The 1920s American Real Estate Boom

and the Downturn of the Great Depression:

Evidence from City Cross Sections

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Prior to the 2000s there were several regional real-estate booms in American history, but the only one that appears to have spread across most of the country occurred in the mid-1920s. In popular memory and some academic accounts (e.g. Shiller, 2005), the real-estate boom of the 1920s was concentrated in Florida. But as Frederick Lewis Allen (1931) observed in *Only Yesterday*, his history of the decade:

especially during its middle years, there was a boom in suburban lands outside virtually every American city. ..the automobile played its part...by bringing within easy range of the suburban railroad station, and thus of the big city, great stretches of woodland and field which a few years before had seemed remote and inaccessible. Attractive suburbs grew with amazing speed...The old Jackson farm with its orchards and daisy-fields was staked out in lots and attacked by the steam-shovel and became Jacobean Heights or Colonial Terrace or Alhambra Gardens, with paved roads, twentieth-century comforts, Old World charm, and land for sale on easy payments (p. 285-86).

The mid-1920s house-building boom was accompanied by rising house prices, increased homeownership rates, financial innovations that boosted the supply of credit to real-estate developers and house-buyers (White, 2009; Snowden, 2010), and an unprecedented increase in the volume of mortgage debt which some viewed as “evidence of a fundamental revision in homeowners’ and probably lenders’ attitudes toward mortgage indebtedness” (Grebler, Blank and Winnick 1956, p. 164). On average across the country as a whole, construction and house prices peaked in 1925 and fell off steadily over the late 1920s. With the onset of the Great Depression in 1930, the house-price decline accelerated sharply and many mortgages went into default, with consequences that were obvious to contemporaries:

From 1930 to 1934,..the value of..residential property fell about one-third...The important role real estate values play in the economy is most clearly evident at such times. Not only the owners of real estate and the holders of real estate mortgages but also bank depositors and other persons whose savings are committed to financial institutions having substantial real estate investments may feel directly or indirectly the effects of radical fluctuations in real property prices. The disturbing effect of interrupted financing, of fluctuations in income from real property and hence in its value and salability, inevitably makes less secure the status of financial institutions and of their owners and depositors (Wickens, 1941, pp. 1-2).

Looking back on the real estate boom of the 1920s, economists have grappled with two questions: did it contribute to the depth of the Great Depression, and was it the result of an irrational "bubble" in residential real estate? Both questions remain open.

In the 1930s, many economists hypothesized that 1925 had been the peak of a long-swing "building cycle," independent of business cycles and of longer frequency. The business-cycle depression after 1929 was deeper, they argued, because it took place during the building cycle's downswing. The hypothesis of an independent building cycle did not survive examination (Hickman, 1974), but economists have continued to look for ways that the 1920s real-estate boom could have depressed real activity in the 1930s. Obviously, a plunge in house prices as big as that after 1929 could depress aggregate demand. Declining house prices cause defaults on mortgage debt as homeowners abandon negative-equity properties or are unable to refinance balloon-payment mortgages (Elul et. al., 2010). Mortgage defaults damage the balance sheets of exposed financial intermediaries, choking off credit supply. Declining house prices also hinder lending by devaluing potential borrowers' collateral, and perhaps decrease consumer spending through"wealth effects" (Mishkin, 1978; Case and Quigley, 2008). But it is not clear that the 1920s boom was responsible for any portion of the house-price declines and foreclosures after 1929. They could have been entirely a consequence, not an additional cause, of a cyclical downturn. Aggregate output and employment continued to grow for years after the house market's 1925 peak. Indeed, economic historians have rarely if ever argued that the boom contributed to the Depression through the wealth and financial effects of house-price declines and foreclosures. Instead, they have considered the possibility that the boom left behind an overhang of excess housing ("overbuilding"; Gordon, 1951; Bolch, Fels and McMahon, 1971) or an unwieldy layout of streets and land parcels (Field, 1992) that depressed investment in housing capital, specifically, in the 1930s.

The boom in house markets around 1925 looks like most people's notion of a bubble - excessive investment in a class of assets, driven by unreasonable expectations that the assets will continue to appreciate. But it is generally hard to rule out the possibility that a historical peak in asset prices reflected expectations that were rational *ex ante*, even though they were not fulfilled *ex post*. Economists still debate whether the stock-market boom that ended in 1929 was a bubble (White, 2006). Most booms are coincident with developments in financial conditions or technology that could plausibly raise "fundamental" values. The mid-1920s house boom is no exception. The automobile, for example, was a new technology that could be expected to affect demand for single-family houses around a city. An economist today can try to produce a forecast of the automobile's ultimate effect on house prices from the point of view of 1925, based on information available then. But the forecast must have very wide bounds.

As other contributions to this volume attest, the experience of the 2000s has revived interest in the 1920s. This is not only because the 1920s may help us understand the 2000s, but because the growing body of research on the 2000s provides new ways to approach the 1920s. A common approach in research on the post-World War II era is to examine cross-sectional variation across local housing markets such as metropolitan areas. Across the peak of the 2000s boom, around 2006, prices and construction across metro areas displayed in extreme form a pattern that had been seen in the smaller regional cycles of the postwar era. In the run-up to the peak some metro areas experienced persistently higher rates of increase in house prices, year after year, accompanied by relatively high rates of construction. In the bust, house prices fell most in metro areas that had experienced the greatest price increases and construction in the boom. Theoretical models of local housing markets suggest these patterns are easy to explain as the result of a nationwide bubble that was stronger in some localities than others. It is generally accepted that the post-2006 bust contributed to the "Great Recession" which followed close at its heels (the NBER dates the cyclical peak at December 2007) through financial channels and perhaps wealth effects.

In this chapter we examine cross-sectional data on residential construction, house prices and other variables across American cities in the 1920s and the downturn of the Great Depression. We find that cities which had experienced the biggest house construction booms in the mid-1920s, and the highest increases in house values and homeownership rates across the 1920s, saw the greatest declines in house values and homeownership rates after 1930. They also experienced the highest rates of mortgage foreclosure in the early 1930s. These patterns look very much like those around 2006, despite the gap between the house-market peak in 1925 and the business-cycle downturn in 1929. They are consistent with a bubble. They show that the effects of the mid-1920s boom on house markets were still present as of 1929. They suggest that in the downturn of the Great Depression house values fell further, and there were more foreclosures, because the 1920s boom had taken place.

1**) House markets in theory**

In the context of house markets, most economists define a bubble as a situation in which prices are elevated by expectations of future increases in prices, and the expected level of future prices is inconsistent with a rational view of the economy.[1] To identify a bubble, it may be necessary to specify what a rational view would be, based on a theoretical model. Most models depict two features of housing markets. First, a house is a long-lived asset, a claim to the stream of future services (net of maintenance) provided by the house. Second, housing markets are fundamentally local, the flip side of local labor markets, because a person must live within commuting distance of his job.

In simple models, capital markets are perfect and owner-occupied houses are the same as units available on a rental market. Thus, house prices are determined by the real interest rate, expectations of future rents, the covariance of rents with returns on other assets such as stocks, and tax treatment of homeownership. More complicated models allow for capital market imperfections, so that house prices are also affected by the state of institutions supplying credit to house-buyers, potential buyers' wealth and their ability to insure against income shocks (Himmelberg, Mayer and Sinai, 2005; Favilukis, Ludvigson and Nieuwerburgh, 2010). Glaeser and Gyourko (2009) note that owner-occupied housing may have different characteristics from rental housing, so that the value of the future service flow from an owner-occupied house is an implicit rent related to, but not exactly the same as, observable market rents. To generalize, in models without bubbles the price of a house is determined by rational expectations of its future

[1] Economists have developed models of "rational" bubbles, in which expectations are rational but the price of an asset exceeds its "fundamental" value, that is the present value of the future benefits from owning the asset apar from any price appreciation (such as dividends on a stock). Glaeser, Gyourko and Saez (2008) explain that rational bubbles cannot arise in housing markets, because the long-run supply of housing is not fixed. In a rational bubble, an asset's price can remain above its fundamental value forever, validating the expectations that support the bubble. To make this true, first, the rate of increase in the price, times the probability that the bubble will continue for one more period, must equal the real interest rate, so that people are willing to hold the bubbled asset. Second, the real interest rate in the economy must be lower than the rate of general rate of economic growth in real income and wealth (the economy must be "dynamically inefficient"), so that the future value of bubbled assets remains within future generations' buying power. A rational bubble cannot arise on an asset that has an ordinary upward-sloping long-run supply curve because the continuously rising price of the asset would call forth the production of more and more units, whose value would eventually exceed future generations' buying power.

implicit rents (net of maintenance and accounting for tax treatment) interacting with capital-market imperfections as well as the term structure of real interest rates on safe liquid assets.

Rents or implicit rents are determined in local markets by local supply and demand. Local demand increases with local population and household income. Some models (e.g. Adam, Kuang and Marcet, 2011) also allow for variations in the utility derived from housing services, relative to other consumption goods. Local supply is determined by past construction. Because construction takes time, supply is fixed in a short run. In the long run, housing is supplied at the cost of construction. Local population and income are endogenous as households migrate across localities to maximize utility and employers migrate to maximize profit.

Construction cost is the sum of the price of local land and the cost of producing a structure from capital and labor (similar to a manufactured good). The price of local land may increase with the quantity of local housing units in a way that varies across local markets. Thus, the long-run supply of housing in a local market may be less than perfectly elastic, with different elasticities across markets, even if the cost of a structure *per se* is the same in all locations.

Households migrate in response to local real wages and "consumption amenities," that is characteristics of a locality that affect residents' happiness at a given real wage. The price level in the real wage denominator varies across locations only due to differences in housing costs (other consumption goods are tradable across localities), so real wages are relatively low if housing costs are high relative to wages. Employers - at least the ones that produce for national (or international) markets - migrate in response to local *nominal* wages and "production amenities" that affect production or transportation costs. Some production and consumption amenities are exogenous (e.g. weather). Some are due to more-or-less-exogenous institutional factors (e.g. state government quality). Some are affected by the size of the population or employer base (e.g. congestion costs, thick-market externalities).

In the long-run equilibrium, depicted in models following Roback (1982), nominal wages are relatively high in locations with good production amenities (which compensate for high local labor costs). Rents are high relative to nominal wages in locations with good consumption amenities (which compensate for low local real wages). Thus, rents are relatively high in localities with good production amenities (which raise local wages *and* rents) and/or good consumption amenities (which raise rents relative to wages). Relative house prices reflect rents.

Models of short-run fluctuations in local housing markets build on this structure. They add passing shocks to financial factors (e.g. real interest rates) and local supply or demand (e.g. temporary fluctuations in local population or incomes) that disturb the long-run equilibrium. There may also be changes from time to time in the exogenous components of local amenities, or the functional relation between endogenous amenities and the size of the local population. The response of prices and construction to shocks and their paths back to equilibrium depend partly on the nature of expectations, as current prices capitalise expected future rents, and expected future price increases raise current housing demand.

Two models of short-term fluctuations *without* bubbles are Nieuwerburgh and Weill (2010) and Glaeser, Gyourko, Morales and Nathanson (2011). In these models, expectations are rational, so prices respond immediately to any predictable movement in rents. In response to shocks with statistically predictable outcomes for rents, house prices jump upon receipt of the news, then move gradually to the long-run equilibrium as factors such as construction and migration come into play.

