



A Nation of Gamblers: Real Estate Speculation and American History

By **Edward L. Glaeser** (Harvard University)

Introduction

Between 1996 and 2006, there was a 53 percent real increase in housing prices in the United States. Between 2006 and 2011, real housing values decreased by 28 percent. This sharp increase then almost equally sharp reversion to the mean was the Great Housing Convulsion.

Figure 1 shows how the increase, then decrease, in real estate prices was consistent across the country but the magnitude varied widely. The figure shows the relationship between the change in the logarithm of Federal Housing Finance Agency (FHFA) prices between 2000 and 2006, and the change in the logarithm of FHFA prices between 2006 and 2012. It illustrates both the remarkable amount of mean reversion (the regression coefficient is $-.85$) across areas and the tremendous heterogeneity across the United States.

Economists have now studied this Great Housing Convulsion extensively, but many questions remain unresolved. Why did spectacular booms and busts occur when and where they did? Were buyers largely rational, or were their beliefs inconsistent with any sensible model of housing prices? What role did credit markets play in fueling the boom or causing the bust? Finally,

what are the policy implications of the Great Convulsion?

This policy brief, drawn from a more detailed lecture and paper¹, examines America's long history of real estate speculation to shed light on recent events. First, rural land speculation is examined across three time periods — 18th Century Speculation in New York State, the 1815-1819 Huntsville Cotton Land Boom, and the 1900-1940 Iowa Wheat Land Cycle. Next, three episodes of urban speculation, confined to specific cities, are studied — The Chicago Boom: 1830-1841, Los Angeles in the 1880s, and New York City: 1890-1933. Last, metropolitan speculation, spread across urban areas and their surrounding suburbs, is reviewed across three periods and locations — “The Housing Bubble That Didn't Happen” after World War II, California in the 1970s and 1980s, and, finally, the Great Housing Convulsion: 1996 – 2012. From these nine episodes, six key lessons are drawn.

The first and most obvious lesson of this history is that America has always been a nation of real estate speculators. Real estate speculation was an integral part of the “winning of the west,” the construction of our cities, and the transformation of American home life, from tenements to mini-mansions.

Taubman Center Policy Briefs are short overviews of new and notable research on key issues by scholars affiliated with the Center. This policy brief is based on the text of the 2013 Ely Lecture presented at the American Economics Association convention in San Diego. The text of the lecture is available in full in the forthcoming issue of the American Economic Review.

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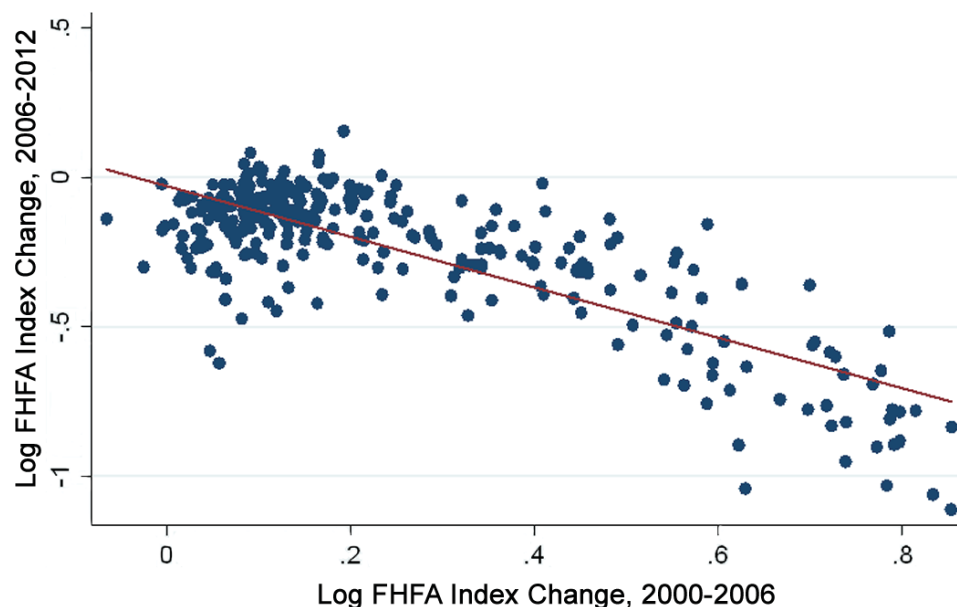
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Figure 1: Mean Reversion in MSA Housing Prices
2000 - 2006 and 2006 - 2012



