $10 certificate or 3 $10 lots. The only problem was that this new development of unimproved palmetto and scrub oak was "near," 65 miles west of, Jacksonville (Vanderblue, 1927, pp. 260).

Figure 21
Ratio of Bank Debits to Bank Deposits
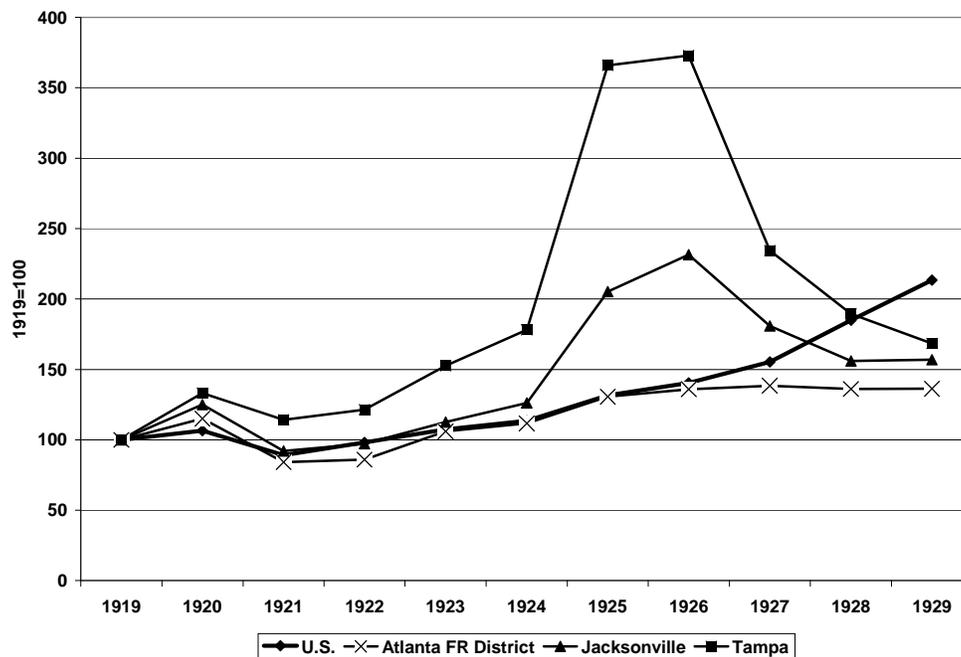
Did transactions in real estate really jump as these sources allege? Real estate transfers boomed. Vanderblue (1927) retrieved a record of real estate transfers for several cities. In Miami, transfers peaked at 16,969 in October 1925, when they had stood at only 5052 in October 1924 and 2383 in October 1923, descending to 5824 a year later. A similar pattern emerges for Orlando with a peak in October 1924 of 4062 transfer compared to 1165 and 1067 in the two previous years. Jacksonville was not immune, peaking in October 1925 at 4110, compared to 1661 and 1428 in the two prior years. By October 1926 Orland and Jacksonville only recorded 1925 and 2268 transfers. While these are big surges, they do not include the activity in binders. Another view of the level of this rise in transaction is given by Figure 21, which presented the bank debits to bank deposits, indexed to 1919. The data is based on clearing house data and unfortunately there was no clearing house for Miami, which was the hottest market but the jump in relative turnover for Jacksonville and Tampa suggest considerable statewide

speculative activity in Florida that is absent in U.S. national data and even in the Atlanta district.

The abrupt collapse of the Florida land boom, so evident in these graphs, has not been well explained. If the public believed that the supply of land was somewhat constrained, they were gravely mistaken, as it was quiet elastic, given the ability of developers to drain vast new acreage. People might also have been captivated by what Shiller (2007) termed a "uniqueness bias." An investor placing his or her money in a development in Miami or Coral Gables or Boca Raton, might well have believed that this heralded opportunity was unique and there was little substitution between developments. One contemporary estimated that if all the acres sold in the Miami area were developed there would be lots for 2 million houses at a time when the population was probably a little over one million. The lead developer of Miami, Carl Fisher was certainly less than sanguine in the summer of 1925. Worried by the spiraling price of real estate, he began to investigate the creditworthiness of buyers and raised the minimum down payment to 20%, indicative of a fear that there would be a drop in prices.

Negative information began to appear and undermine the boom. The disaster began to unfold when passenger traffic peaked in September 1925 and the Winter Rush of vacationers fell far below expectations. To make matters worse, most construction materials had to be imported into the state. By the fall of 1925, Miami Harbor was jammed had docking delays of 10 days to 3 weeks. The East Coast Railway, the largest line, was overwhelmed by passengers and construction materials. In August it declared an embargo for freight except for fuel, livestock and perishable foods. The press in the North began to report unfavorably on the weather, transport, sanitation, high prices and disease. Although its direct impact is unclear, the Internal Revenue Service ruled that the entire amount of the purchase price for real estate had to be reported as income, not just the payment for a binder (George, 1986), a judgment that would have raised costs for speculators.

Northern states became hostile to the southward flow of money and people. In Ohio, the state government decided to protect its citizens from unscrupulous promoters and passed a law that prohibited firms from selling Florida real estate. Ohio banks published advertisements: "You are going to Florida to do what? To sell lots to the other fellow who is going to Florida to sell lots to you?" Perhaps nothing is worse that a concerted effort to reassure the public that nothing is wrong---and in October 1925 the Florida Governor and selected legislators did that in a "Truth About Florida" press conference at the Waldorf-Astoria Hotel in New York. It failed and prices and sales plummeted.

What is clear is that it was neither the turn in the business cycle or an act of nature. According to the NBER, the trough of the business cycle was July 1924, reaching its peak in October 1926---a full year after the peak in real estate transfers in Florida. Both Galbraith (1954) and Shiller (2005) attribute the pricking of the bubble to the major hurricane of September 1926 that caused 400 deaths and destroyed thousands of homes. But the timing is too late and the market was already in full retreat.

The collapse of the Florida real estate boom had immediate consequences for the state's financial system. There is evidence that holders of binders defaulted on their obligation to make payments to developers who, in turn, defaulted on their loans to banks. The closely intertwined and sometimes corrupt relationship between developers,

bankers, and regulators produced excessive forbearance. The Florida State Controller's 1926 reported concealed the deteriorating condition of the banks---notably the insolvent Palm Beach Bank and Trust Company. Favoring his cronies, the controller proposed to place it under the control of the borrowers' lawyers and reorganize it with depositors taking a haircut. At the federal level, the national bank examiner found the Palm Beach National Bank to be insolvent in February 1926 but his superiors extraordinarily prevented its closure. At the same time the Federal Reserve Bank of Atlanta, whose Governor, M.B. Wellborn was an intimate of Manley and Anthony, made a loan to this bank equal to 87% of its capital.

The dam of information broke on June 21, 1926 when an angry stockholder charged that the development company for Boca Raton was insolvent. This news triggered a run on an allied bank. When this bank was closed on June 28, runs flared at all the Manley-Anthony banks. In Georgia 83 banks failed in the next several days followed by a second wave of runs and failures in Florida. The extraordinary and regional interest rate shock to the South uncovered by Landon-Lane and Rockoff (2007) was no doubt a consequence of this disaster. The Florida market and economy was now in full retreat, with the rest of the U.S. real estate market following it in 1926. Florida is the only well documented case and it may be an extreme one, however it was not the whole story.