Models with bubbles incorporate some form of non-rational expectations. There is no generally accepted alternative to rational expectations. But for house markets Case and Shiller's (1989, 2003) view is prominent. They argue that bubbles can be set off by initial price increases due to "fundamental factors" such as "demographics, income growth, employment growth, changes in financing mechanisms or interest rates, as well as changes in locational characteristics," interacting with short-run fixed supply (2003, p. 337). Observed price increases create irrational expectations of future increases. As expected future price increases boost current demand, they cause self-confirming increases in current prices, in a feedback mechanism. But only up to a point. "Longer-run forces that come into play tend eventually to reverse the impact of any initial price increases and the public overreaction to them" (p. 338). Construction increases supply, and employers and households migrate away from high-cost areas. When prices fail to increase as expected, the bubble ends.

Glaeser, Gyourko and Saiz (2008) present a model of local housing markets with bubbles that is partly consistent with Case and Shiller's view. In the model, people irrationally expect an observed rate of price increase in the previous period to continue forever. As higher prices call forth greater supply, the rate of price increase slows. Eventually "beliefs revert to rationality and the equilibrium returns to the rational expectations equilibrium with, of course, an extra supply of housing" (p. 202), which tends to depress rents and hence house prices in the aftermath of the bubble. The model lacks one element emphasized by Case and Shiller: bubbles are not set off by price increases due to fundamental factors, but to an equal, exogenous increase in expected future prices that hits all markets. The subsequent evolution of prices and construction varies across markets because markets have different supply elasticities. In the boom, areas with more elastic supply see more construction but smaller price increases. When the bubbles burst, one possible outcome is that areas that had experienced more construction during the boom suffer greater price declines.

Adam, Kuang and Marcet (2011) present another model of bubbles in local house markets supported by a feedback mechanism between experienced price increases and expected future price increases. (The localities in this model are meant to depict various national housing markets, rather than areas within a country, so there is no migration between localities: the long-run steady state is determined just by preferences for housing and construction. But that does not matter for the point here.) The model is closer to Case and Shiller's view in that bubbles are set off by initial price increases due to fundamentals. Fundamentals include a real interest rate common to all markets, and idiosyncratic, local shocks to preferences that affect individual markets. A decrease in the real interest rate tends to set off a bubble in all localities, but a bubble may not develop in localities where the housing price had been falling for local reasons. Bubbles are bigger where prices had already been rising for local reasons. During the boom, localities with bigger bubbles experience greater price increases and also more construction.

2) Patterns in postwar data on local markets

For the postwar era, annual data on housing construction and prices are available for Census Bureau metropolitan areas, which correspond well to local housing markets in models as they are defined on the basis of observed commuting patterns. For construction most studies rely on Census Bureau estimates of housing starts. These are based on reports from municipalities on the number of construction permits, adjusted by Census Bureau estimates of the time-lag between permit issuance and the beginning of construction, the fraction of permitted structures never built, and construction in municipalities that do not require permits. Multi-family structures are aggregated with single-family houses by counting each separate apartment as one unit.

With respect to prices, one must keep in mind a distinction between prices in actual sales and peoples' estimates of the price a house *could* fetch if it were put on the market. For most wealth and financial effects, estimates are more important than actual sale prices. For wealth effects, what matters is homeowners' estimates. For financial intermediaries possibly exposed to mortgage debt, what matters is estimates of financial-market participants and depositors. Estimates of potential prices may deviate from actual sale prices if only because (at least until recently) there was little freely available information about house sale prices in a locality (Shiller, 2005, p. 26). For some years of the postwar era, measures of actual sale prices can be compared with homeowner's estimates of their homes' potential sale prices, gathered by surveys. Studies find that homeowners generally overestimate the price of their houses, but changes in homeowners' estimates are strongly correlated with changes in actual sale prices (Kiel and Zabel, 1999; Bucks and Pence, 2006).

Most recent research has relied on measures of actual sale prices. Simple averages of sale prices reflect the characteristics of houses put on the market in a period, as well as changes in the price of a house of given quality. To focus on the latter, "repeat-sale indices" use prices of the same structures sold in different years. The well-known Case-Shiller series cover just a few metro areas. For cross-sectional analysis, many studies rely on the repeat-sale indices published by the Federal Housing Finance Agency (FHFA, formerly OFHEO), which are limited to sales financed by agency-insured mortgages but cover nearly all metro areas.

Prior to the national boom and bust of the 2000s, research had found two strong patterns in metro-area sale prices: short-run "momentum" and long-run "mean-reversion." In the short run, from year to year, the rate of change in an area's price index shows strong serial correlation: if an area's price level rises relatively fast in one year, it is likely to rise relatively fast in the following year. But in the long run, across five or ten years, an area's price level reverts to the previous trend (Kodrzycki and Gerew, 2006; Glaeser, Gyourko and Saiz, 2008). Case and Shiller (1989, 2003) argue that short-run serial correlation in house-price increases is evidence for bubbles: under rational expectations any predictable movements in future (implicit) rents should be immediately, not gradually capitalized in prices. This argument is supported by Glaeser, Gyourko, Morales and Nathanson (2011), who find that their rational-expectations model can generate mean reversion, but not serial correlation in metro areas' house-price changes.

The national boom and bust of the 2000s was an extreme example of price momentum followed by mean-reversion. In the early 2000s, indices of sale prices for the U.S. increased rapidly, year after year. Construction rates were also very high. Construction (nonfarm housing starts) peaked in 2005. House prices peaked in mid-2006 (Case-Shiller) or early 2007 (FHFA). Both construction and prices fell off after that. Prices fell fast through 2008, then leveled off or continued to fall at a much slower rate. The national nonfarm homeownership rate rose and fell with construction and prices, peaking in 2006 (Haughwort, Peach and Tracy, 2009). Mortgage deliquency and foreclosure rates increased in the bust (U.S. Department of Housing and Urban Development, 2011, pp. 81-82).

The magnitude of the boom varied across metro areas. During the boom, the rate of price increase was persistently higher in some areas. At least in the later years of the boom, metro areas with the highest rates of price increase tended to have the highest rates of housing starts. In the bust, these boom cities saw the greatest house-price *declines.* Thus, a metro area's rate of housing starts during the boom was *positively* related to its rate of change in house prices during the boom, *negatively* related to its rate of change in house prices during the bust (Mayer and Pence, 2008; Goettman, Peng and Yen, 2009; Carson and Dastrup, 2012; Abel and Deitz, 2010). Mortgage default rates in the bust reflected price declines: they were higher in metro areas where house prices fell more, controlling for local unemployment and the prevalence of subprime mortgages (Furlong, 2008; Elul et. al., 2010).

The relationships between boom construction and price changes in the 2000s are key to our assessment of the 1920s, so we review them here. For comparison with the 1920s, it is better to look at raw permits, which also peaked in 2005, than estimates of starts. To scale permit counts to the size of the metro area we divide them by the number of metro-area housing units counted in the 2000 census. Table 1 shows results of regressing changes in the log of FHFA metro-area price indices on permit rates in boom years. For panel A, the left-hand side variable is the change in log price indices across the bust 2006-2008. Column (1) gives the coefficient from regressing these price changes on permits issued in the year 2000. For column (2), the RHS variable is permits in 2001, and so on across the table. The negative coefficients indicate that house prices fell more in metro areas that had more boom-year permits. For panel B, the LHS variable is the change in the log of the price indices in the boom from 2004 to 2006. The positive coefficients show that price changes in the boom years were positively related to permits. We would like to know whether the patterns in Table 1 also held for homeowners' estimates of potential sale prices, but we have found no homeowners' estimates from the mid-2000s for a large enough set of metro areas to allow for cross-sectional analysis.[2]

The patterns apparent in Table 2 can *perhaps* be accounted for in a model without bubbles, as the result of rational expectations and market fundamentals. But they are certainly *easy* to account for as the result of bubbles. The positive correlation between construction and price increases across metro areas during the boom is consistent with a bubble set off by a general positive fundamental demand shock, magnified or muffled by local fundamental demand shocks as in the model of Adam, Kuang and Marcet (2011). The negative correlation between boom construction and price change in the bust would result from the effect of bubble-created supply on prices as the model of Glaeser and Gyourko (2008).

3) Data from the 1920s and 1930s

For the 1920s and 1930s, cross-sectional data on housing markets are few and far between. In this section, we describe the nature and sources of the data we have found. We do not have

[2] From 1985-95 the Census Bureau's American Housing Survey collected such data for 41 metro areas annually. Until 2004, the metro-level data were collected semiannually. Since then, due to budget cuts, the AHS has collected

data on actual house sale prices. We do have city or metro-area averages of homeowners' estimates of the potential sale values of their homes, from a few years: 1920, 1930 and 1934. We have homeownership rates from the same years. Starting in the early 1930s, we have annual data on foreclosure rates by county. From within the 1920s, we have annual counts of residential construction permits by city. Our data on prices and homeownership rates in 1920 and 1930 are from the decennial census, and thus cover nearly all cities. Our data on construction permits cover a large sample of cities. Our data on foreclosures, house values and homeownership rates from within the 1930s are for smaller samples, but they overlap the cities covered by the building permit data to an adequate degree.

With the data we have, we can observe the cross-sectional relation between construction in the 1920s boom and two elements of house-market distress in the downturn of the Great Depression: foreclosure rates, and price declines as perceived by homeowners. We can also observe the relation between construction, perceived values and homeownership rates across the 1920s as a whole, that is from 1920 to 1930.

3.1) Residential construction permits in the 1920s

Today's estimates of housing starts evolved from a program begun by the Bureau of Labor Statistics (BLS) in the early 1920s. In 1920, the BLS began to collect information from municipalities on issued residential building permits. Localities reported not just the number of structures permitted, but the "number of families provided for" in each structure. From 1921 through the end of the decade, data were collected from over 250 municipalities. Over later decades the BLS program was expanded to cover more municipalities, and eventually taken over by the Census Bureau which developed methods to estimate starts as distinct from permits. From the 1920s there are no city-level estimates of starts, but BLS publications from the era (e.g. U.S. BLS, 1925) give for each city the number of permits issued in a year, separately for single-family houses and multi-family structures. They aggregate multi-family structures by the number of

data for just a handful of very large metro areas in scattered years (http://www.census.gov/hhes/www/housing/ahs/datacollection.html).

families provided for, which is close to the definition of a housing unit in postwar housing-start estimates.[3]

Standard historical estimates of nonfarm housing starts for the 1920s and 1930s are based on these permit data. The top two lines of Figure 1 plot estimates of single- and multi-family starts, separately, from 1900 through 1940 (*Historical Statistics Millenium Edition,* series Dc510, 511). According to these estimates, both types of construction rose from the early 1920s to the mid-20s. They followed different paths after that. Construction of single-family houses, specifically, appears to have boomed in the middle of the decade, peaking in 1925 and falling off sharply in 1926. Multi-family starts, on the other hand, remained high through 1928. Many studies of the 1920s boom have identified the late 1920s as the time of a separate boom in apartment buildings motivated by "Speculation on quick capital gains" (Hickman, 1960, p. 319). "White elephant apartment buildings, poorly located and with low occupancy rates, figure prominently in journalistic accounts of the boom and are certainly a feature of the late 1920s" (Field, 2011, p. 279).

Kimbrough and Snowden (2007) use the city-level permit data as indicators of construction, to examine the relation between 1920s construction and 1930s construction across cities. They calculate the total number of permits, aggregating single- and multi-family structures, for each city in three-year spans: 1921-23, 1924-26, and 1927-29. They find that the issuance of permits in the 1930s, controlling for population and other city characteristics, was strongly related to the stability and timing of permit issuance across the 1920s. Cities where permit rates fluctuated more within the 1920s - that had more pronounced peaks - and that peaked in 1924-26 rather than 1927-29, tended to issue fewer permits in the 1930s.

Permits are not the same as starts, of course, even apart from the lag between permit issuance and the beginning of construction. Many permitted projects are abandoned, especially, perhaps, around the peak of a boom. Also, permit counts reported by municipalities do not directly measure construction outside city limits, which was an important component of the 1920s boom (U.S. BLS 1925, p. 4).