Source: Price data from the Federal Housing Finance Agency (FHFA)
<http://www.fhfa.gov/Default.aspx?Page=87>

The second lesson is that these boom-bust cycles can generate significant social costs, primarily through ensuing financial chaos. This fact implies some urgency to rethinking the national and local policies that impact housing markets. If buyers are particularly prone to engage in wishful thinking about future price appreciation, then policies that encourage homeowner borrowing can lead to larger social losses.

The third lesson is that the high prices paid during the boom and the low prices paid during the bust are typically compatible with reasonable models of housing valuation and defensible beliefs about future price growth. Manhattan's builders in 1929 could justify their land purchases based on office rents at the time. Real estate economists have examined price-to-rent ratios in 2004 and argued that they seemed reasonable given plausible expectations about future price growth and current capital costs.

The fourth major lesson is that under-priced default options can often help explain high

prices even though low interest rates have been less important than other factors in generating price booms. The Chicago land boom of 1836-37 was coincident with the chartering of two new state-supported Illinois banks. Securitization of mortgages for builders in the 1920s appears to have decreased the downsides of development, and increased credit availability also boosted prices during the recent boom.

The fifth lesson is that the dominant mistake made by investors is underestimating the impact that elastic long-run supply of land, structures and crops will have on future land values. Land buyers during Alabama's 1819 land boom look sensible given then-current cotton prices and trends, but land values depreciated as cotton prices fell with increased U.S. and worldwide supply. Home buyers in Las Vegas and Phoenix in 2005 seem to have misunderstood the almost perfectly elastic supply of homes in America's deserts.

The sixth lesson is that the Great Housing Convulsion of the past 16 years is unlike

previous booms in at least one major way. In every previous episode there was significant uncertainty about major economic trends that would impact land values and housing prices. In the late 18th century, it was unclear how quickly transportation costs could fall and how fast Americans would move west. The future appeal of dense downtowns, like Chicago and New York, was unsure in 1835 and still unsure a century later. There is no obvious equivalent source of uncertainty during the Convulsion.

Limited Rationality and Housing Markets

Before delving into more detail about the historic housing booms, a framework of economic analysis is presented. Over the past 20 years, spurred on by experimental evidence and events like the Internet equity boom and bust, economics has increasingly embraced “behavioral” models that assume either limited cognition or downright irrationality. Surveys of home buyers during booms suggest that they hold a dizzying array of apparently inconsistent beliefs about future prices. Buyers in Boston in 2004, for example, on average report that they believe that housing prices will increase by 10.6 percent in each of the next ten years, but only by 7.6 percent in the next year. These beliefs have many plausible sources. Some buyers may be extrapolating from recent trends; others may be engaged in wishful thinking about the value of their largest asset. “Entrepreneurs of error” may persuade buyers that home prices will experience dazzling future growth. The history of real estate bubbles is replete with examples of interested parties hyping local land values.

Though behavioral models are quite useful, economic models will lose all discipline if they treat investors as blank slates that irrationally absorb any foolish notion that they hear. An alternative approach is to assume that such beliefs are limited by sensible models of asset valuation. There are two reasonable models that can be used to justify prices during a

boom. The first is a “Gordonian” approach, which uses finance to determine the net present value of a property. The second is the “Von Thunenite” approach, based on the Rosen-Roback economic model, which justifies prices by comparing local prices to the prices in similar geographic areas, thus determining if a given local price is “reasonable.” Buyers’ primary error appears to be a failure to internalize Alfred Marshall’s dictum that “the value of a thing tends in the long run

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to correspond to its cost of production.” Frequently supply of land and housing is ignored, but land is abundant in the United States, and even the most desirable cities can be reproduced. Additionally, building up – through skyscrapers – can provide a virtually limitless supply of space. However, this error is better seen as limited cognition— failing to use a sophisticated model of global supply and demand – than as stupidity or irrationality.