Fundamentals

The mid-decade boom in the American real estate market was not a pure bubble; as in all such episodes there were fundamentals and froth. I will focus on the three fundamental factors. First, the boom took place after a short but very serious decline in construction during World War I. The upswing might be attributable to a recovery of residential construction. Secondly, there may have been some new fundamental. The most common possibility mentioned is the spread of the automobile and the development of suburbs, leading to greater sprawl. Lastly, there may have been excessively easy monetary policy.

The enormous needs to finance World War I crowded out non-essential investment and consumption as resources were transferred to the government. Repressed demand helped to fuel the postwar boom in goods and inventories, but demand for housing had also been repressed, as real GDP continued to grow. To examine the possibility that the upsurge in home construction in the mid-1920s was only a catch-up, I have attempted to provide some simple forecasts in the absence of World War I. After first differencing to ensure the stationarity of the variables, I regressed housing starts and then the real value of construction on real GDP, population, and the Manhattan mortgage rate for the years 1889-1914.[2] The actual and predicted out-of-sample values are plotted in Figures 22 and 23. The results diminish substantially the appearance of a bubble in the aggregate data. Housing starts and the value of new construction would have followed slow paced growth without the war and increased later as real incomes grew faster. While predicted housing starts and construction are below their actual levels in the 1920s, the predicted wartime levels are higher. If we consider the deficit in housing starts during the war, defined as 1917-1920, there were 1,049,000 starts that never materialized. In

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[2] The series from Historical Statistics are Dc510, Dc522 and Grebler, et. al. Table O-1.

contrast there were 1,306,000 starts in excess of the predicted during the early twenties. The difference, 256,000, might be considered as a measure of the "bubble." While this might seem small, it is two-thirds of the annual average starts for 1900-1917.

Figure 21
Actual and Forecast Residential Housing Starts
1889-1939
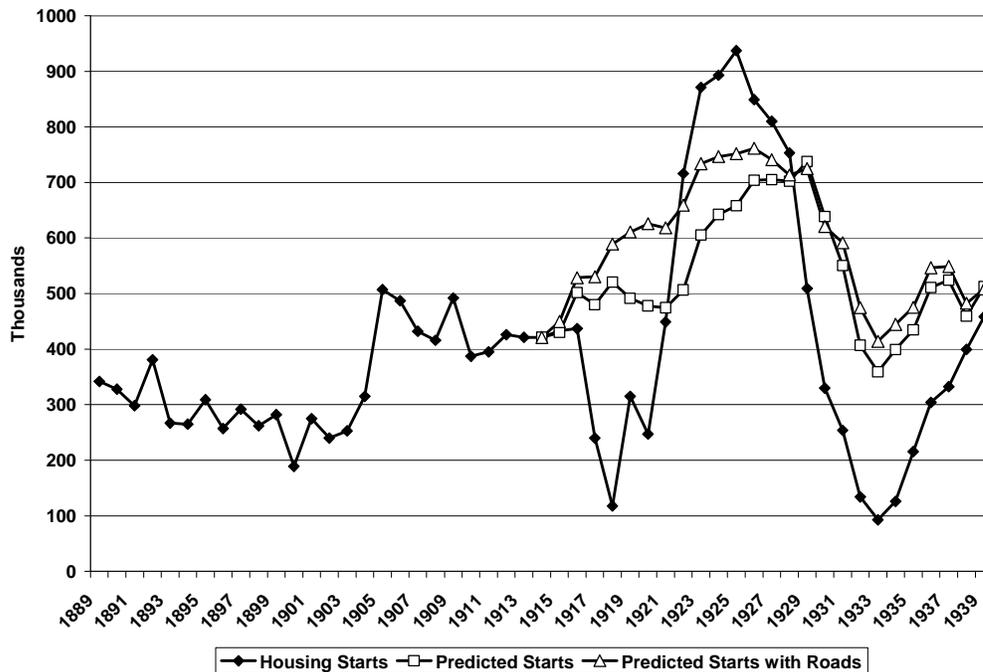
Source: Historical Statistics Table Dc510 and the text.

Unfortunately, there are no very good measures of suburban expansion. In order to approximate the effects of the automobile and suburbanization in the 1920s, I used the miles of streets and roads under control of the states to the regressions.[3] However, this series only begins in 1904. Given the paucity of observations before 1914, it was not possible to obtain meaningful results, so the estimated coefficients for a full sample of 1904-1939 were used to obtain the predicted housing starts and the value of new construction for 1915 to 1939. These appear to diminish further and eliminate the bubble as the upward movements in the series would seem to represent catch-up. But, the coefficient on the variable for roads in both estimations is insignificant and these are in-sample forecasts. There is also some reason to doubt contemporaries' belief that the auto and suburbanization were responsible for the housing boom. In the absence of the automobile, there could just as easily have been a housing boom in the central cities substituting for suburban growth and overcoming the wartime deficit.

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[3] The series is from Historical Statistics Table Df184.

Figure 22
Actual and Predicted Value of Real New Residential Construction
1889-1939
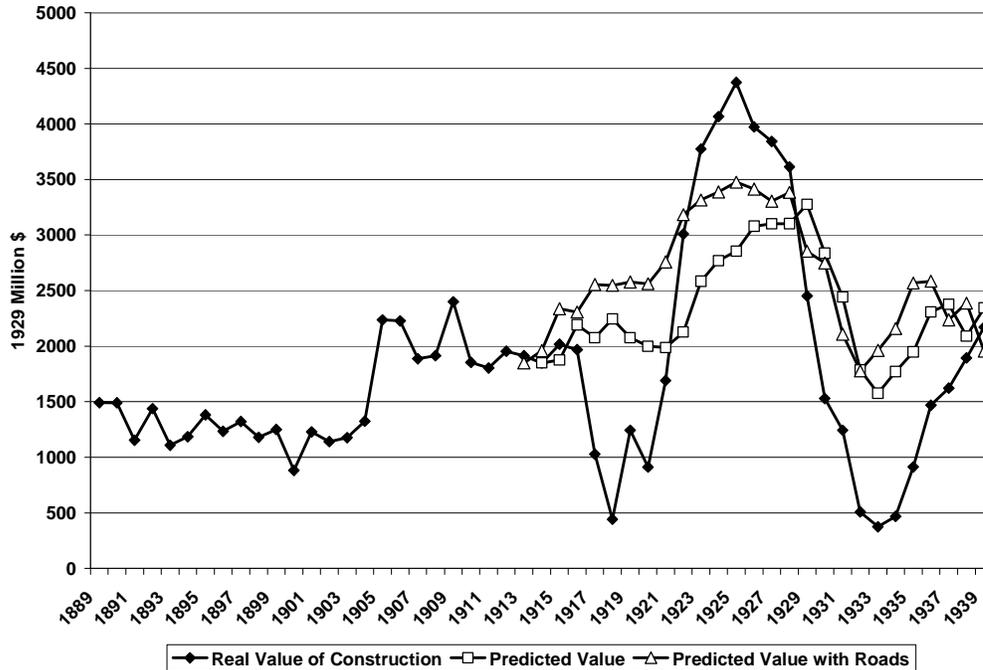
Source: Historical Statistics Table Dc522 and the text.