[3] Kenneth Snowden kindly provided us with these data.

However, we believe the permit courts are the *only* reliable cross-sectional data on single-family house markets from within the 1920s. Our other data are from the beginning or the end of the decade, or within the 1930s. We use the 1920s permit counts to look for patterns analogous to the ones in Table 1. We think of permits as an indicator of the relative magnitude of the mid-1920s boom across cities,. For that purpose, the difference between permits and starts may be not a big problem. In boom cities, perhaps, an especially large fraction of mid-1920s permits were abandoned. But that would only make permit counts a better indicator of the degree a city was affected by the boom.

3.2) Data from the Decennial Census

To scale the number of permits to a city's size, we need a measure of the number of housing units in a city at the beginning of the 1920s. Censuses of this era did not count housing units.[4] But they did count "families." A census family was a group of people who shared "housekeeping." The number of census families was not the same as the number of housing units, on any definition. It was, at best, an indicator of the number of *occupied* units. But it could also differ from the number of occupied units. Some some units held more than one family - "doubling up." Boarding houses and apartment hotels, two types of housing common in the 1920s, were hard to categorize. Instructions to census enumerators make it clear that these were important practical problems for census counts.[5] However, the number of census families appears to be the best available estimate of the number of units in a city, and has been used as such by many studies (e.g. Wickens and Foster, 1937). We will scale permit counts to the number of census families in a city in 1920 for most of the results we present. We will also look

[4] Census publications give counts of "dwellings," but a multi-unit structure was counted as just one dwelling.

[5] Instructions for Census enumerators are available at the website of the Minnesta Population Center, Integrated Public Use Microdata Series [IPUMS] website (e.g. http://usa.ipums.org/usa/voliii/inst1930.shtml). The 1930 instructions, for example, contain this: "*Families in hotels.*-All of the persons returned from a hotel should likewise be counted as a single "family," *except* that where a family of two or more members (as a husband and wife, or a mother and daughter) occupies permanent quarters in a hotel (or an apartment hotel), it should be returned separately, leaving the "hotel family" made up principally of individuals having no other family relations. The distinction between an apartment house and an apartment hotel, and in turn between an apartment hotel and a hotel devoted mainly to transients, will often be difficult to establish."

at the relationship between permit counts over the 1920s and the change in the number of census families in a city from 1920 to 1930.

Along with the number of families, census publications give homeownership rates and homeowners' value estimates in 1920 and 1930.

In 1920, a special census survey of nonfarm households in many cities of the U.S. asked a respondent to report whether he owned his home. If the answer was yes, he was asked whether his dwelling was mortgaged. If his dwelling was mortgaged, he was asked for the amount of the mortgage and an estimate of the price the home would fetch if sold. Owner-occupants of multi-unit structures such as duplexes and three-deckers were asked to pro-rate the structures' potential sale price down to the fraction of the structure occupied by the owner. Owners free of mortgages were *not* asked to report values. Published results of this survey (U.S. Census Bureau, 1923) give numbers of renters and homeowners in a city in 1920. Results also give average estimated selling prices of owner-occupied homes in a city, including units within multi-family structures, for mortgaged structures only.

In 1930 a family reported whether its home was owned or rented. Renters reported the rent bill. Homeowners were asked to estimate the potential sale price of the home. As in 1920, owner-occupants of multi-family structures were expected to pro-rate the value of the entire structure down to the fraction they occupied. A census official later admitted that "this point was unfortunately not covered in the printed instruction pamphlet [for census takers]. Because of this there are doubtless some cases in which the owner returned the entire value of the structure rather than only that part which he occupied as a residence" (Wickens, 1941, p. 18 footnote 3). Census publications give median, not average, estimated selling prices of owner-occupied homes in a city, including units within multi-family structures. Unfortunately, the 1930 census collected *no information at all about mortgages*. So figures from the 1930s census are for mortgaged and non-mortgaged structures *together.*

Standard historical estimates of nonfarm homeownership rates for the U.S. are based on these census data. These estimates show that something unusual happened over the 1920s: the national rate, which had fallen from 1890 to 1920, reversed its downward trend and rose from

1920 to 1930 - similar, of course, to the increase in ownership rates over the 2000s boom. From 1930 to 1940, the homeownership rate fell again (*Historical Statistics Millenium Edition* Dc729, Dc713).

From city-level figures, we calculate homeownership rates as owned units in ratio to owned plus rented, excluding homes of unknown tenure. Over 250 of the cities covered by the construction permit data are covered by the census as well. Across these cities, we can observe the relationship between 1920s permits and changes in homeownership rates from 1920 to 1930. We will also use census data to observe the relationship between permits and the change in house values from 1920 to 1930, subject to a caveat we will detail below.

3.3) Data from within the Great Depression

Foreclosures

In most states, records of foreclosures (like other property transfers) are kept by counties. In the mid-1930s, the Federal Home Loan Bank Board (FHLB) began to collect reports on the number of residential foreclosures filed or completed from about 75 "urban" counties, that is counties with most of their population in one or more cities (Federal Home Loan Bank Board, 1936, p. 231). For a few cities the county was contiguous with the city limits, but for most the county and hence the foreclosure counts covered a larger area. The numbers include foreclosures on multi-family dwellings, which may have been more than 20 percent of the total.[6] For about 70 counties annual data are available beginning with 1932, and for the single year 1926. For 1927 to 1931, the FHLB collected data from only 13 counties. Data through 1937 were published in Federal Home Loan Bank Board (1938, p. 191).

The standard annual estimate of nonfarm foreclosure rates in the U.S. (*Historical Statistics Millenium Edition,* series Dc1257) was derived from these data. Figure 2 plots the series (fraction of mortgaged structures), which of course begins with 1926. It also plots Weir's (1992) annual series for the (nonfarm, civilian, private-sector) unemployment rate. There is no telling whether the foreclosure rate was much higher in the late 1920s than it had been during the boom,

[6] According to the FHLB (1938, p. 191), "approximately 80 percent of all foreclosures are on 1-to-4 family dwellings." That means less than 80 percent were on single-family houses.

but it increased every year from 1926 to 1929, despite a stable, low unemployment rate. The foreclosure rate rose sharply after 1930 and peaked in 1933.

We use the foreclosure data county by county. To get a foreclosure rate, we divided foreclosure numbers by the number of "dwellings" - single-family houses *plus* multi-family residential structures (with each multi-family structure counted just once) - in the county (or other matching municipal unit) from the 1930 census. Almost 60 of the counties covered by the foreclosure data in 1926 and beginning with 1932 contain cities covered by the construction permits data. Across these years and counties, we can observe the cross-sectional relationship between foreclosure rates and 1920s permits.

The Financial Survey of Urban Housing and the Real Property Inventory

The most important data for our study come from surveys carried out by Federal employees in early 1934: the "Financial Survey of Urban Housing" and the "Real Property Inventory."

The Real Property Inventory was directed by the Census Bureau. It covered 64 cities. In some cities the survey extended to suburban areas outside the city limits, and published data are for the metropolitan area. It collected information mainly about the physical characteristics of the housing stock, but also recorded information about ownership. The survey was meant to cover all states, so it included some very small cities (such as Butte, Montana) from states without big cities. It did not include any of the really large cities of the day (New York City, Chicago, Philadelphia). The largest city covered was Cleveland, Ohio. None of the cities was a suburb or satellite of a larger city (with the possible exception of St. Paul, Minnesota). None was in the New York City metropolitan region (northern New Jersey, western Connecticut, downstate New York). Wickens (1937, Table I) gives figures on the number of tenants and owners found in surveyed cities in the Real Property Inventory. From these figures we calculate homeownership rates as from census data. 43 of the cities covered by these data are also covered by the construction permit data. For these cities, we can observe the relationship between permit counts and changes in homeownership rates from 1930 to early 1934.

The associated Financial Survey of Urban Housing collected further information about housing finance and economic status of occupants in most of the cities covered by the Real

Property Inventory. Complete data were collected from 52 cities. For six of these (Providence, RI; Cleveland OH; Wheeling WV, Atlanta GA, Birmingham AL, Seattle WA, San Diego CA) the survey covered areas outside the city limits. Information was collected from owner-occupants, tenants and landlords, by mail and by agents' visits to homes. An owner-occupant was asked to report the "estimated market value of this property as of January 1st" 1930, 1933 and 1934; and a great deal of information about mortgage debt. He was also asked to report the year he had bought the property and what he paid for it. A renter was asked to report annual rental bills for 1929, 1932 and 1933. All subjects were asked to report household annual income in 1929, 1932 and 1933.[7]

Grebler, Blank and Winnick (1956) constructed a annual index of single-family house prices for 1890-34 from the homeowners' retrospective reports of purchase prices in the 22 largest cities of the Financial Survey. This has become the standard house price index for the U.S. in the era (used by Shiller [2005], among others). The bottom line in Figure 1 plots the index. Like single-family house starts, the house price index peaks in 1925. It falls about six percent from 1925 to 1930 and another 20 percent from 1930 to 1934. White (2009, p. 9) argues that this index may underestimate the actual level of house sale prices reached around 1925, because it does not include prices of houses that were lost by their owners between 1929 and 1934: "if foreclosures or abandonment of property were more common for owners who had bought late in the boom at high prices, the peak of the boom would be underestimated." The index may be reliable, however, with respect to the *timing* of the peak. The only other time-series on single-family house prices from the 1920s, which are city-specific indexes for Cleveland, Seattle (Grebler, Blank and Winnick, 1956, p. 350) and Washington, D.C. (Fisher, 1951), all peak in 1924, 1925 or 1926.[8]

To observe city-level changes in house values we use another set of figures derived from the 1934 survey. For a study published as Wickens (1941), researchers connected with the 1934 survey attempted to estimate the change in the value of residential real estate in the U.S. from

[7] The exact questions asked in the Financial Survey are reproduced in Wickens (1937).
[8] Nicholas and Scherbina (2010) show that prices of Manhattan real estate, dominated by the apartment market of course, dipped in 1927 but rose to another peak in 1929.

1930 to 1934. As part of this effort, they created estimates for survey cities of the average value of owner-occupied single-family houses, as reported by owners, in January 1934 and 1930 (Table A10, p. 97). For 1934 the researchers used both the Financial Survey and the Real Property Inventory (p. 78). For 1930 they used data from the 1930 census rather than the retrospective reports of 1930 house values from the 1934 survey, perhaps because other work with the survey data had suggested the retrospective values were biassed downward (Wickens, 1941, p. 36). To create figures that exactly matched what they had from 1934 - averages not medians, for single-family houses only, including areas outside city boundaries for the six metropolitan areas - they re-tabulated punchcard records from the 1930 census (pp. 32, 77, 78). They were able to do this for 50 cities.

Table 2 shows the estimates city by city. Values fell relatively little, less than 25 percent, in cities such as Providence, Topeka and Austin. The greatest declines, about 50 percent, occurred in cities including Wichita Falls, Birmingham, and San Diego. The average decrease in values in these 50 cities, weighted by 1930 population, was 33 percent. For comparison, the decline in the overall Case-Shiller repeat-sale index from July 2006 to the end of 2008 was about 27 percent. (Relative to wages or other prices, house prices fell much more after 2006.)

We believe these estimates are the best available city-by-city estimates of changes in house values in the downturn of the Great Depression. Of course, they are not actual sale prices. Even as measures of changes in the perceived market value of a given house, they are less than perfect. They must also reflect changes between 1930 and 1934 in the stock of owner-occupied single-family houses in a city. There may have been little change over 1930-34 in a city's total house stock, because there was very little construction (see Figure 1), but there must have been changes in the distribution of the housing stock between owner-occupancy and rental or vacancy.