Rural Speculation

18th Century Land Speculation in New York State

Robert Morris occupied a storied place in American history, as a merchant, financier of the revolution, signer of the Declaration of Independence, and national “Superintendent of Finance” from 1781 to 1784, when he may

have been the wealthiest man in America. Morris gambled in real estate throughout his career, but his truly immense real estate speculations began in 1790, when he spent about \$175,000 (\$4.4 million in 2012 dollars) to buy about 1.3 million acres of New York State land.

Morris resold the land in 1791 for 75,000 pounds, or \$343,800 (about \$8.4 million in 2012 dollars), making a substantial profit. He plowed his earnings into massive land purchases both in New York and in other states, but faced increasingly difficult credit conditions. Morris' ability to meet his debts deteriorated, and he progressively mortgaged his property. Eventually, he was unable to meet his obligations and become bankrupt.

Morris' land purchases were not at absurd "bubble" level prices, but rather at prices that were quite low both relative to future prices and relative to prices elsewhere in the country. Credit market tightening helps explain Morris' decline, but increases in easy credit do not seem to have fueled his earlier buying. However, there is a credit puzzle hidden in the Morris story. The people who invested in Morris did not have the same upside potential that the equity owners did. Yet they lent money at relatively standard interest rates, suggesting that, like recent purchasers of mortgage-backed securities, they may have underestimated the risks inherent in real estate speculation.

The 1815-1819 Huntsville Cotton Land Boom

Before the national financial crisis known as the Panic of 1819, Huntsville, Alabama was the epicenter of the housing boom. It combined excellent cotton-growing soil with access to the Tennessee River, which brought access to the Ohio River, the Mississippi River and, ultimately, the Gulf of Mexico. Transportation was the key to making frontier land valuable, and water was the key to transportation. 5,610 acres of public land in Madison County, Alabama (which contains Huntsville) were sold

in 1817 for \$11,220 (\$168,000 in 2012 dollars), and 973,000 acres were sold in 1818 for \$7.2 million (\$130 million in 2012 dollars). A 270 percent increase in price during a single year is impressive.

In 1819, the boom busted, the country went into recession and Alabama land values plummeted. Land buyers owed \$21 million to the Federal government in 1820, and \$12 million of that amount was due from Alabama itself. The government responded to these debts with various relief measures and it reduced the credit available for buying public land.

The Alabama boom and bust illustrates a phenomenon that will reappear throughout these real estate episodes: an under-appreciation of the long-run power of elastic supply to push prices downward.

These boom prices were not as unreasonable as they might first appear. Alabama land yielded large amounts of cotton, and prices of cotton and demand for cotton were high. When cotton prices fell, land prices followed. The Alabama boom and bust illustrates a phenomenon that will reappear throughout these real estate episodes: an under-appreciation of the long-run power of elastic supply to push prices downward. At current cotton prices, land prices in 1818 Alabama were justifiable. But since land was so freely available, in the U.S. and elsewhere, a smart investor might have reasoned that prices would eventually fall so that land prices in Alabama would resemble land prices of similarly productive places throughout the world. That logic would have made the land buyer of 1818 far wavier about paying so much for even prime Alabama land.

The boom was not initiated by any change in credit policies for public land, but instead

fueled by optimism about uncertain economic fundamentals, such as declining transport costs and English demand for American cotton.

Alabama's land prices were not obviously rational in 1818, but they weren't obviously irrational either. Ex post, the Alabama speculators look foolish, but ex ante, there was enough uncertainty to justify the buying; prices would have been reasonable as long as cotton prices stayed high, and that was hardly such a crazy thought.