Fundamentals in terms of a catch-up in construction and perhaps suburbanization can account for a fair fraction but not increase. Macroeconomic policies may have been the another contributing variable. It is commonly argued that bubbles require some macroeconomic pre-conditions. I consider two possibilities: (1) there is a promise by the central bank to prevent a financial crisis, and (2) interest rates are abnormally low.

The promise that the central bank will prevent a financial crisis is often called the "Greenspan put." This phrase was coined after the 1998 collapse of Long-Term Capital Management when it was believed that the then chairman of the Federal Reserve Board, Alan Greenspan would lower interest rates whenever necessary to preserve stability capital markets forgoing price stability. Because this appeared to guarantee an "orderly" exit of sellers, he was criticized because such a policy would encourage excessive risk taking. In addition to observers and wags, some academics (see Miller, Weller and Zhang, 2002) argue that this policy was at least partially responsible for the subsequent dot.com boom. While this view of recent Fed policy is dismissed by many who believe that it confuses the co-movement of economic fundamentals with the market, there is general agreement that the establishment of the Fed substantially reduced the threat of crises and panics. What has not been considered is the effect that this fundamental change may have had on the housing and stock market booms 1920s.

The establishment of the Federal Reserve System marked a sharp change in the stochastic behavior of interest rates. As is well known, the Fed was founded in response to the Panic of 1907 and charted in the Federal Reserve Act of 1913 to "furnish an elastic currency." Consequently, the Fed considered it a key obligation to eliminate the seasonal

strain in financial markets, as the first <u>Annual Report</u> (1914, p. 17) emphasized "its duty is not to await emergencies but by anticipation, to do what it can to prevent them." After opening in 1914, Miron (1986) documented that the Federal Reserve promptly carried out policies that reduced the seasonality of interest rates. Because panics occurred in periods when seasonal increases in loan demand and decreases in deposit demand strained the financial system, accommodating credit to seasonal shocks reduced the potential of a crisis. Comparing 1890-1908 and 1919-1928, Miron found the standard deviation of the seasonal for call loans fell from 130 to 46 basis points, with the amplitude dropping from 600 to 230 basis points.   The remarkable change in interest rate movements is seen in Figure 24 for both commercial paper and brokers' term loans.[4] The reduction of seasonality in interest rates lowered the stress on the financial system, leading Miron to conclude that it had eliminated banking panics during the period 1915-1929. Mostly striking, was the absence of a panic during the severe recession of 1920-1921.

Figure 24
Nominal Short-Term Interest Rates, 1890-1933
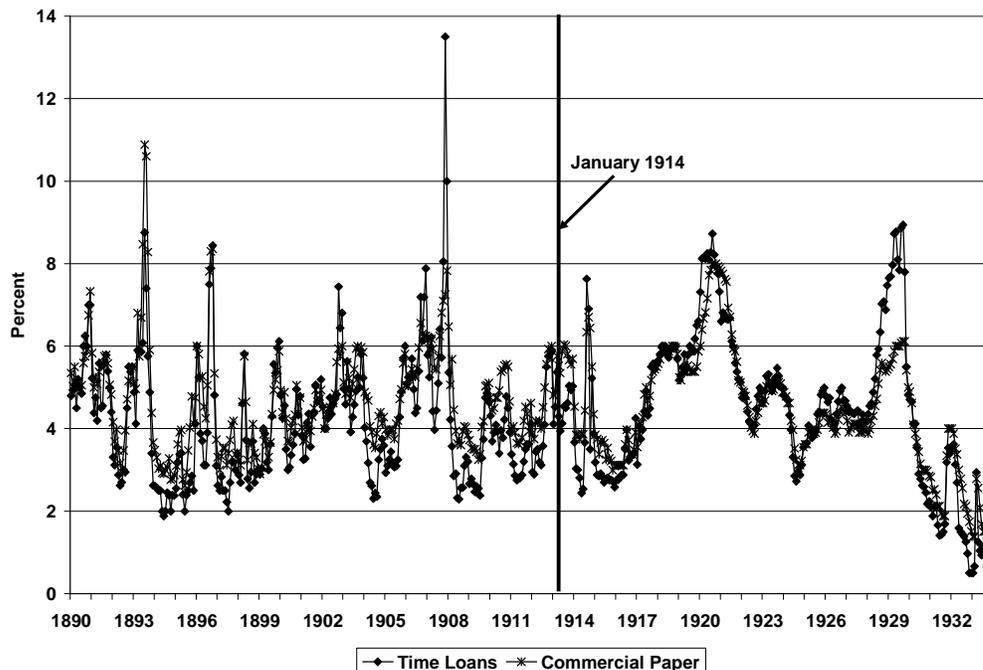
Source: NBER, Macro History Database, <u>www.nber.org</u>. The Time Loan rate is the interest on 90 day brokers (stock exchange) loans in New York City (Series m13003) and the Commercial Paper rate (Series m13002) is the interest on prime double name 60 to 90 day commercial paper until 1923 and 4 to 6 month paper thereafter.

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[4]During World War I, the Fed ceded control of the level of interest rates to the Treasury, which wanted to ensure that it could float bonds at low nominal rates. Nevertheless, the Fed first began to dampen seasonals in 1915 I by rediscounting bills backed by agricultural commodities at preferential rates, continuing this program until 1918. Gaining control over its discount rate in 1919, the Fed acted more directly. A measure of the Fed's intervention was its credit outstanding. Over the period 1922-1928, Miron (1986) calculated that there was an increase in the level of reserve credit outstanding over the seasonal cycle of 32% or approximately $400 per year at a time when the total New York City banks' loans was $6 billion.

Both the timing in the decline of seasonality and the role of the Fed have been challenged, but Miron's basic results have been upheld.[5] However the subsequent literature has focused on a comparison of 1890-1910 with 1920-1933. By combining the 1920s with the Great Depression, the nature of the environment during the twenties has been obscured. Separating the years 1922-1928 that Friedman and Schwartz (1963) termed the "High Tide" of the new Fed reveals that not only were seasonals in nominal interest rates lowered but that there was also a return to long-term price stability under the revived Gold Standard.

For the period 1890-1910, Barsky, Mankiw, Miron and Weil (1988) find evidence in the autocorrelations for inflation, measured from the monthly wholesale index, for inflation being a white noise process. Regressions on lagged inflation and seasonal dummies show little inflation persistence and seasonality. After the establishment of the Fed, inflation for 1920-1933, their autocorrelations and regressions show strong persistence. Yet, if one excludes World War I and the postwar adjustment and the Great Depression, which represented different regimes, the years 1922-1929 in Table 1 look remarkably similar to 1890-1910. The autocorrelation die out quickly and seasonals are weak, looking like there was a return to a stationary process for inflation---which would have corresponded to contemporaries idea of a return to normalcy.