40 cities covered by these estimates are also covered by the building permits data. For these forty cities, we can observe the relationship between house value decline in the downturn of the Great Depression and 1920s permits. Fortunately, though the sample is small, it appears to be representative of the U.S. with respect to the timing of house permits in the 1920s boom. Figure

3 plots index numbers of permits for single-family houses for these 40 cities, and for all cities. Both sets of cities peaked in 1925. Importantly, though total single-family permits in the 40 cities peaked in the mid-1920s, that was not true for each city. In about half of the cities, there were more single family permits in the early (1921-23) or late (1927-29) 1920s. Figure 4 plots index numbers for multi-family units. Here the 40 cities were not typical of the U.S. That makes sense, since they did not include the big, apartment-dominated cities of the day such as New York City and Chicago.

4) Results

To observe relations between a city's participation in the 1920s boom and other variables, we run many cross-sectional regressions with permit counts on the right-hand side, scaled to 1920 census families and with control variables as appropriate. (Results were similar if we scaled permits to 1930 census families.) Following Kimbrough and Snowden, we average annual permit counts up to three-year intervals: the "early 1920s" 1921-23, the "mid-1920s" 1924-26, and the "late 1920s" 1927-29. Some kind of aggregation across years is necessary because there is strong collinearity between permit counts for individual years. But we distinguish between single-family and multi-family structures.

When we put the change in a city's number of census families from 1920 to 1930 on the left-hand side, we find the change in census families was positively related to permit counts over the 1920s as a whole and to permits within most intervals of the 1920s. But the change in census families was peculiarly *un*related to single-family house permits in the mid-1920s. It was also unrelated to multi-family permits in the late-1920s, the period often identified as an apartment boom. These patterns may indicate that cities with more boom-period permits experienced some combination of especially high growth in vacancy rates and especially high rates of permit abandonment.

Next, using the sample of forty cities from the Financial Survey, we put the 1930-34 change in the average house value on the left-hand side. We find average perceived house values fell more from 1930 to 1934 in cities that had experienced high rates of single-family house permits during the mid-1920s. This remains true when we control for measures of the local severity of the depression - changes in family income, changes in retail sales - or for changes in average rents. The pattern holds *only* for the mid-1920s boom years and for *single-family* houses: we find no relation to early- or late-1920s house permits, or to multi-family permit rates. Using census data, we look at the change in values from 1920 to 1930 and across the entire span from 1920 to 1934. Results indicate that from 1920 to 1930, average house values *rose more* in cities with high rates of mid-1920s house permits.

The foreclosure data, which combine houses and multi-family structures, show that foreclosure rates over 1932-34 were positively related to mid-1920s house permits and also positively related to late-1920s multi-family permits. Finally, we find that mid-1920s house permits were negatively related to the change in homeownership rates from 1930 to 1934, positively related to the change in homeownership rates from 1920 to 1930.

4.1) Changes in Census Families 1920-1930

In an accounting sense, the change in census families from 1920 to 1930 was determined by construction of new housing units over the entire decade, changes in rates of vacancy and doubling-up, changes in municipal boundaries, destruction of old structures, breakup of single-family houses into apartments, and errors in the census count. Permits measure just one of these determinants, construction, and measure that imperfectly because some permits are abandoned.

Table 3 shows correlations between the 1920-30 change in the log of census families in a city, and the city's permit counts scaled to the number of 1920 census families in the city. Panel A) is for the 254-city sample of all cities in the permit data and the 1920 census. B) is for the sample of 40 cities also covered by the 1930-34 value data. Looking down the first columns, one sees that in both samples growth in the number of census families was strongly correlated with permit counts of every period. The second columns show that mid-1920s single-family permits were strongly correlated with single-family permits in the other two periods. The last rows show that late-1920s multi-family permits were strongly correlated with multi-family permits in other periods. Correlations were much weaker between single- and multi-family permits.

Table 4 shows results of regressing the change in families on permit counts, for both samples. Estimated coefficients would be close to one if all permitted projects were carried out and construction were uncorrelated with the other factors affecting the change in families. Coefficients could be less than one if some permitted projects were abandoned, but abandonment rates were uncorrelated with permit counts. Results in columns (1) and (2), which aggregates permit counts across the decade as a whole, seem to match this pattern.

But results in columns (3) and (4), with permit counts divided into the early-, mid- and late-1920s, do not. For the larger sample in (3), two coefficients are not significantly different from zero: the coefficient on mid-1920s house permits, and the coefficient on multi-family permits in the late 1920s. This is true even though the simple correlations between these variables and the change in families is positive (as indicated in Table 2). Coefficients on other periods' permits are significant and larger in magnitude than their counterparts in (1). For the smaller sample in column (4), coefficient values are similar to (3) but none is significantly different from zero - no surprise given the high correlations apparent in Table 3. When multi-family permits are excluded from the right-hand side in column (5), coefficients for early- and late-1920s house permits are significant at conventional levels and larger than one, while the coefficient on mid-1920s house permits is not significantly different from zero.

Statistically, these results mean that across cities the change in families was positively related to permit counts *outside* the boom periods, But the change in families was positively related to boom-period permits - mid-1920s for houses, late 1920s for multi-family - only to the degree that boom-period permits were positively correlated with other periods' permits. To put it another way, the change in families was positively related to the portion of variation in boom-period permits that was correlated with other periods' permits (which boosts the other periods' coefficients in columns (3) - (5)). The extra variation in permit counts across cities specific to the boom periods was unrelated to the growth in family count across the 1920s.

Given the factors making up the change in families, this means cities where permit counts were especially high during the booms, relative to permit counts in other periods, must have experienced some combination of the following: high rates of permit abandonment; increases in vacancy rates; destruction of old housing; decreases in doubling-up; less break-up of houses into apartments; less expansion of municipal boundaries; census counts erroneously low in 1930 or erroneously high in 1920.

Of the items on this list, two stand out as likely correlates of boom-period permits: permit abandonment and vacancy. According to Frederick Lewis Allen (1931), vacant buildings and abandoned projects were conspicuous in the late 1920s. By:

> 1928 or 1929..many suburbs were plainly overbuilt: as one drove out along the highways, one began to notice houses that must have stood long untenanted, shops with staring vacant windows, districts blighted with half-finished and abandoned "improvements"... (p. 287)

4.2) Changes in house values 1930-34

Table 5 shows results for changes in values from 1930 to January 1934. Column (1) shows results with single- and multi-family permit rates on the right-hand side. (2) includes only house permits. Either way coefficients on 1924-26 house permit rates are negative and significantly different from zero at conventional levels. Coefficients on multi-family permits, and on house permits in the early or late 1920s, are *not* significantly different from zero. Figure 5 is a scatterplot that shows the negative correlation between the change in house values and the mid-1920s house permit rate.

Many studies of postwar data find that metro-area house prices are affected by exogenous shocks to growth in local employment, personal income per capita and unemployment rates, presumably through demand (Case and Shiller, 2003). It is important to control for such variables here. Unfortunately, there are no data on local unemployment rates from around 1933 but the Financial Survey itself gives good measures of income changes in reported household incomes for 1930 and 1933. The published survey results (in Wickens, 1941) give incomes for homeowners and tenants separately. We use tenants' income for the results we present, in case homeowners' own income changes biassed their assessment of house values or vice-versa, but all results were very similar if we used the change in owners' income. As an alternative measure of local economic conditions we use the change in retail sales from 1929 to 1933 for the county containing the city. These are the same data used by Fishback, Horrace and Kantor (2005). The original sources for the data give retail sales for cities as well, but the county data are a better match for the results on foreclosure rates that we will present below.

Adding these variables to the RHS, in columns (3) - (5), makes little difference to the building permit coefficients. Coefficients on income change and retail sales are both positive and significantly different from zero, as one would expect.

Recall that the 1934 survey asked tenants to report rental bills in 1933. The same researchers who estimated the change in single-family house prices to January 1934 also estimated the change in a city's average rents from 1930 to 1933, using the survey data for 1933 and re-tabulated 1930 census records (Wickens, 1941, Table B-8 p. 125). For columns (6) and (7) we add the change in average city rents to the RHS. The coefficient on the change in rents is positive, indicating that, as one would expect, house values fell more in cities where rents fell more. But the coefficient on mid-1920s house permits is still positive, significantly different from zero, and even in larger in magnitude than in (1)-(5).

None of our result shows a significant relation between the 1930-34 change in house values and permits for multi-family units, or permits for houses outside the mid-1920s. To make sure that this is not just because of collinearity between those variables, in (8) and (9) we combine all multi-family units into one variable and do the same for early-and late-1920s house permits (the sum of permits 1921-23 and 1927-29, in ratio to 1920 census families). Coefficients on these variables are still not significantly different from zero.

4.3) Changes in house values 1920-30 and 1920-34

Next we examine how mid-20s house permits were related to changes in average values from 1920 to 1930, and over the entire span from 1920 to 1934. There is an important caveat for the results for 1930-30, but together with the results for 1920-34 they indicate that boom cities saw bigger increases in average values from 1920 to 1930.

The caveat is that we cannot make a perfect match between the data for 1920 and 1930. 1920 figures are averages for owner-occupied units including the owner's portion of multi-family structures, *excluding* structures that were not mortgaged (recall owners without mortgages were not asked to report house values). Published 1930 census figures also include the owner's portion of multi-family structures, but include mortgaged structures, and are medians not averages. Researchers for the 1934 survey calculated 1930 figures for most survey cities that are a better match for the 1920 data: *averages* for cities (not metro areas), apparently by re-tabulating census punchcards (Wickens 1941, Table A-6). But they could not exclude non-mortgaged structures from the averages, because the 1930 census collected no information at all about mortgages. This may be a problem. In the 1934 survey, average values were higher for mortgaged houses. If that was also true in 1930, and if the fraction of mortgaged houses in 1930 was larger in cities that had more mid-1920s single-family permits, then there will be a positive bias to any estimated relation between mid-1920s permits and the change in values from 1920 to 1930.

Subject to this caveat, the data indicate that mid-1920s house permits were positively related to the change in house values across 1920-30. Table 6, columns (1) and (2) show results from the better data for the 1934 survey cities. Columns (3) and (4) show results from the published 1930 census medians, which give a larger sample. Generally, the coefficient on mid-20s house permits is positive and significantly different from zero.

For 1934 there are figures for survey cities that exactly match 1920 data. Wickens (1941, Table D-7) gives average values in surveyed cities (excluding outlying areas) for *mortgaged* owner-occupied units (including multi-family structures) only. The last two columns of Table 4 show results of regressions with the 1920-34 change on the LHS. The coefficients on early-20s permits are significantly negative but the coefficients on mid-20s permits are positive and not significantly different from zero. Thus, there is no indication that boom cities' house values *rose less* from 1920 to 1934. Since we know that boom cities' values *fell more* from 1930 to 1934, it seems safe to conclude that boom cities saw greater increases from 1920 to 30.

Of course, the change in a city's average home value from 1920 to 1930 must have been affected by changes in characteristics of the stock due to net construction. If newly-built houses were generally priced higher than old ones, average values would rise more in cities with more construction, whether or not construction was associated with differences in prices of given houses. But this *cannot* account for the apparent relation between mid-1920s permits and the

1920-30 change in average values. Houses built in the late 1920s were even newer, yet coefficients on late-1920s permits are *not* positive.