The 1900-1940 Iowa Wheat Land Cycle

During the period from 1900-1930, prices for rural land, particularly in Iowa, first rose dramatically, reaching historic heights in the early teens, before dropping during the 1920s, almost ten years before the Great Depression. The price growth of land during the first decades of the 20th century was understandable, as both wheat yields and wheat prices were steadily increasing over this period. In fact, national wheat prices had increased 34 percent (in real terms) from 1910-1916. Unfortunately, wheat prices switched from growth to decline in 1917, when they hit their 20th century peak. International supply recovered after World War I and American production stayed high. Over the 1920s, the growth in world wheat production appeared to be seriously outpacing the growth in world wheat demand, and prices of wheat, and thus rural land values, plummeted. Though reasonable projections of increases in wheat prices, yields and lower transportation costs could readily justify the high land values seen during the boom years, those projections were wrong, and farmers should have anticipated the fall in prices that would eventually result from abundant supply. Still, it would be a far-sighted farmer indeed who wouldn't have been optimistic given over a decade's worth of positive price movements. However, across the U.S. as a whole, farm debt per acre increased five-fold between 1910 and 1920, and this

subsequent price collapse led to financial failures.

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Urban Speculation

The Chicago Boom:1830-1841

The great Chicago boom and bust of the 1830s has been seen as the epitome of a classic real estate bubble, as prices for land on the edge of America rose from essentially nothing to New York levels in six years. Homer Hoyt's *One Hundred Years of Land Values in Chicago* (1933) remains the indispensable resource for 19th century Chicago real estate. Focusing on his data estimates for land values in the Chicago loop, prices per acre in 2012 dollars were about \$800 dollars in 1830, \$327,000 per acre in 1836 and \$38,000 per acre in 1841. In the aftermath of the bust, the Bank of Illinois first foreclosed on sizable real estate holdings and then declared bankruptcy in 1842.

The Chicago boom was vitally connected with the deep currents of America's economic development. The Erie Canal, which had opened in 1825, gave Chicago access to the East Coast, and the State of Illinois was digging the Illinois and Michigan Canal which promised to give Chicago access to the Mississippi River System. With these two canals, Chicago would sit at the epicenter of America's transportation network. Additionally, comparisons with New York and Cincinnati suggest that prices were reasonable at the time of the boom.

Many authors—Hoyt among them— discuss the contribution of the role of easy money after 1835 to the boom and bust. Since the Bank of Illinois was a creature of state policy, and since the legislature pushed the bank to support real estate, it is certainly possible that the Bank was not charging appropriate interest rates given the probability of default. In 1837, there was widespread panic, and in May 29, 1837, the Illinois banks suspended payments. As the banks careened towards bankruptcy, Illinois' internal improvements, like the canals which were supposed to be financed by the banks, stopped.

However, the optimists were vindicated in the long run. Even the buyers of the most expensive tract in the loop in 1836, on Dearborn Avenue near the Chicago River, experienced 3.6 percent real property value appreciation over the next twenty years.

However, ex post justification is dangerous. Chicago is studied precisely because it ended up as a success. Yet numerous other never-built communities that went through land boom and bust cycles during the same period are not well-understood.

Los Angeles in the 1880s

Los Angeles in the 1800s, the “Chicago of the West,” experienced a substantial run-up in values during the 1880s and a subsequent reversal based on land value data from reported sales in the Los Angeles Times from 1882 to 1889. The median price per square foot, in 2012 dollars, increases from 1.8 cents in 1882 to 2.8 cents in 1885. In 1886, the real price per square rises to 6.9 cents, and then 9.3 cents in 1887 and 18 cents in 1888, before the price returns to 12 cents in 1889. The 90th percentile price in 1888 is 70 cents per square foot.

The Los Angeles boom was precipitated by the entry of the Sante Fe railroad into the Los Angeles market, which caused the price of transport for people and goods to drop

dramatically, and the population of Los Angeles increased from six thousand to fifty thousand between 1885 and 1890. Migrants saw benefits in the southern California climate, the agricultural value of its land and the economic opportunity, created partially by real estate speculation.