Table 1
Autocorrelations of the One Month Inflation Rate.

lag	1890-1910	1890-1914	1915-1921	1922-1929	1920-1933
1	0.18	0.19	0.19	0.21	0.63
2	0.03	0.01	0.18	0.09	0.54
3	0.03	0.03	0.13	-0.03	0.42
4	-0.01	-0.02	0.12	-0.02	0.33
5	-0.02	-0.01	0.10	0.03	0.17
6	-0.02	0.00	0.05	-0.02	0.08
7	-0.04	-0.03	0.05	-0.01	-0.01
8	0.05	0.06	0.05	-0.08	-0.08
9	0.02	0.01	-0.03	-0.05	-0.11
10	-0.03	-0.04	-0.04	0.16	-0.10
11	-0.02	-0.02	-0.06	0.21	-0.06
12	-0.10	-0.09	-0.06	-0.08	-0.10

Barsky, Mankiw, Miron, and Weil (1988) also regressed ex post real rates on seasonal dummies, which provide consistent estimates the seasonal in the ex ante real rates, though unanticipated inflation adds noise. For the pre-Fed period, they find a significant real rate seasonal at the 10% level. Yet, while a similar regression for the years 1920-1933 shows no significant seasonals, tests of a break cannot be rejected. However, they miss the Fed's achievement by combining part of the post-World War I deflation and the deflationary policy during the Great Depression. Like the nominal time rate, the real time rate is mean reverting for 1922-1929 as it was for 1890-1910 with

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[5] See Clark (1986), Mankiw, Miron, Weil (1987), Barsky, Mankiw, Miron and Weil (1988), Fisher and Wohar (1990), Kool (1995), and Carporale and McKiernan(1998).

autocorrelations dying out quickly and first differences showing significant negative autocorrelation. Regressing the real time rate on its lagged values and seasonal dummies reveals pronounced seasonality for 1890-1910, which is reduced for 1922-1929.

The bottom line of this literature is that the stochastic behavior of American nominal short-term interest rates changed radically after 1914. The 1920s saw a return to long-term price stability but with a reduction in seasonality and the risk of a panic. The substantial reduction in the variance of interest rates would have been an incentive to increased investment.

The second question about Federal Reserve policy is whether it was too lax in the years leading up to the boom. Many observers of the contemporary double stock market-housing market booms have contended that the low interest rate regime of the late 1990s was a necessary condition for the explosive growth of asset prices. To measure whether monetary policy was easy or tight, I use the literature on Taylor rules. Although Taylor rules have been applied to many different environments, Taylor's original formulation (1993) had the federal funds rate adjusted in a fixed response to changes in inflation and the gap in real GDP, which fairly accurately described the recent policy actions of the Federal Reserve.[6] The functional form he employed was linear in the interest rate and the logarithms of the price level and real output. Using the inflation rate and the deviation of real output from a stochastic trend, rendered the two variables stationary. The result was a linear equation:

(1) $r = r^* + \pi + h(\pi - \pi^*) + gy$

where r is the short-term policy interest rate, r^* is the equilibrium rate of interest, π is the inflation rate and π^* is the target inflation rate, and y is the percentage deviation of real output from trend. The policy response coefficients to inflation and the output gap are (1+h) and g, with the intercept term being $r^* - h\pi^*$. If h is greater than zero, then the policy rate will rise, not decline, in response to an increase in inflation.

In Taylor's original formulation (1993) g = 0.5, h = 0.5, $r^* = 2$ and $\pi^* = 2$. Equation 1 then became:

(2) $r = 2 + \pi + 0.5(\pi - 2) + 0.5y$

Taylor (1999) examined policy rules for the period when the U.S. was on the classical gold standard (1880-1914) and the post-World War II period (1955-1997). Under the classical gold standard in the U.S. when there was no central bank, there should still be a relationship between short-term interest rates, such as r, and inflation. If there were a shock causing inflation in the U.S., the price-specie-flow mechanism would produce a balance-of-payments deficit and consequent losses of gold, decline in the money stock and rise in interest rates. Similarly, increases in real output would increase the demand for funds and yield a rise in interest rates. If there is a central bank in a country on the gold standard and it plays by the "rules of the game," it should reinforce

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[6] More generally, Taylor (1999) viewed his work as focusing on the short-term interest rate side of monetary policy, rather than the money stock side. Instead of the quantity equation that had informed Friedman and Schwartz's (1963) analysis of American monetary history, Taylor formulated his monetary policy rule that was derived from the quantity equation.

the operation of the adjustment mechanism and the response coefficients should be larger. Given that after World War I, the Fed sought to formulate a consistent policy, "leaning against the wind," this is what one would expect to observe in the United States. However, Taylor dismisses the Fed's efforts to find an effective rule in the interwar period because of its disastrous performance during the Great Depression, Yet, upon closer inspection, the 1920s reveals a better informed policy, and Orphanides (2003) offers a more positive assessment Taylor rule analysis of the 1920s even though his only provides a narrative appraisal.

In a simple OLS estimate of his equation for the gold standard era, Taylor (1999) found low positive coefficients for inflation and the output gap, with only the coefficient on the output gap being significant.[7]   These results contrasted the period 1960-1974, when the coefficients became significant with values of 0.813 and 0.252, and the period for 1987-1997, when they had values of 1.533 and 0.765, signifying that policy responded sufficiently to control inflation. To depict Fed policy in the 1920s, I have estimated a Taylor equation for the late nineteenth and early twentieth centuries.

Table 2 reports the estimates for Taylor equation, equation 1, on quarterly data for the last years of the classical gold standard 1890-1914 and for the interwar gold standard, 1922-1929. The war years and the postwar boom and bust of 1915-1921 are omitted because the Fed was not free to operate as an independent central bank but instead served the interests of the Treasury. For 1890-1914, the interest rate is the time rate for brokers' loans, rather than the commercial paper rate used by Taylor. The market for brokers' loans was larger than for commercial paper and more closely approximates the market for federal funds as banks often parked excess funds in this market. Using the commercial paper rate or the call rate on brokers' loans did not substantially alter the results. The GNP data were obtained from Balke and Gordon (1986), and the output gap as the percentage deviation of real output from the trend as extracted by a Hodrick-Prescott filter.[8] The inflation rate is derived from Balke and Gordon's GNP deflator. The first three rows report the results for the Taylor equation under the classical gold standard, where the instrumental variables are the second lags on inflation, the output gap and the time rate. These regressions produce fairly consistent results, recalling that with the lagged dependent variable the estimated coefficients are $(1 – \rho)\beta$. Once adjusted for this factor, the coefficients on inflation and the output gap are in the vicinity of 0.10, and thus far smaller than the coefficients for the last twenty years of the 20th century when the coefficient on inflation is well over one and on the output gap, somewhat under one, implying the Fed was pursuing a stable policy.

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[7] Taylor (1999) estimated equation 1 using ordinary least squares with the commercial paper rate for the years 1879-1914 with inflation measured as the average inflation rate over four quarters and. He did not correct for serial correlation, allowing for the possibility that monetary policy mistakes were serially correlated. He pointed out that serial correlation was high under the gold standard and hence the equations fit poorly and his t-statistics are not useful for hypothesis testing.

[8] The Hodrick-Prescott filter is used to estimate the trend from 1890.1 to 1930.2. Covering a longer period causes a sharp decline in the trend in 1929 because of the persistence of the Great Depression, creating a huge and unrealistic output gap for 1929.