Finally, we want to know whether the change in house values 1930-34 was actually related to 1920s house construction, or to the change in house values 1920-30, or to both. To do this, we must change the specification a bit. Our measures of house values in 1930 may be affected by unaccounted-for factors (such as measurement errors) absent from our 1934 measures. If we simply added the change in values 1920-30 to the RHS of the specification for Table 3, corresponding to:

$$Ln\ (P_{1934}) - Ln(P_{1930}) = Constant + \beta\ [\ Ln(P_{1930}) - Ln(P_{1920})\ ] + ...$$

then such factors would tend to create a negative estimate for β even if the "true" β were zero. Thus we instead estimate:

$$Ln\ (P_{1934}) = Constant\ + \gamma_1\ Ln(P_{1930})\ + \gamma_2\ Ln(P_{1920})\ + ...$$

which means: $\gamma_1 = 1 + \beta \qquad \gamma_2 = - \beta$

If the true value of β is zero, the estimated coefficient on 1920 values (γ_2) should be close to zero and the estimated coefficient on 1930 values (γ_1) should be close to one. If the true value of β is between zero and negative one, the estimated coefficient on 1920 values should be positive, and the estimated coefficient on 1930 values should be about equal to one *minus* the coefficient on 1920 values.

Results are in Table 7. They indicate the change in values 1930-34 was related to *both* mid-1920s construction and the value change from 1920 to 1930. In all columns, the LHS variable is the log of 1934 single-family house values we have been using all along. For columns (1) and (2), the 1930 number is the average value of single-family houses, which is the best match for the 1934 number but a worse match for the 1920 measure (which is city only, includes owners' portion of multi-family, mortgaged only). For (3) and (4), the 1930 number is the one that best matches the 1920 number (city only, including owners' portion of multi-family, mortgaged and nonmortgaged). Either way, the coefficient on 1920 values is positive (significantly different from zero except in (1)) and the estimated coefficient on 1930 values should be about equal to one *minus* the coefficient on 1920 values. The estimated coefficient on mid-1920s house permits is still negative.

4.4) Foreclosures

Recall that foreclosure counts include foreclosures on multi-family structures. Some of the counties covered by the foreclosure data contained more than one city covered by the building-permit data: for these we aggregated the cities' permits. To control for local economic conditions we add the change in county retail sales 1929-33 to the RHS. The FHLB foreclosure data include New York City and a number of its New Jersey suburbs; we exclude these from our regression samples since we have no sensible definition of "local economic conditions" for such places. On the same grounds we exclude Camden, New Jersey (a suburb of Philadelphia). A number of states had more than one county included in the foreclosure data. State laws (such as, in the early 1930s, foreclosure moratoriums [Wheelock, 2008]) are a potentially important factor affecting foreclosure rates, given economic local conditions. Thus, it may be appropriate to cluster standard errors at the state level.

Table 8, columns (1) and (2) show results for the average foreclosure rate 1932-34, with and without clustered SE's. The coefficient on mid-1920s house permits is positive and significantly different from zero, indicating that boom cities saw higher foreclosure rates in the downturn. The coefficient on late-1920s multifamily permits is also significantly positive. Foreclosure rates for 1926, in column (3), and 1935-37 in (4), appear unrelated to any of the permit variables.

Only 15 counties in the foreclosure data contain cities covered by the 1934 survey, so we cannot very well estimate the relation between foreclosures and house value changes 1930-34. But figure 7 is a scatterplot of these counties' average foreclosure rates 1932-34 against changes in house values for the survey cities they contain. The obvious negative relation indicates that foreclosure rates were higher in counties where city house values fell more.

4.5) Homeownership rates

Changes in homeownership rates should reflect the relative frequency of foreclosures and distressed sales. Assuming a family is unlikely to buy another house shortly after a foreclosure or distressed sale, and some degree of persistence in residence in a city, cities that experienced higher rates of distressed sales and foreclosures over 1929-33 would show greater decreases in homeownership rates from 1930 to 1934.

Table 9, columns (1) - (5) shows results of regressing changes in ownership rates 1930-34 on various combinations of 1920s construction permits and changes in income or rents 1930-34. Coefficients on mid-20s house permits are generally negative: in the 1929-33 downturn, homeownership rates fell more in cities that had boomed in the mid-1920s. Figure 6 is a scatterplot that shows the negative correlation between the change in the homeownership rate 1930-34 and mid-1920s single-family permits. As the stock of structures was more or less fixed over 1930-34, this correlation indicates that over the 1929-33 downturn boom cities saw more conversions of formerly owner-occupied units to rental or vacancy.

Was the change in the homeownership rate actually related to 1920s permits, or to the 1930-34 change in house values? Because the homeownership data are for survey cities, we can check. For column (6), RHS variables were mid-1920s house permits rates and the 1930-34 change in house values. The coefficient on permit rates is significantly different from zero and about the same as in the other columns. The coefficients on the value change 1930-34 is not significantly different from zero. Apparently it was really a city's participation in the mid-1920s boom, not the change in house values that was related to the change in the homeownership rate.

Columns (7) and (8) show results for change in homeownership rates 1920-30. Here the coefficient on mid-1920s house permits is positive and significantly different from zero, showing that boom cities saw greater *increases* in homeownership across the 1920s. With the change 1920-34 on the LHS, in (9), the coefficient on mid-1920s permits is positive but not significantly different from zero.

5) Remaining questions

Clearly, a city's participation in the mid-1920s house boom was strongly related to the degree of distress in its house market after 1930. But what was the mechanism linking the mid-1920s boom to house market conditions after 1929? And why did those particular cities boom in the mid-1920s?

5.1) What was different about boom cities in 1929?

In 1930, the peak of the single-family house boom was four or five years in the past. Why did the cities that had boomed then experience higher foreclosure rates and greater decreases in perceived house values in the Great Depression? What was different about boom cities as of 1929? Research on postwar house markets suggests some possibilities.

In the aftermath of local booms in the postwar era, asking prices of homeowners attempting to sell their houses have exhibited "downward stickiness," falling much slower than prices in realized sales, while the number of housing units for sale and the average time a unit remains on the market increase (Genesove and Mayer, 2001; Case and Qigley, 2008). Benitez-Silva et. al. (2010) find that a homeowner overestimates the value of his house more if he bought the house at a time of rising house prices, mainly because he overestimates subsequent capital gains.

Perhaps house prices were also subject to downward stickiness in the late 1920s. If so, then as of 1929 homeowners' estimates of potential sale prices could have been higher, relative to actual sale prices, in mid-1920s boom cities. House markets in these cities would more likely be in a state of disequilibrium, with asking prices unusually high relative to selling prices and larger numbers of houses on the market, unsold, for longer. As overestimates dissipated after 1929, perhaps especially fast in response to the conspicuous events of the Depression, perceived values would fall farther in boom cities because they had been further above equilibrium in 1930. If this hypothesis is correct, as of 1929 boom cities should have tended to have higher fractions of houses for sale, longer average times on the market and higher ratios of homeowners' estimates to actual sale prices. Unfortunately, we have not found data on such variables from around 1929.

Another mechanism apparent in postwar data is interaction between shocks to a local house market and the degree to which homeowners in the market are already leveraged. In data from 1984-1994, Lamont and Stein (1999) found that house values were more sensitive to changes in per-capita income in metropolitan areas where homeowners reported especially high ratios of mortgage debt to house values. Perhaps homeowners in mid-1920s boom cities were more leveraged as of 1929, and that magnified the effect of the cyclical downturn on those cities' house markets. Also, in the late 1920s many mortgages were outright balloon loans with maturities as short as five years (White, 2009). Perhaps in boom cities more balloon mortgages came due in 1930-33 - about five years after the boom. According to Hickman (1960, p. 323) "after the boom collapsed many a borrower was unable to refinance his mortgage balance when it came due. Foreclosures and distress sales would hve been fewer..during the early 1930's had mortgages been fully amortized."

Unfortunately, we have found no cross-sectional data on homeowners' mortgage debt around 1929. As we have noted, the 1930 census collected no information about mortgage debt. The 1934 Financial Survey gathered extensive data from homeowners on their mortgage debt at the time of the survey. It also asked about their mortgage debt back in 1930. We have calculated homeowners' leverage (mortgage debt as a fraction of mortgaged homes' values, or as a fraction of all homes' values) in our cities in 1920, and in 1930 based on the retrospective data from 1934 homeowners. We have found no relation between these variables and 1920s permits, changes in house values or ownership rates. But 1934 homeowners were a select group. They had survived the wave of foreclosures in 1932-33. There is no telling what we would find if we had information about leverage of *all* homeowners in 1930, including those who lost their homes before 1934.

5.2) What was different about boom cities in the early 1920s?

Models of house markets discussed above imply that a general increase in house prices and building can be caused by decreases in real interest rates, innovations that loosen credit supply in imperfect financial markets, and factors that increase the utility people derive from a unit of housing. Under rational expectations, price increases at the inception of a boom reflect forecasts of shocks' effects on (implicit) rents in the long run, when the building supply response is complete. In models with bubbles, people incorrectly extrapolate experienced price increases into expectations of the future, with feedback to current prices, so fundamental shocks that would tend to raise a market's prices can cause bigger price increases and more building than would occur under rational expectations, until the bubble bursts.

With or without bubbles, a general shock can cause some local markets to boom more than others as the shock interacts with localities' pre-existing characteristics. Shocks that change the nature of local amenities, or the functional relation between population size and endogenous amenities, can boost some localities' rank in the long-run structure of relative house prices. Empirical studies of postwar housing markets have found that financial innovations in mortgage credit raised house prices more in localities where credit had been especially restricted before due to a lack of local lending institutions or low wealth of potential borrowers (Mian and Sufi, 2010; Favara and Imbs, 2011). Studies have examined the possibility that relative house prices in hot localities were raised by the technological innovation of air conditioning, which raised the amenity value of their climates (Biddle, 2012). In the 2000s price increases were larger relative to growth in housing supply in metro areas where local government regulations restricted land development (Saks, 2007; Gyourko, Saiz and Summers 2008) or geography restricted the marginal supply of buildable land (Saiz, 2010).

The house-building boom of the 1920s has been attributed to automobiles; low, stable real interest rates; new types of financial intermediaries that supplied more credit to homebuyers and builders; and a lack of house building during the First World War which left housing supply below equilibrium at the start of the 1920s (White, 2009). The last factor cannot explain the mid-1920s: a supply snapback should be associated with *falling* prices. But the others would tend to raise prices as well as construction. Automobiles, that is to say the decreasing cost of quality-adjusted automobiles and the development of supporting infrastructure, meant a decrease in the cost of a key complement to single-family detached houses, individual transportation. In a model that does not include transportation explicitly, the spread of automobiles would correspond to an increase in the utility of services from a single-family house.

Automobiles and 1920s financial innovations could have affected house prices in some cities more than others. Along with raising the utility of single-family houses, automobiles must have changed the functional relation between local population and amenities, through the nature of congestion costs. The rise of an earlier transportation technology, railroads, had clearly reordered local amenities since the early nineteenth century as it reduced the value of proximity to navigable water (Glaeser and Kohlhase, 2004). The new mortgage institutions of the 1920s, building and loan associations and mutual savings banks, grew faster in some regions at least partly due to differences in state regulations; perhaps more importantly, they appeared in regions where mortgage credit was relatively restricted prior to the 1920s (Snowden, 2003).

For us, the question is whether there are measures of cities' characteristics as of, say 1920, that have strong predictive value for cross-sectional variations in mid-1920s single-family permit counts, particularly the component that is orthogonal to permit counts in other periods. So far, we have not found any such data. (Of course, we may have been trying the wrong specifications.) Further research on regional aspects of 1920s mortgage finance institutions may bear high returns here.

6) Conclusion

To conclude, we review what we have found in the data, then pull together our interpretation - a picture of what happened in American house markets over the 1920s and early 1930s.