Within Los Angeles, there was considerable demand for rented residential and commercial space, and given the high rents charged by landlords and the relatively cheap prices of land and construction prices seemed reasonable. Los Angeles prices could also be justified using comparisons to other cities. Residential properties in Los Angeles cost 40 percent of prices in Cleveland or Chicago, and the Times repeatedly compared Los Angeles with San Francisco and pronounced its own city cheap.

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Prices declined after 1888, but Southern California continued to grow. Since aggressive financing was provided by sellers not banks, there was no financial crisis during the bust. Los Angeles did have a large boom-bust cycle and people who bought during the boom did lose money. Yet prices were also quite justified given subsequent events, at least in the city itself. The biggest losses were sustained by investors in outlying boom-towns, who don't seem to have focused on the virtually limitless supply of space in greater Los Angeles, at least relative to the demand during the 19th century.

New York City: 1890-1933

During the great boom of New York during the 1920s, median price per square foot increases from \$2.70 per square foot in 1920 (\$31 in 2012 dollars) to \$4 per square foot in 1929, (\$54 in 2012 dollars) based the data collected by Nicholas and Scherbina (2011). Can these higher prices be reconciled with rational buyer beliefs? From an analysis of the costs and revenues of both a tenement purchaser intending to rent out rooms and a builder of skyscraper looking for sell office space, both the standard tenement purchaser and the skyscraper builder of the late 1920s could expect to receive a relatively good return on investment. Additionally, given the cost of living and productivity of those in New York city, the prices paid seemed reasonable when compared with other cities of the time.

The period between 1945 and 1960 would seem to be an ideal setting for a housing bubble. The economy was resurgent after World War II and the Great Depression. Household formation soared during the baby boom. Most strikingly, there was a revolution in mortgage finance, making it far easier to almost anyone to get a long-term, relatively low-rate mortgage.

As for the role of credit, it is more likely that an under-priced default option played more of a role in encouraging the speculative activities of builders. While some mega-buildings of the 1920s, including the Chrysler and Empire State Buildings were largely self-financed, there was an impressive increase in the securitization business for property-backed securities. These securities were bought by ordinary investors,

in search of a six percent return, and those investors may well have under-appreciated the value of the default option that they were giving the building's promoters.

The one approach that would have managed to predict the future more accurately is Marshallian. At 50 stories a building, there was essentially an infinite supply of upward space in New York and Chicago in the 1920s. After 1929, prices plummeted during a great global meltdown. Yet even if the Great Depression had not occurred, it is hard to see how peak 1920s prices would have been sustainable. Before 1961, there were no effective height limits on building up, only setback requirements, and the amount of space that could have been added is considerable. Prices would have eventually been squeezed down near construction costs, at least for skyscrapers, which would ultimately causes the price of land to also fall.

Metropolitan Speculation*Post World War II: The Housing Bubble That Didn't Happen*

The period between 1945 and 1960 would seem to be an ideal setting for a housing bubble. The economy was resurgent after World War II and the Great Depression. Household formation soared during the baby boom. Most strikingly, there was a revolution in mortgage finance, making it far easier to almost anyone to get a long-term, relatively low rate mortgage.

Before the Great Depression, down-payment requirements averaged 50 percent, and bank loans had terms under five years, with six percent interest rates. In the 1940s and 1950s, Federal programs, including the Federal Housing Administration, the Veteran's administration and the Federal National Mortgage Association (Fannie Mae), enabled a massive increase in credit availability.

Yet during the entire 1950-1970 prices remained astonishingly flat across America's metropolitan areas. Though almost everywhere

experienced a significant increase in prices, those prices were perfectly in line with the general increase in construction costs in America during that time period. The natural explanation for the missing boom in prices after World War II is that there was an enormous increase in housing supply over the same time period. During the 1950s, America permitted 11.84 million housing units, which is roughly the same as America permitted during the twenty-six years from 1920 to 1945. The post-World War II era demonstrated exactly what textbook economics predicts should happen when robust demand meets relatively elastic supply. Quantities rose and prices stayed relatively flat.