Table 2
Taylor Equation Estimates

		Constant	Inflation	Output Gap	Lagged Dependent Variable	Lagged Excess Interest Seasonal	Adjusted R2
Time Rate OLS	1890.1-1914.4	4.160** (0.144)	0.110** (0.037)	0.102* (0.039)	---	---	0.122
Time Rate OLS	1890.1-1914.4	2.657** (0.416)	0.084* (0.037)	0.069+ (0.038)	0.360** (0.094)	---	0.231
Time Rate IV	1890.1-1914.4	2.727** (0.442)	0.139 (0.107)	0.065+ (0.039)	0.331** (0.109)		0.214
Time Rate OLS	1922.1-1929.4	5.081** (0.259)	0.070 (0.099)	-0.025 (0.084)	---	---	0.00
Time Rate OLS	1922.1-1929.4	0.642 (0.576)	0.179** (0.058)	0.149** (0.051)	0.896** (0.113)	---	0.678
Time Rate IV	1922.1-1929.4	0.695 (0.583)	0.147* (0.070)	0.128* (0.058)	0.881** (0.114)	---	0.675
NYFDR OLS	1922.1-1929.4	4.111** (0.117)	-0.042 (0.044)	-0.071+ (0.037)	---	---	0.054
NYFDR OLS	1922.1-1929.4	0.708 (0.599)	0.054 (0.035)	0.031 (0.031)	0.838** (0.146)	---	0.548
NYFDR IV	1922.1-1929.4	0.846 (0.644)	0.035 (0.046)	0.018 (0.038)	0.801** (0.159)	---	0.544
NYFDR OLS	1922.1-1929.4	4.107** (0.118)	-0.027 (0.047)	-0.047 (0.044)	---	0.278 (0.299)	0.049
NYFDR OLS	1922.1-1929.4	.0130 (0.662)	0.049 (0.034)	0.015 (0.031)	0.981** (0.162)	-0.409+ (0.229)	0.581
NYFDR IV	1922.1-1929.4	0.227 (0.685)	0.035 (0.042)	0.005 (0.036)	0.956** (0.169)	-0.416+ (0.230)	0.578

Note: instruments are second lags on inflation, the output gap and the time rate.

For comparison, Taylor equations are estimated for 1922-1929 using the time rate for brokers loans. In contrast to Taylor's glum assessment, these results suggest that the Fed acted appropriately as Friedman and Schwartz (1963) have argued. The response coefficients for inflation and the output gap are positive and significant. Furthermore, they appear to be of an appropriate magnitude once they are adjusted for the presence of the lagged dependent variable. The coefficient on inflation in the instrumental variables equation has a value of 1.22. Of course, the Fed did not operate in the brokers loan market or the commercial paper market then as the Fed operates in the Fed funds market today. It is more appropriate to examine the discount rate for the Federal Reserve Bank of New York. The next three equations apply the same model for this dependent variable. Unfortunately, the discount rate changed infrequently and it was reinforced by non-interest rate instruments, leading policy to look particularly feeble unless one views its impact through the brokers loan market where it was robust.

While Taylor equations capture the focus of contemporary policy, they do not include a measure of the seasonal problems that Miron showed were a vital component of Fed policy. To correct this omission, I include a variable for excess seasonality. Using the time rate, I constructed a centered moving average that deseasonalized the data. Comparing the actual values with the deseasonalized values, I obtained a measure of the

degree of seasonality (See Wilson and Keating, 2002). Although the Fed certainly would have responded more quickly if its efforts to reduce seasonality appeared weak, I include the lagged value of the difference between the time rate and the centered moving average as a measure of excess seasonality to which the Fed should have responded. In the last three regressions this variable has a negative and significant, suggesting that it is capturing an important feature of Fed policy even on a quarterly basis.

By these simple measures, Fed policy in the 1920s thus appears to have been run in largely accordance with the "rules of the game" while lowering the risk of a panic. This "new regime" appearing in the 1920s should have increased investor confidence by reducing inflation risk and panic risk. These estimates show that Fed policy moved in the right directions but the question remains as to whether policy was too loose or too tight. To address the counterfactual question whether the Fed have should conducted policy differently in the 1920s, I apply some simple Taylor rules that have been invoked to judge recent Fed policy.

Figure 25
Taylor Rules and the Rate of Interest
1890-1914
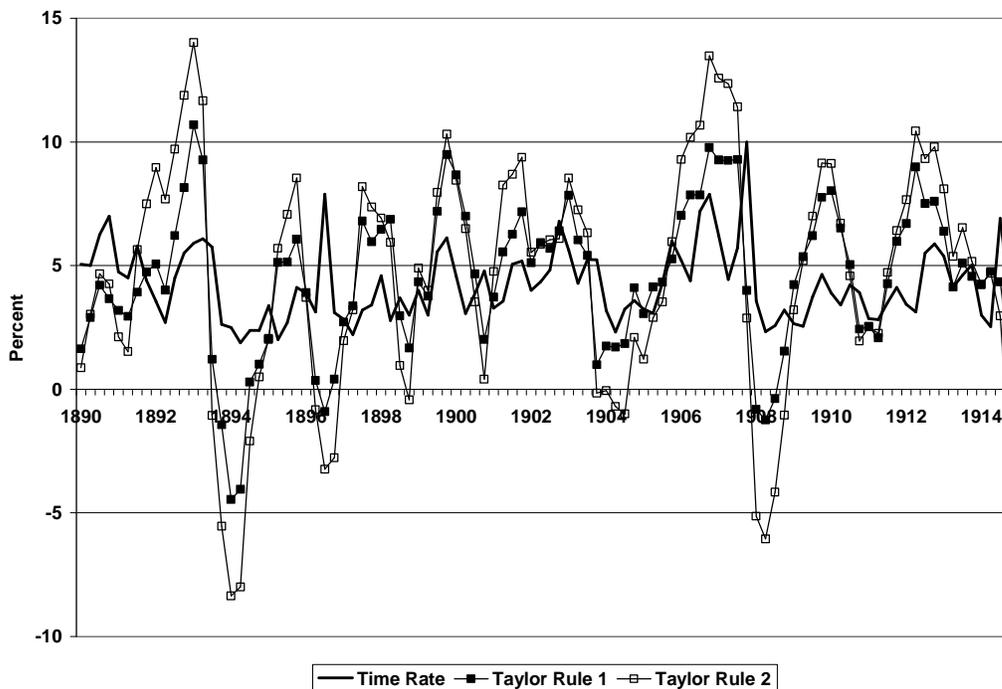
The first simple Taylor rule is Taylor's original rule with the policy response coefficients set equal to 0.50. The second rule sets the coefficient on the output response at 1.0 (see Taylor, 1999). When applied to the second half of the twentieth century, they show that the Fed funds rate was particularly low in the late 1960s, the 1970s, and possibly the late 1990s. In Figures 25 and 26, these two rules are applied to the classical gold standard era and the 1920s, omitting World War I when the Fed purposely kept rates low. It is important to note that the Taylor rule is being applied here when there is no target rate of inflation π^*, as in equation one. Both the periods examined here were under

the gold standard that promised long-term price stability, at the expense of short-term price volatility. In this case, the implicit inflation rate target is zero. The Fed funds rate real rate is assumed in the Taylor rule to be 2.0%. However, this value cannot be used for the earlier periods because the real rate for the time rate on brokers loans was higher. The nominal rate averaged 4.2% for 1890-1914 and 5.0% for 1922-1929. Combined with an inflation rate target of zero, the combined value of the real rate of interest and the target inflation rate is 4 to 5%. A value of 4% is used to construct Figures 25 and 26, 5% yields similar results.