We have found that across the 1920s, from 1920 to 1930, homeownership rates and homeowners' estimates of house values rose more in cities which issued especially large numbers of single-family house building permits in the mid-1920s. At the same time, these cities did not experienced especially high growth in the number of census families. In the Great Depression, these cities experienced especially large declines in homeowners' estimates of house values and homeownership rates, and especially high rates of foreclosure.

Our interpretation is that in the early 1920s some set of fundamental shocks, perhaps including the development of automobiles and new mortgage finance institutions, tended to raise house prices and construction in some cities more than others. By the mid-1920s differences were reenforced by a feedback mechanism of irrational expectations in a bubble. Then the bubble burst. Prices and construction began to fall. In cities where prices and construction had most outrun fundamentals, a large fraction of building permits was abandoned (which helps account for the absence of a relation between mid-1920s permits and growth in census families) and prices had the farthest to fall.

In 1929, house markets in the cities that had boomed in the mid-1920s were still in disequilibrium. In these cities vacancy rates were high (which also helps account for our results on census families) and homeowners' estimates of potential sale prices were high relative to actual sale prices, so value estimates were high relative to 1920 whether or not that was still true of actual sale prices. Homeowners in these cities may have had more mortgage debt, on average, and more balloon mortgages taken out in the boom that were about to come due.

Then the Depression hit. As homeowners' value overestimates were corrected, perceived values fell more in former boom cities. Actual sale prices may have fallen more, too, as sticky asking prices became unstuck and a backlog of sellers who had been holding out for above-market prices gave in. As the general decline in income interacted with relatively high leverage, rates of foreclosure and distress sales were higher in former boom cities, and homeownership rates fell more.

Our story fits the evidence, but we admit it is long on speculation. We have hopeful, perhaps irrational expectations that it will be validated by future research. In any case, our results can leave little doubt that cities more affected by the house boom of the 1920s suffered greater declines in house values and higher foreclosure rates during the Great Depression. Thus, we have found evidence the 1920s real estate boom contributed to the Great Depression through wealth and financial channels.

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Table 1 Changes in house prices around 2006

Metropolitan areas (MSA's)

LHS variable: Change in log house price, FHFEO index
Permit rate: Residential building permits (houses and apartments) / Housing units in 2000 census

Coefficient
[Standard error]
p-value

	Permit rate in year					
	2000	2001	2002	2003	2004	2005
A) Bust	(1)	(2)	(3)	(4)	(5)	(6)
Price change 2006 – 2008	-5.809 [1.143] *0.00*	-5.095 [1.073] *0.00*	-5.069 [0.968] *0.00*	-4.247 [0.473] *0.01*	-4.395 [0.704] *0.00*	-3.595 [0.614] *0.00*
Number obs.	260	260	260	260	261	261
R2	0.09	0.08	0.10	0.03	0.13	0.12
	1984	1985	1986	1987	1988	1989

	2000	2001	2002	2003	2004	2005
B) Boom	(1)	(2)	(3)	(4)	(5)	(6)
Price change 2004-2006	3.347 [0.751] *0.00*	3.336 [0.697] *0.00*	3.596 [0.623] *0.00*	3.886 [0.533] *0.00*	3.406 [0.442] *0.00*	3.336 [0.370] *0.00*
Number obs.	260	260	260	260	261	261
R2	0.07	0.08	0.11	0.17	0.19	0.24

Table 2 Changes in Average Estimated Values of Single-Family Owner-occupied Houses

City	$Average value 1930	1934	Percent Change
Portland, ME	6875	5453	-20.7
Providence, RI	6981	5370	-23.1
Austin, TX*	4918	3779	-23.2
Topeka, KS	4176	3203	-23.3
Waterbury, CT	8995	6822	-24.2
Baton Rouge, LA*	5449	4124	-24.3
Boise, ID*	4463	3323	-25.5
Salt Lake City, UT	4566	3398	-25.6
Peoria, IL	6168	4590	-25.6
Worcester, MA	8144	6038	-25.9
Hagerstown, MD*	6709	4973	-25.9
Butte, MT	3254	2412	-25.9
Fargo, ND*	6561	4850	-26.1
Saint Paul, MN	5604	4142	-26.1
Minneapolis, MN	6346	4643	-26.8
Sioux Falls, SD	5218	3744	-28.2
Columbia, SC	6617	4730	-28.5
Saint Joseph, MO	4419	3153	-28.6
Indianapolis, IN	5985	4238	-29.2
Richmond, VA	7197	4967	-31.0
Des Moines, IA	5026	3458	-31.2
Portland, OR	5004	3434	-31.4
Springfield, MO*	4172	2863	-31.4
Cleveland, OH	9684	6596	-31.9
Wheeling, WV	5026	3411	-32.1
Lincoln, NE	5583	3775	-32.4
Racine, WI	7224	4863	-32.7
Casper, WY*	3684	2455	-33.4
Sacramento, CA	5803	3837	-33.9
Jackson, MS	5535	3652	-34.0
Pueblo, CO	2884	1889	-34.5
Erie, PA	7905	5127	-35.1
Kenosha, WI	8140	5249	-35.5
Oklahoma City, OK	5871	3773	-35.7
Atlanta, GA	6701	4288	-36.0
Binghamton, NY	8232	5240	-36.3
Jacksonville, FL	6128	3890	-36.5
Trenton, NJ	6360	4029	-36.7
Wichita, KS	4649	2938	-36.8
Greensboro, NC*	7432	4663	-37.3
Seattle, WA	5166	3086	-40.3
Little Rock, AR	5533	3280	-40.7
Phoenix, AR	7080	4175	-41.0
Dallas, TX	5973	3422	-42.7
Lansing, MI	6192	3545	-42.7
Paducah, KY*	3780	2124	-43.8
Syracuse, NY	10340	5580	-46.0
San Diego, CA	6747	3583	-46.9
Birmingham, AL	5662	2939	-48.1
Wichita Falls, TX*	5364	2574	-52.0

*No construction permit data

Table 3: Correlations between Construction Permits and Changes in Census Families

A) 254 cities

			House Permits		Multi-family permits	
	ΔLn(Families)	1924-26	1921-23	1927-29	1924-26	1921-23
	(1)	(2)	(3)	(4)	(5)	(6)
Houses 24-26	0.73					
Houses 21-23	0.68	0.79				
Houses 27-29	0.71	0.69	0.51			
Multi-fam. 24-26	0.46	0.14	0.13	0.03		
Multi-fam. 21-23	0.47	0.13	0.25	0.10	0.59	
Multi-fam. 27-29	0.58	0.28	0.24	0.28	0.80	0.52

B) 40 cities

		House Permits		Multi-family permits		
	ΔLn(Families)	1924-26	1921-23	1927-29	1924-26	1921-23
	(1)	(2)	(3)	(4)	(5)	(6)
Houses 24-26	0.69					
Houses 21-23	0.70	0.79				
Houses 27-29	0.84	0.71	0.70			
Multi-fam. 24-26	0.27	0.43	0.36	0.18		
Multi-fam. 21-23	0.36	0.10	0.22	0.10	0.47	
Multi-fam. 27-29	0.54	0.38	0.42	0.73	0.40	0.23

Table 4: Change in City Census Families, 1920-30

Coefficient
[White robust SE]
p-value

Sample:	254 cities (1)	40 cities (2)	254 cities (3)	40 cities (4)	40 cities (5)
Coeffs.					
Houses 21-29	0.971	0.789			
	[0.142]	[0.142]			
	0.00	*0.00*			
Multi-fam. 21-29	0.751	0.716			
	[0.053]	[0.121]			
	0.00	*0.00*			
Houses 24-26			-0.736	-0.789	-0.508
			[0.570]	[0.129]	[0.765]
			0.20	*0.54*	*0.51*
[illegible] 21-23			1.953	1.496	2.259
			[0.451]	[1.475]	[0.700]
			0.00	*0.32*	*0.00*
Houses. 27-29			2.233	3.988	2.685
			[0.540]	[2.273]	[1.323]
			0.00	*0.09*	*0.05*
Multi-fam. 24-26			1.081	1.424	
			[0.479]	[1.574]	
			0.02	*0.37*	
Multi-fam. 21-23.			1.263	0.692	
			[0.344]	[2.579]	
			0.00	*0.79*	
Multi-fam. 27-29.			0.084	-2.301	
			[0.500]	[1.477]	
			0.87	*0.13*	
R2	*0.97*	*0.85*	*0.97*	*0.88*	*0.78*
R bar 2	*0.97*	*0.84*	*0.97*	*0.86*	*0.77*

Table 5: Changes in House Values 1930-34
40 cities

Coefficient
[White robust SE]
p-value

Coeff. on	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Houses 24-26	-2.126	-2.206	-2.141	-2.131	-2.346	-2.610	-2.511	-2.079	-2.515
	[0.982]	[0.784]	[0.875]	[0.579]	[0.845]	[0.993]	[0.608]	[0.590]	[0.620]
	0.04	*0.01*	*0.02*	*0.00*	*0.01*	*0.01*	*0.00*	*0.00*	*0.00*
Houses. 21-23	-0.134	-0.126	-0.347	-0.487	-0.437	0.359	0.069		
	[1.190]	[1.176]	[1.060]	[1.079]	[1.119]	[1.105]	[1.136]		
	0.91	*0.92*	*0.75*	*0.65*	*0.70*	*0.75*	*0.95*		
Houses. 27-29	-0.767	-1.179	-0.278	-0.745	0.735	0.612	-0.007		
	[1.612]	[0.964]	[1.695]	[0.913]	[1.654]	[1.932]	[0.957]		
	0.64	*0.23*	*0.87*	*0.42*	*0.66*	*0.75*	*0.99*		
Multi-fam. 24-26	-0.786		-0.666		-1.166	-0.669			
	[1.542]		[1.523]		[1.530]	[1.780]			
	0.61		*0.67*		*0.45*	*0.70*			
Multi-fam. 21-23.	0.465		-0.879		1.068	-1.467			
	[1.392]		[1.259]		[1.740]	[1.365]			
	0.74		*0.49*		*0.54*	*0.29*			
Multi-fam. 27-29.	-0.972		-0.997		-1.258	-1.060			
	[2.029]		[2.275]		[2.052]	[2.398]			
	0.74		*0.66*		*0.54*	*0.66*			
House . 21-23+ 27-29								-0.745	0.808
								[0.961]	[1.182]
								0.44	*0.50*
Multi-fam. 21-29.								-2.459	-2.926
								[1.816]	[1.884]
								0.18	*0.13*
ΔIncome tenants			0.299	0.263				0.290	
			[0.135]	[0.127]				[0.128]	
			0.04	*0.05*				*0.03*	
ΔRetail sales					0.288				
					[0.115]				
					0.02				
ΔRents						0.356	0.310		0.346
						[0.122]	[0.100]		[0.120]
						0.01	*0.00*		*0.01*
R bar 2	0.32	0.38	0.40	0.43	0.41	0.44	0.46	0.45	0.49

Table 6: Changes in House Values 1920-30 and 1920-34

Coefficient
[White robust SE]
p-value

Coeff. on	1920-30, 45 cities (1)	1920-30, 45 cities (2)	1920-30, 254 cities (3)	1920-30, 254 cities (4)	1920-34, 42 cities (5)	1920-34, 42 cities (6)
Houses 24-26	5.353	4.167	3.614	4.145	2.122	1.631
	[2.185]	[1.738]	[1.420]	[1.355]	[1.268]	[1.045]
	0.02	*0.02*	*0.01*	*0.00*	*0.10*	*0.13*
Houses. 21-23	-6.107	-5.060	-4.215	-3.946	-5.796	-5.337
	[2.310]	[2.111]	[1.223]	[1.229]	[1.451]	[1.319]
	0.01	*0.02*	*0.00*	*0.00*	*0.00*	*0.00*
Houses. 27-29	-0.749	0.005	-1.441	-1.936	-3.359	-1.291
	[3.638]	1.666	[0.797]	[0.773]	[2.505]	[1.141]
	0.84	*1.00*	*0.07*	*0.01*	*0.19*	*0.26*
Multi-fam. 24-26	-3.198		2.635		0.659	
	[3.338]		[0.761]		[1.887]	
	0.34		*0.00*		*0.73*	
Multi-fam. 21-23.	5.674		0.331		3.144	
	[5.362]		[0.370]		[2.782]	
	0.30		*0.37*		*0.27*	
Multi-fam. 27-29.	1.418		-0.208		3.876	
	[4.483]		[0.721]		[3.487]	
	0.75		*0.77*		*0.27*	
R bar 2	0.04	0.09	0.16	0.06	0.32	0.34