In the early sixties, California was responsible for over a fifth of the total number of permits in the United States. But permitting dropped off significantly after 1965, and the housing stock grew by only 32 percent in the 70s and just 21 percent in the 1980s.

California in the 1970s and 1980s

For the first half of the post-war period, California housing prices didn't seem all that different from prices elsewhere in the U.S. Between 1950 and 1970, housing values in the California metropolitan areas didn't grow much faster than in other American metropolitan areas. By contrast, between 1970 and 1990, price growth was significantly higher annually in California than elsewhere.

The shift in California prices wasn't rooted in changes in credit markets: real mortgage rates were rising over much of this time period, and local economic conditions don't seem to have driven the price rise. Rising wages or productivity when compared to other geographical areas are also not enough to

explain the shift. However, there was a major shift in California's housing markets in the 1970s: new supply fell significantly. In the early sixties, California was responsible for over a fifth of the total number of permits in the United States. But permitting dropped off significantly after 1965, and the housing stock grew by only 32 percent in the 70s and just 21 percent in the 1980s.

What caused this shift? Starting in the early 1960s, activists started using environmental arguments to justify barriers to new building. All major private developments became required to go through an environmental impact review process, and there were myriad local regulations as well, such as 60 acre minimum lot sizes. Limits on supply would have driven up prices in any case, but buyers seem to have been particularly optimistic about future price growth, expecting increases in prices to top 14% over the next decade.

The events after 1989 were typical for the ends of booms, as supply gradually increased and prices gradually fell. Prices took a long time to reach bottom, but finally in 1996, real prices in Los Angeles hit 62 percent of the peak level. The California boom and bust is the precursor to the great convulsion of the last 10 years. The earlier event featured real shocks to housing supply and a somewhat limited ability to provide abundant housing elastically, especially in a short time period. Across metropolitan areas during this period, there was a tight connection between inelastic housing supply and the extent of price appreciation. The prices during both the boom and the bust were compatible with reasonable valuation models. Those models just weren't right.

The Great Housing Convulsion between 1996 and 2012

The basic contours of the period from 1996 to 2012 are well known. Across the U.S. as a whole, there was a 53 percent real increase in housing prices between 1996 and 2006, which

was followed by a 28 percent decrease in real values between 2006 and 2011. The boom was not felt everywhere equally, as price growth occurred disproportionately in the warmest quarter of America's metropolitan areas. Moreover, there was enormous mean reversion across areas, as shown in Figure 1. If a place experienced 10 percent more price growth between 2001 and 2006, that place on average saw prices drop by nine percent relative to 2001 prices.

While the previous booms were associated with dramatic episodes of economic uncertainty, it is hard to find any comparable force in the recent boom. The economy was not growing particularly swiftly, nor was it obvious that there were any tectonic shifts in the geography of American enterprise.

While the previous booms were associated with dramatic episodes of economic uncertainty, it is hard to find any comparable force in the recent boom. The economy was not growing particularly swiftly, nor was it obvious that there were any tectonic shifts in the geography of American enterprise. Some denser, older cities like New York and Boston were doing particularly well, but that can do little to explain the boom in Las Vegas and inland California. The move to the Sunbelt was continuing during this time period, but much of that appears to have been driven by unrestricted supply of new housing, which should not have boosted prices. Land buyers may have thought that the supply of new land surrounding Las Vegas was likely to contract, but reasonable projections still suggest that there was more than enough desert space for America to build enormous amounts of housing.

Easy credit is a common explanation for the boom. In previous work, I have argued that credit market conditions cannot explain the boom if buyers are rational. The changes in interest rates were too small to justify such price swings. Scholars also stress easier approval rates and lower levels of down payment, but it is hard to assess the magnitude of these effects since it is impossible to control adequately for the changing characteristics of mortgage applicants.