Figure 26
Taylor Rules and the Rate of Interest
1922-1930
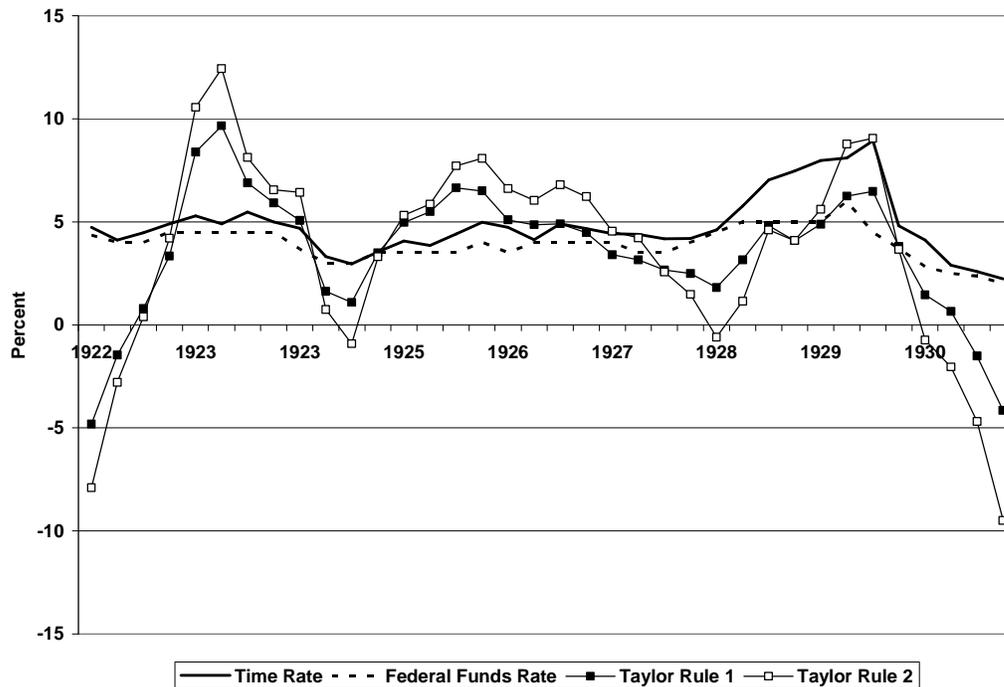
In Figure 24 for the classical gold standard, the Taylor rules, have a greater amplitude than the time rate, suggesting that there was indeed a need for a central bank to intervene and lean against the wind to accelerate corrections. Thus, in booms higher rates would have slowed down expansions and in recessions lower rates would have accelerated recoveries. The rule, of course is not a precise formulation of policy as it would sometimes dictate negative rates of interest.[9] For the 1920s, it appears that Fed policy, while appropriate, was not sufficiently vigorous. Was it an improvement over the pre-Fed period? One simple measure would be the amplitude of interest rates for the pre-Fed period and the 1920s, measured as the root mean square or quadratic mean. In Table 3, the root mean square for the time rate, the discount rate of the New York Fed and the two Taylor rules are reported. The amplitude of the two Taylor rules is lower for the period 1922-1928 relative to 1890-1914 suggesting that the Fed correctly leaned into the

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[9] Taylor (1999, p. 338, footnote 13) recognized this problem for analyzing alternative policy in the 1960s.

wind.   This apparent success stands in contrast to the period which includes the Great Depression where the alternative policies would have required larger swings.

Table 3
Amplitude (Root Mean Square) of Interest Rates

	Time Rate	Discount Rate	Taylor Rule 1	Taylor Rule 2
1890-1914	4.49		5.41	6.62
1922-1928	4.78	4.06	4.81	5.84
1922-1933	4.55	3.76	4.75	6.80

Could the Fed have pursued even stronger policies in the 1920s? What is the importance of the gap between the actual interest rates and the counterfactual Taylor rates in Figure 25? Taylor (1999) reported that when policy was first too loose in the early 1960s with the gap between the Federal Funds rate and Taylor Rule 1 at 2-3% for three and a half years. Then, in late 1960s to the late 1970s, it rose to 4-6% creating the "Great Inflation.   As seen in Figure 26 policy should have been eased more quickly during the severe contraction of 1920-1921. It was too easy in the following boom and too tight in the short recession that followed.   For the housing market, it appears that policy then eased considerably beginning in 1925 and remained loose through 1926 with the gap between the market rate and the counterfactual, peaking at 2% for Taylor Rule 1 and staying above 2% for Taylor Rule 2, remaining at 2% or above from 1925.2 through 1926.3 These are the crucial years for the housing boom and suggest, at least by the measure of the early 1960s, that the magnitude of the error was substantial and may have contributed to igniting a housing boom.

Even if the Fed policy should have been somewhat more vigorous why did it not respond to the housing market?   One answer may be that financial markets were incompletely integrated even in the 1920s. The housing market boom, where there are strong regional elements and where long-term interest rates are most important may have drawn far less attention that the stock market boom, centered in New York and sensitive to short-term interest rates   As is well-known, the money and capital markets were only slowly integrated during the nineteenth century, a process that was incomplete at the time of the founding of the Fed.   The problem of asymmetrical regional shocks has only recently been tackled by Landon-Lane and Rockoff (2007) who identified regional shocks by looking at regional commercial bank lending rates. They estimated a VAR system that includes a national interest rate (the commercial paper rate in New York or the Federal Funds rate) and the bank lending rates in four regions. They used the model to estimate the independent shocks hitting each region. Looking at the period 1880-1913, they found that shocks from New York were not the most important factor driving regional rates.   For example, the shock from the New York commercial paper rate accounted for only 10% of the forecast error variance in the West, while the Plains were responsible for 44% and the West itself 34%. Even for the Northeast and the South, New York accounted for only 46% and 27% of the forecast variance.   For the nineteenth century there are multiple asymmetric shocks providing a distinctive character to traditional financial crises of this era.