Table 7: Changes in House Values 1920-30 and 1920-34 and 1920s Construction Permits

LHS variable: Ln (1934 house value)
Coefficient
[White robust SE]
p-value

40 cities

Coeff. on	(1)	(2)	(3)	(4)
1930 value matching 1934 measure	0.796	0.773		
	[0.097]	[0.084]		
	0.00	*0.00*		
1930 value matching 1920 measure			0.644	0.625
			[0.111]	[0.110]
			0.00	*0.00*
1920 value	0.147	0.169	0.336	0.348
	[0.104]	[0.085]	[0.130]	[0.125]
	0.15	*0.05*	*0.01*	*0.01*
Permits Houses 24-26	-2.870	-2.697	-2.944	-2.788
	[0.515]	[0.482]	[0.650]	[0.595]
	0.00	*0.00*	*0.00*	*0.00*
ΔIncome tenants	0.242		0.167	
	[0.135]		[0.157]	
	0.08		*0.30*	
ΔRetail sales		0.328		0.277
		[0.089]		[0.113]
		0.00		*0.02*
R bar 2	0.92	0.94	0.88	0.89

Table 8 Foreclosure Rates

Coefficient
[White robust SE]
p-value

	1932-34 Clustered SE (1)	(2)	1926 (3)	1935-37 (4)
Counties	58	58	58	57
Coeff on.				
Houses	0.74	---	-0.01	0.15
1924-26	[0.34]	[0.30]	[0.04]	[0.22]
	0.04	*0.02*	*0.87*	*0.49*
Houses.	-0.64	---	0.01	-0.32
1921-23	[0.35]	[0.37]	[0.05]	[0.28]
	0.08	*0.09*	*0.87*	*0.26*
Houses.	-0.61	---	0.00	-0.13
1927-29	[0.26]	[0.26]	[0.04]	[0.17]
	0.03	*0.02*	*0.93*	*0.44*
Multi-fam.	0.05	---	-0.04	0.06
1924-26	[0.43]	[0.41]	[0.05]	[0.28]
	0.91	*0.91*	*0.41*	*0.84*
Multi-fam.	-0.39	---	0.05	0.10
1921-23.	[0.24]	[0.28]	[0.06]	[0.29]
	0.12	*0.17*	*0.44*	*0.74*
Multi-fam.	1.32	---	0.04	0.20
1927-29.	[0.52]	[0.50]	[0.07]	[0.38]
	0.02	*0.01*	*0.53*	*0.60*
Δ Retail	-0.05	---	0.00	-0.04
Sales	[0.02]	[0.02]	[0.00]	[0.02]
1929-33	*0.02*	*0.03*	*0.18*	*0.04*
R2	0.35	0.35	0.10	0.13

Table 9: Changes in Homeownership Rates

Coefficient
[White robust SE]
p-value

	1930-34						1920-30		1920-34
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cities	40	40	40	40	43	43	254	43	43
<u>Coeffs.</u>									
Houses 24-26	-68.722 [39.656] *0.09*	-82.164 [33.177] *0.02*	-67.002 [33.606] *0.05*	-79.406 [29.516] *0.01*	-68.907 [33.235] *0.04*	-64.385 [23.283] *0.01*	83.588 [32.565] *0.01*	120.928 [44.364] *0.01*	52.021 [57.053] *0.37*
Houses. 21-23	-24.080 [35.500] *0.50*	-7.204 [30.943] *0.82*	-17.139 [41.595] *0.68*	-2.760 [34.552] *0.94*	-2.766 [41.574] *0.95*		-114.328 [31.800] *0.00*	-139.575 [41.201] *0.00*	-142.341 [64.595] *0.03*
Houses. 27-29	-47.411 [63.891] *0.46*	-15.353 [53.310] *0.78*	-17.139 [41.595] *0.68*	13.491 [44.433] *0.76*	-34.419 [39.349] *0.39*		-35.990 [39.164] *0.36*	-35.419 [45.046] *0.44*	-69.838 [51.288] *0.18*
Multi-fam. 24-26	35.336 [39.816] *0.38*	50.247 [43.712] *0.26*							
Multi-fam. 21-23.	35.336 [39.816] *0.381*	-0.336 [47.583] *0.99*							
Multi-fam. 27-29.	63.071 [93.484] *0.50*	60.947 [69.544] *0.39*							
ΔIncome tenants	4.058 [5.319] *0.45*		5.441 [5.293] *0.31*						
ΔRents		10.029 [4.594] *0.04*		11.016 [4.941] *0.03*					
ΔHouse Value 30-34						8.495 [5.352] *0.12*			
R bar 2	0.39	0.48	0.37	0.47	0.39	0.40	0.09	0.20	0.19