While the price boom does not seem to be explained by changing credit conditions, interest rates were low enough to justify prices given the standard Gordonian model, especially given reasonable growth rates. Additionally, buyer expectations were far more optimistic than historic norms would justify. For example, in 2005, the average Orange county buyer said that he expected 15.2 percent price increases in each of the next ten years. Such beliefs seem utterly implausible, but even if buyers expect five percent perpetual growth, they would essentially be willing to pay an almost limitless amount for a new house.

Just as a Gordonian approach could explain the boom, a Thunenite approach can also help explain the Las Vegas phenomenon. It seems plausible that some Las Vegas buyers in 2003 noted that prices seemed extremely low, relative to California, and reasoned that conditions weren't all that different. This reasoning may explain their increased willingness to pay. Additionally, a free, or under-priced, default option might also add considerably to the willingness to pay. During this period, the mortgage insurance practices of Federally-subsidized mortgage giants Freddie Mac and Fannie Mae provide the most natural explanation for why borrowers might have received an underpriced default option.

There were few obvious changes in economic fundamentals that set off the bust. The economy continued to grow strongly throughout most

of 2007, but the Case-Shiller index reached its peak in April 2006. Nor is it obvious that credit markets conditions were tightening. Perhaps the most plausible explanation is that slowing price growth led to a reassessment of future price growth, which is often given as an explanation for the end of a speculative boom.

Conclusion

The housing convulsion that occurred between 1996 and 2012 has many precedents in U.S. history. Americans have been speculating heavily on real estate for centuries, and vast fortunes have regularly been won and lost. Many things are similar between the most

To an economist with the benefit of hindsight, the drop in cotton prices after 1819 may seem highly predictable, but why should that have been true among cotton farmers on America's frontier?

recent boom and previous events. Rising prices are most strongly associated with optimistic expectations, and credit market conditions more typically played a supporting role. The optimistic expectations have been justifiable based on recent experience and a simple capitalization formula (the Gordonian approach) and by Thunenite comparisons with land prices or rents in other areas.

In the most recent boom, paying high prices required an optimistic assessment of future price growth. Expecting a better future was also critical to the rural land boom on the New York frontier in the 1790s, in Iowa in 1910, and in the urban booms of Chicago in the 1830s and Los Angeles in the 1880s and 1980s. In other cases, such as the Alabama land boom of 1819 and tenements in New York during the 1920s, prices were reasonable even if rents would stay constant.

Booms end when these optimistic projections fail to materialize, at least in the short run, but in many cases, the shocks seem like they should have been predictable to a forecaster with a Marshallian appreciation for the power of long-run elastic supply. A sufficiently well-informed buyer in Alabama in 1819 should have been able to expect that world-wide cotton supply would push prices down, just like a skyscraper builder in 1920s Manhattan should have been able to predict that abundant office space should decrease rents dramatically. In the recent boom, sufficiently well-informed buyers in Las Vegas presumably should have recognized that America's incredible abundance of desert space would ultimately limit the long run value of homes on the urban fringe of that metropolis.

The difficulties in forecasting the impact of supply are both understandable and hard to arbitrage. They are understandable, because the cognitive requirements needed to forecast the impact of global supply conditions on local property values are large. To an economist with the benefit of hindsight, the drop in cotton prices after 1819 may seem highly predictable, but why should that have been true among cotton farmers on America's frontier?

The ubiquitous nature of housing convulsions remind us that seemingly safe real estate investments can leave a gaping hole in bank balance sheets when things go sour. The tendency of markets to crash teaches that under-priced default options can lead to large social losses, especially because of financial meltdowns. This fact implies that there may be advantages if bank regulators recognize the regular tendency of real estate values to mean revert after booms.

Endnotes

¹This policy brief is based on the text of the 2013 Ely Lecture presented at the American Economics Association convention in San Diego. The text of the lecture is available in full in the forthcoming issue of the *American Economic Review*.

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