Figure 27
Regional Interest Rate Shocks
1919-1930
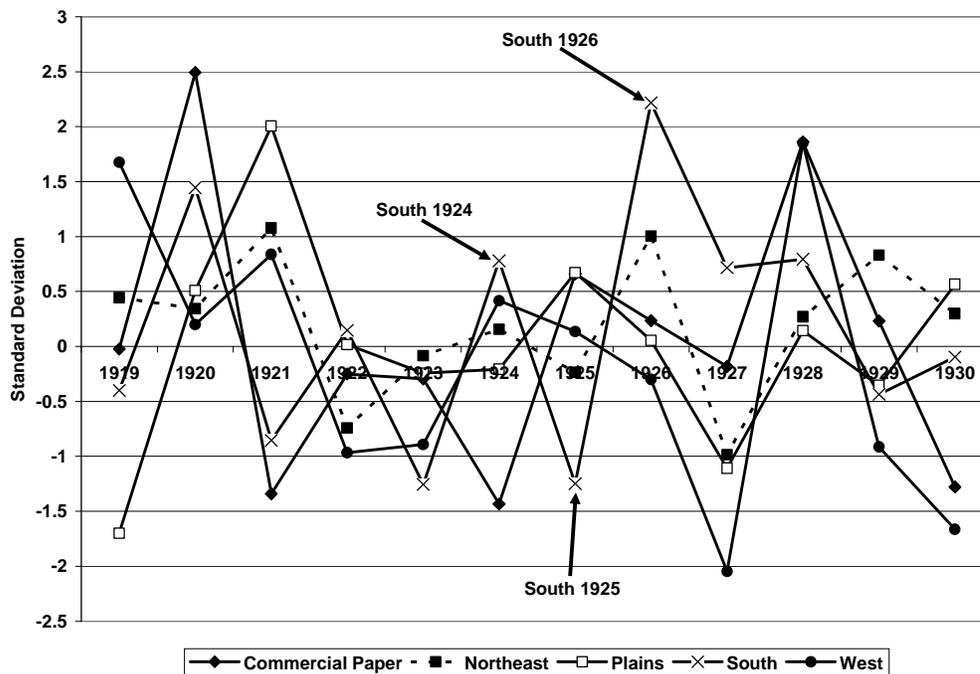
Source: Landon-Lane and Rockoff (2006).

By the 1920s, the national money and capital markets were more tightly integrated. Although Landon-Lane and Rockoff do not separately examine this decade, they show that for 1914-1943, integration was still far from complete. For the Northeast, the South, the Plains and the West, 20%, 18%, 48%, and 15% of the forecast error variance was explained by the shocks from New York.[10] Independent regional shocks for 1919-1930 are showed in Figure 27 and provide a picture for problems emanating outside of New York. The recession of 1920-1921 was intensified when the Fed began raising the discount rate in 1919 to halt gold losses, with the last increase in early 1920 raising the rate from 4.75 to 6%. Thus there is a large shock in the Northeast. However there are also independent shocks from the Plains and the West in 1921, which heavily indebted farmers suffered from the crash in commodity prices. Perhaps, the most surprising feature of this figure is the shocks in the mid-1920s where the Southern shocks are the largest for every year from 1923-1926. The Southern shocks follow the chronology of this regional boom that affected Florida and its neighboring states. The land boom produced a strong demand for funds in 1924 raising rates; the rapid expansion of the banking system and the attraction of deposits from out of region would explain the negative shock that fueled the land boom in 1925. The collapse of the land boom in 1926 and the Florida-Georgia banking system would have then produced the huge shock in

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[10] This stands in contrast to their last period, 1955-2002 when 75% (74%), 95% (93%), 89% (88%), and 78 (79%) of the forecast error variance was explained by shocks in the commercial paper rate (Federal Funds rate).

Southern rates in 1926, as lending risks became apparent and depositors pulled their money out of the banking system.

The Fed did not respond to the boom or the bust, treating it as an asymmetric shock on the periphery, and Landon-Lane and Rockoff conclude that "contractionary monetary policies sufficient to stop the boom might have played havoc with the rest of the economy" and hence the Fed's actions were appropriate. Even the Atlanta Fed, at the center of the Florida storm, held its discount rate constant. Monetary policy would have been a blunt instrument to manage the regional excesses of the housing boom, but the collapse proved costly to depositors in Florida and Georgia as well as those who had recently purchased real estate in any of the booming regional markets.

Consequences

The collapse of the housing market began in 1925 and picked up speed in 1926. By the time of the stock market crash, construction and housing prices had fallen and foreclosures were moving upwards. Real estate markets were weakened further by the rise in interest rates in 1929 driven first by the stock market boom that drove up yields and then by the Federal Reserve's decision to raise interest rates. The deflationary policy pursued by the Fed hit institutions and borrowers with weakened balance sheets, compounding the problems of the economy. One difficulty in measuring the effect of the collapse of the housing bubble is to identify the direct effects of the bubble, which had not fully played out, when the Great Depression began.

The housing market of the 1920s could have had a major impact on the economy if the rise in housing wealth had spurred consumer spending and its decline had done the reverse. There is some concern that the current drop in housing prices will produce a major decline in consumption. Examining the current boom and bust, Belsky and Prakken (2004) estimated that the rise in house prices account for at least one quarter of the growth personal consumption expenditures for 2001-2003 by the wealth effect and increased home equity borrowing. However, the question of what is the marginal propensity to consume out of housing wealth is far from settled; and there are a wide range of estimates. The Board of Governors of the Federal Reserve has maintained and updated a model of the U.S. economy since the 1960s that provides estimates of the marginal propensities. Unfortunately, like many macro models it does not specifically identify the effects of housing on spending. The most recent version of the Board of Governors model separated out equities and all other wealth and estimated that the marginal propensity to consume out of equity was three cents and 7.5 cents for all other wealth. Using comparative international data, Bayoumi and Edison (2003) estimated the marginal propensity to consume from stock wealth to be 4.5 cents per dollar and 7 cents out of housing wealth. Case et. at. (2001) found an even wider range of two cents and between 11 and 17 cents. For the 1920s, there are no estimates of this key propensity, but contemporary estimates may be used to obtain a general idea of the effect of the housing market decline.

The absence of an adequate measure of housing wealth creates an additional problem for the 1920s. There is only one estimate of residential or housing wealth, constructed by Grebler, Blank and Winnick (1956). They estimated the value of owner-

occupied nonfarm mortgaged homes in the 1890 census and then created the series by adding their annual estimates of residential capital formation (Historical Statistics, p. 4-522). This method would appear to omit changes in the value of the existing stock, and it would therefore underestimate the effects of any booms---both the rise in prices and the decline in prices. The real annual growth in housing wealth that they estimated is shown in Figure 28. There is no decline in total housing wealth until the 1930s, but this may be a result of the fact that the index does not pick up changes in the stock of existing homes.

Using Grebler, Blank and Winick's data and contemporary estimates of the marginal propensity to consumer out of wealth, it does not appear that the 1920s housing boom had an exceptional impact on consumption. If the marginal propensity to consume out housing wealth was three cents on the dollar, then in 1923 housing determined 2% of the increase in consumption in 1923, 5% in 1924 and 8% in 1925, falling to 4% in 1926. Yet it rose to 8% in 1927 and 1928 before falling to 1% in 1929. If the marginal propensity to consume was 7 cents on the dollar, the results for the years 1923-1929 would have accounted for 12%, 17%, 10%, 17%, 16%, and 3% of consumption growth. The effects on consumption are thus relatively modest.