Figure 1

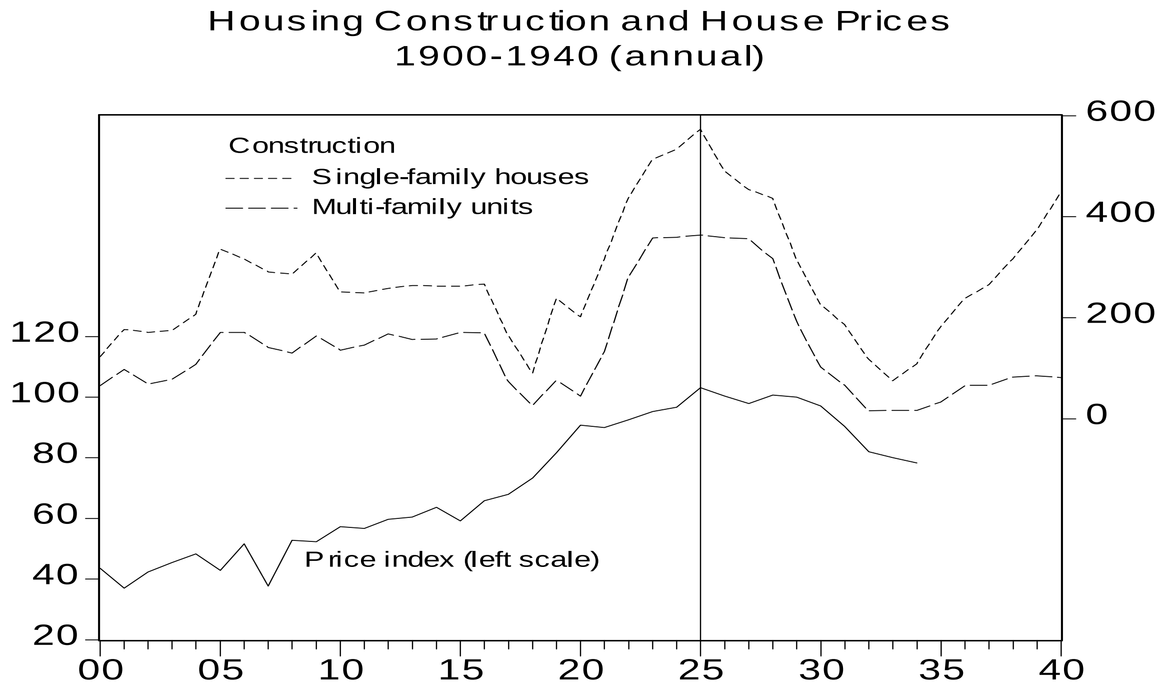

Figure 2

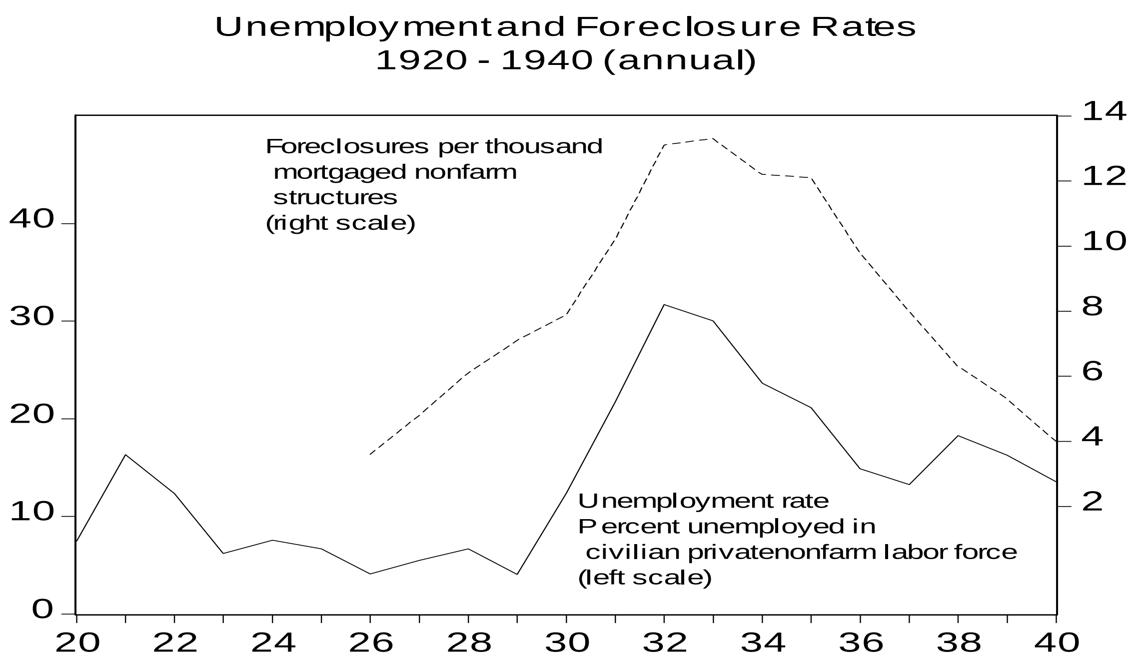

Figure 3

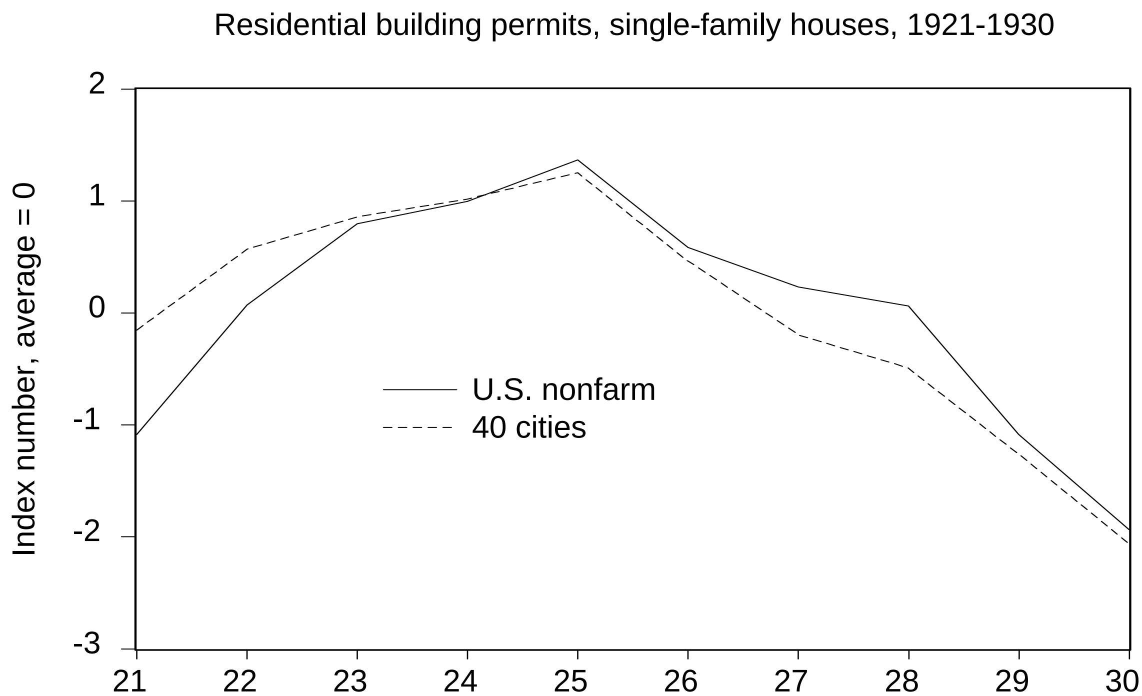

Figure 4

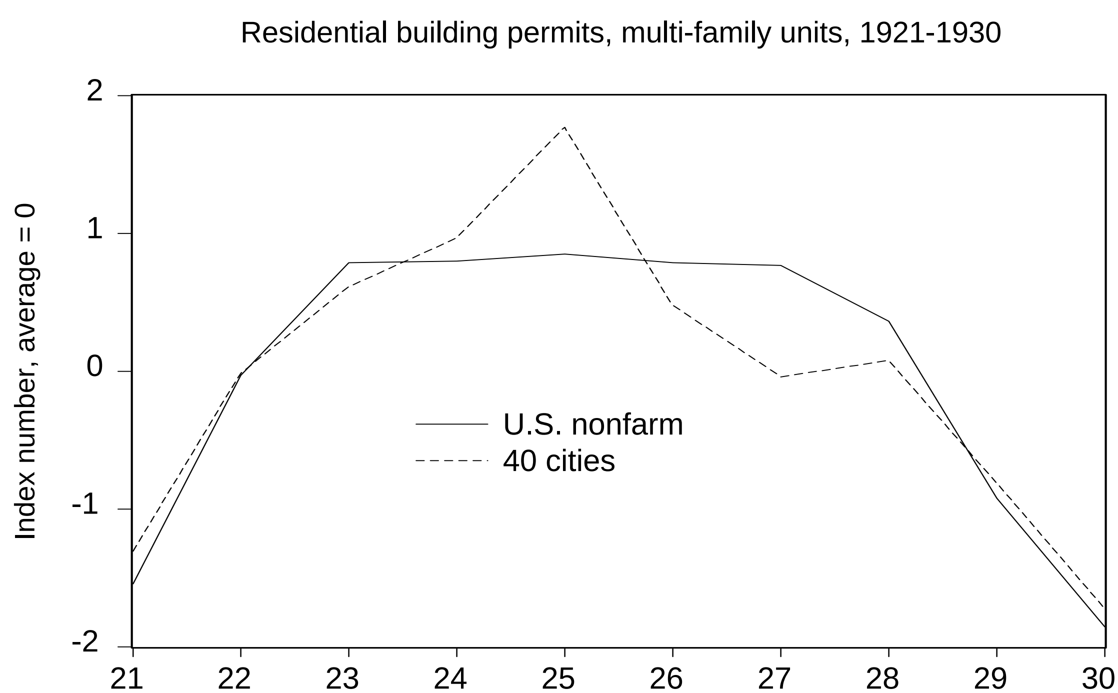

Figure 5 Change in Average House Values 1930-34 and Mid-20s House Permits

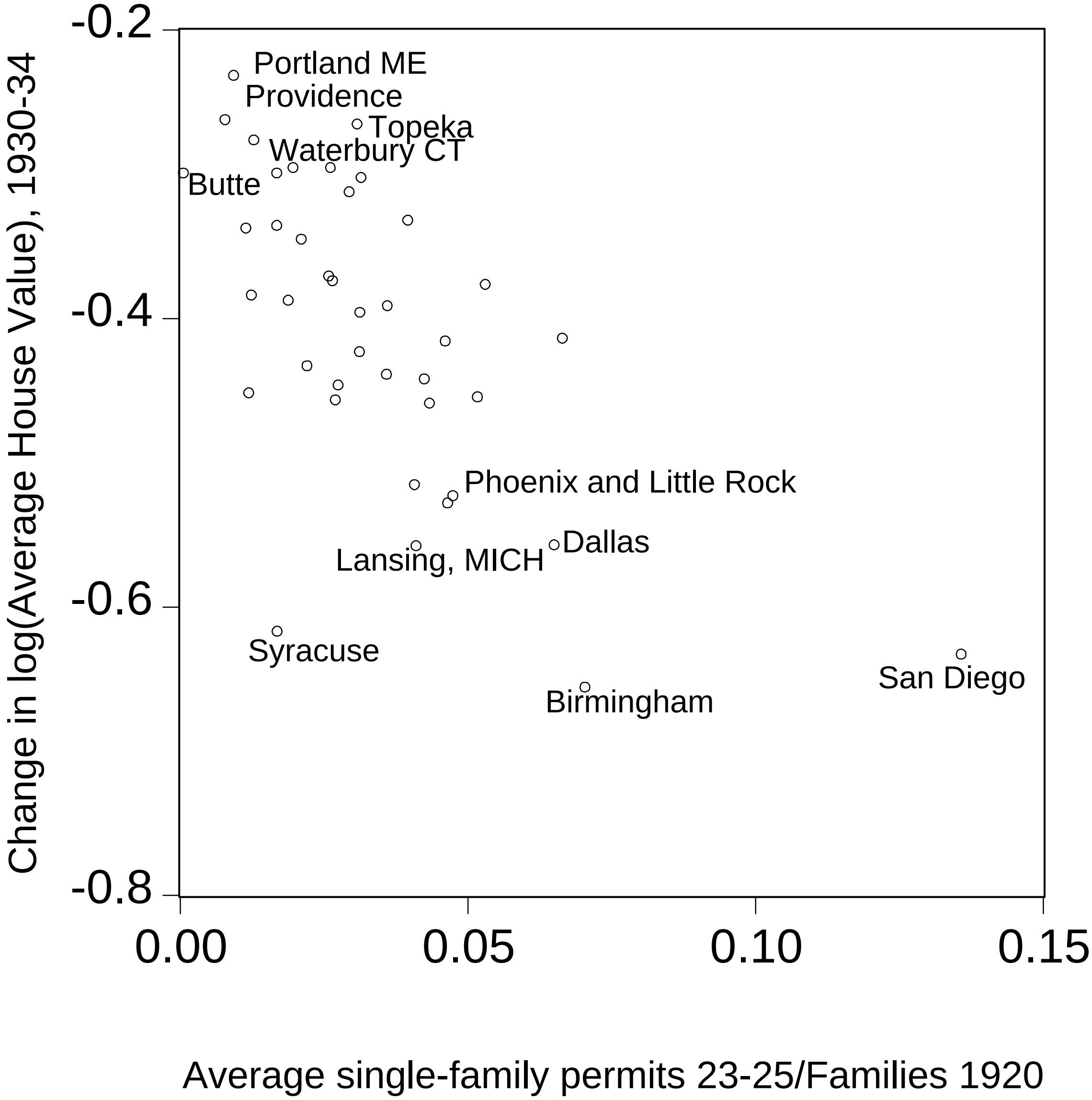

Figure 6 Change in Ownership Rate 1930-34 and Mid-1920s House Permits

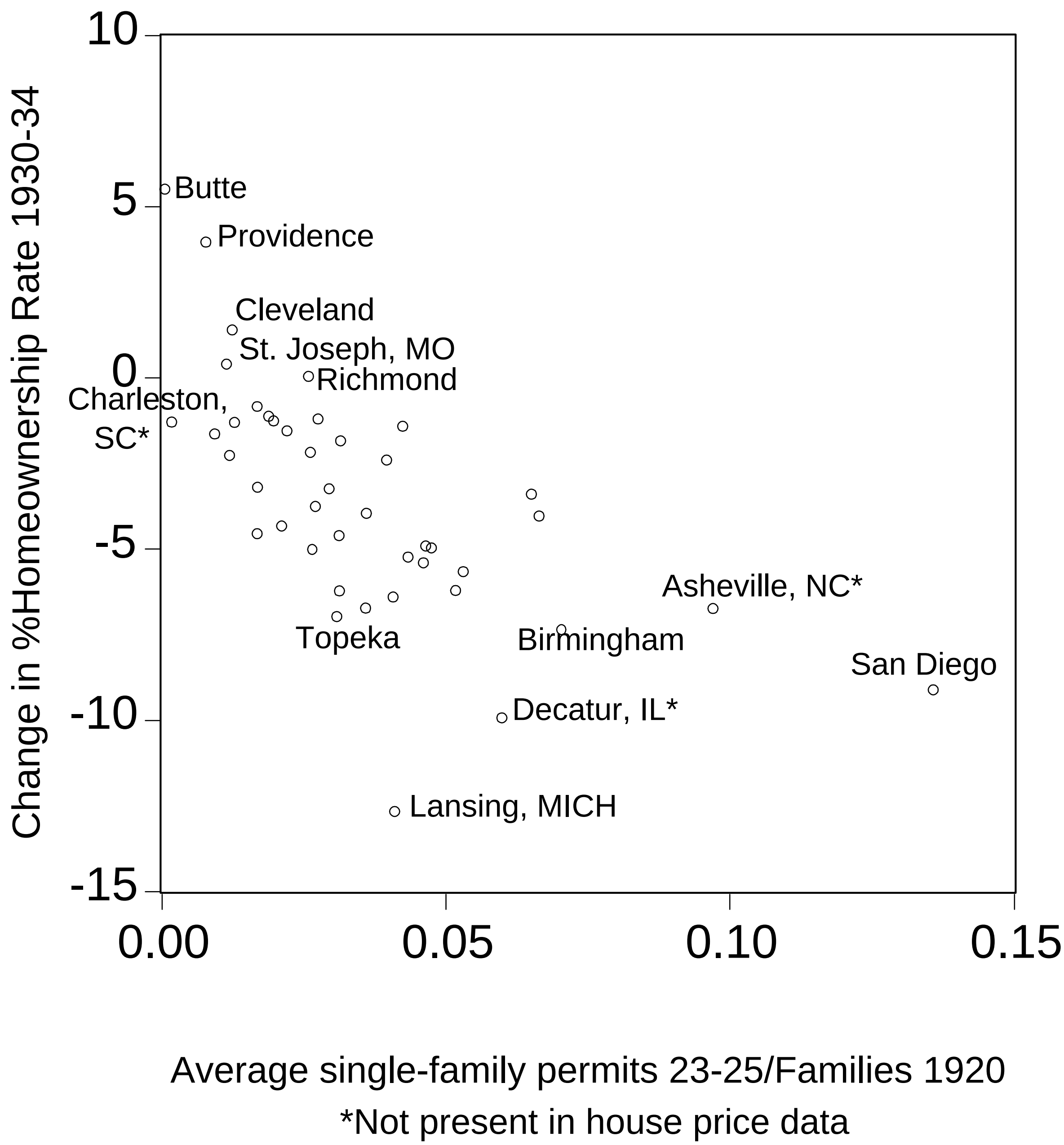

Figure 7 Foreclosure Rates 1932-34 and Change in Average House Values 1930-34