Figure 28
Real Annual Growth of Residential Wealth
1889-1939
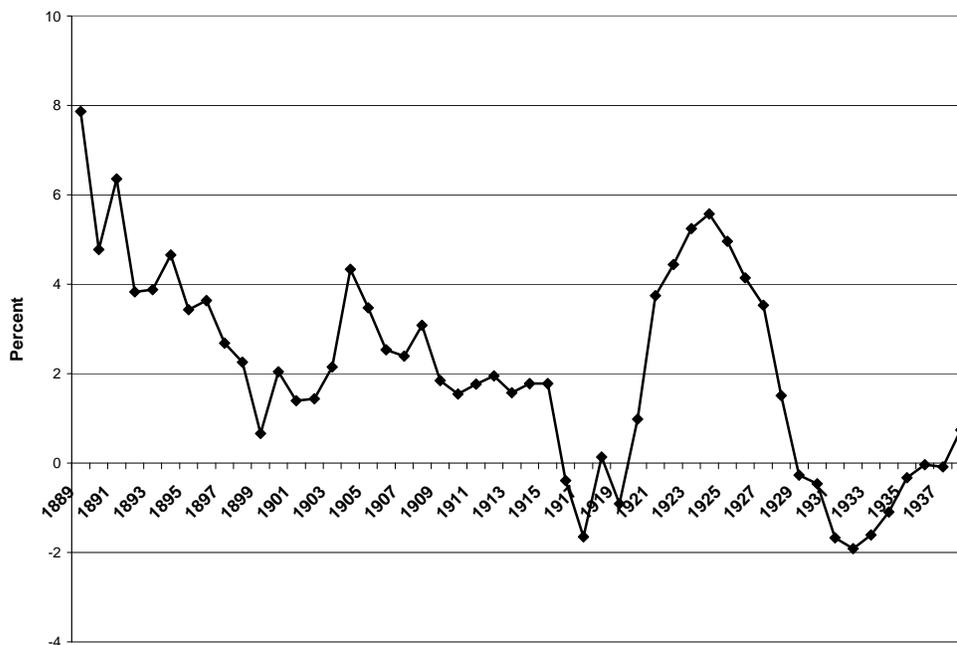
Source: <u>Historical Statistics</u> Table Dc884 Total Wealth and Dc883 Residential Construction Index, which is used to convert current values to 1929 prices.

Where the collapse of the housing market may have had its strongest impact was on the balance sheets of households and financial institutions. The rise in foreclosure rates in the late 1920s when the economy was otherwise booming was an indication that the balance sheets of some households had deteriorated. It left them in a particularly weakened position when hit by the next shock in 1929. The same was true for banks,

savings and loans and insurance companies that had excessive exposure to mortgages. Unfortunately, minimal data at the national level has been collected for financial intermediaries lending on real estate in this period. The most detailed data available is for national banks but, legally constrained, they lent very little on real estate. Data on state banks, insurance companies and savings and loans that helped to contributed most to the rapid mortgage growth is extremely limited.

Table 4
Non-Farm Household Balance Sheet
1929 $

	1912	1922	1929	1933	1912-1922	1922-1929	1929-1933
Total Tangible Assets	85.4	107.3	157.6	112.4	25.7%	46.9%	-28.7%
Residential Structures	42.2	53.3	79.4	60.2	26.5%	48.9%	-24.2%
Land	18.8	21.9	33.8	24.0	16.4%	54.5%	-29.0%
Consumer Durables	20.6	27.7	38.4	23.1	34.7%	38.7%	-39.8%
Total Intangible Assets	127.0	164.8	290.5	190.7	29.7%	76.3%	-34.3%
Common & Pref. Stock	52.9	56.9	138.3	55.7	7.6%	143.1%	-59.7%
Money	19.1	28.6	39.1	36.1	49.4%	36.7%	-7.6%
Total Liabilities	14.9	18.4	41.8	28.7	23.4%	126.9%	-31.4%
Mortgages	7.2	8.4	18.0	14.3	17.3%	113.1%	-20.8%
Consumer Debt	2.6	3.1	6.4	3.1	15.9%	109.6%	-51.2%
Loans on Securities	3.0	4.6	11.6	3.9	53.4%	153.3%	-66.3%
Bank and other Loans	1.9	1.9	3.8	5.6	0.1%	96.5%	46.4%
Net Wealth	197.5	253.6	406.3	274.5	28.5%	60.2%	-32.4%
Net Financial Wealth	112.1	146.4	248.7	162.0	30.6%	69.9%	-34.9%

Source: Goldsmith and Lipsey (1963) and CPI

More can be surmised about the change in households' balance sheets. Mishkin (1978) used interpolations from the benchmark figures for the national balance sheet to follow the deterioration of household balance sheets during the Great Depression, showing how they became increasingly financially constrained, thereby contributing to the decline in consumer spending. Mishkin did not examine the behavior of the balance sheet before 1929 and Table 4 retrieves the bench figures for 1912, 1922 and 1933. It would have been desirable to have a benchmark figure for 1925 or 1926 at the peak of the housing market. However, the change from 1922 to 1929 captures much of its evolution. Net wealth and net financial wealth grew an impressive 60% and 70% during these seven years, especially when compared to the growth rates for 1912-1922. Yet, in that earlier period tangible assets, intangible assets and liabilities all grew at approximately the same rate. By contrast, in the 1920s, total liabilities increased 127% compared to a 47% and 76% rise for of tangible and intangible assets. Households became increasingly

leveraged, taking on more mortgage, consumer, bank, and securities debt. The growth of mortgages, 113%, was only second to the growth of the securities loans, while the value of residential structures and land increased by only 49% and 55%. Households that had bought into the rising market and financed their homes with mortgages (not to mention second or third mortgages) had fragile balance sheet positions. The real burden of interest payments and repayment, especially on balloon loans presented the possibility of disaster for some in the late 1920s and many in the early 1930s. The problem is evident for the years 1929-1993 with the value of residential structures and land falling faster than mortgages. The legacy of the mid-1920s boom contributed to the pain of the thirties.

What policies could have been implemented to limit the damage from the real estate bubble? While monetary policy may not have been the appropriate tool for the real estate bubble, banking supervision failed. Evidence for policy disaster is event in Florida where both federal and state regulators not only exercised excessive forbearance but also were corrupted. Clever operation of chain banking system kept the excessive risk taking by bankers out of view of bank examiners and the public. . Examiners were supposed to use market values to determine the quality of assets and bank solvency but this was gradually weakening. Although it is difficult to measure, there were important changes. Perhaps the most significant, identifiable change was the Comptroller of the Currency's elimination of surprise call reports in 1916, although surprise examinations were retained. Discipline of banks in the 1920s was still the duty of the market, and the purpose of banking supervision was to reinforce the operation of the market Instead, regulators increased the asymmetry of information between depositors and their banks, failing to reveal insider lending and closing insolvent banks. The general well known deterioration of bank balance sheets during the late 1920s had its roots in these changes that amplified the problems of the real estate boom and bust.

Even though it was the first of the double bubble, the reverse order of the double event today, the demise of the housing market in the 1920s could not alone derail the economy between 1926 and 1929. The boom and bust of the housing market was less severe than today's. The primary reason to worry about today's disaster more than in the 1920s is that regulation has induced far more risk-taking by home-buyers and banks. Since the New Deal, the quest to expand home ownership has drawn higher risk families into the home buying marking. The consequence of this policy is that foreclosure rates are far higher than they were in the past reflecting the increased risk exposure of aggregate mortgages for a given shock. In addition, deposit insurance and banking regulation have induced banks to take more risk, if not on their balance sheets, then off balance sheet. Shocks to the banking system thus generate greater losses. There is probably also a role for the increased integration of markets. During the 1920s, Florida was the epicenter of the boom and bust. Funds were drawn from out-of-state to fuel the surge and then retreated after the collapse. Had markets been more integrated as they are currently, the boom would more likely have had national consequences.

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