

# SUPPLY: A TALE OF TWO BUBBLES

*Mark A. Calabria*

To the extent that monetary policy influences asset prices, it does so via the demand for assets, by changing the borrowing costs to purchase assets, or via supply, where movements in interest rates can make investment in assets look more or less attractive. Fiscal policy interventions can also contribute to bubbles by changing the cost of acquiring specific assets. Most discussions of asset bubbles, particularly those involving the role of monetary policy, focus on demand-side factors. This article examines the role of supply-side factors in the recent booms in the U.S. housing market and dot-com stocks. The importance of supply constraints in each market is discussed. Policy implications are then presented.

## Why Supply Matters

If interest rates fall as a result of monetary policy, the demand and supply of assets whose purchase by consumers and production by producers is largely financed are likely to increase. Changes in interest rates can also alter the rate at which corporations and households discount future cash flows. While this simultaneous increase in both demand and supply will result in an increase in the equilibrium *quantity*, the impact on *price* is indeterminate.

When demand and supply increase in equal proportion, then quantity expands while price remains constant. One would rarely, if ever, characterize that situation as an asset bubble. Likewise, when

---

*Cato Journal*, Vol. 31, No. 3 (Fall 2011). Copyright © Cato Institute. All rights reserved.

Mark A. Calabria is Director of Financial Regulatory Studies at the Cato Institute and a former member of the senior staff of the U.S. Senate Committee on Banking, Housing and Urban Affairs.

supply increases more than in proportion to demand, the resulting decrease in price would not constitute an asset bubble.

Where both short-run and long-run supply are inelastic, a positive demand shock resulting from monetary policy is likely to permanently raise asset prices, in the absence of a following negative demand shock (which itself can be driven by monetary policy).

The remaining possibility is when demand increases more than in proportion to supply and there is an increase in both price and quantity. It is this possibility that policymakers need to be most concerned with, especially in the case where short-run supply is relatively inelastic and long-run supply is fairly elastic. Such circumstances can result in large increases in price until sufficient supply can be produced. Of crucial importance is the transition time required to move from the short-run to the long-run. The longer this transition time, the further short-run fundamentals can deviate from long-run equilibrium.

This article avoids the debate over whether bubbles actually occur or not. The assumption is made that price increases that deviate from trend and later display some decline in price, but do not appear related to observable fundamentals, can be characterized as bubbles or booms.

## The Housing Bubble

Stanford economist John B. Taylor (2009) has presented the compelling counterfactual that if monetary policy had followed a “Taylor Rule,” housing starts would have been significantly below their actual level. For instance in 2006, at the height of the housing bubble, Taylor finds an excess of almost 600,000 housing starts—an almost 40 percent increase in supply. Yet, such a massive increase occurred in an environment of escalating house prices.

The observed increase in both housing starts and prices suggests that the increase in demand was significantly greater than the increase in supply. By October 2010, real housing prices were still above their pre-bubble level, despite large declines. Previous housing booms and busts have resembled more the case where new supply ultimately exceeds the increase in demand. The construction booms in the early and late 1980s, the mid-1960s, the late 1960s, and the early 1970s all ended with real housing prices falling below or near their pre-bubble lows. The housing boom of the 1920s, which

peaked in 1925, also saw real prices decline back to levels preceding the boom.<sup>1</sup>

One reason that such a large increase in both prices and supply can be witnessed simultaneously is that national statistics miss considerable variation at the state and local level. While construction activity continued to boom nationally in 2005–06, several states saw activity peak much earlier. Few states characterize the mortgage crisis more than California. Yet permitting activity peaked in 2004 in California, showing declining activity beginning in 2005. The drop in supply was not in response to prices, as California home prices continued to climb, in fact accelerating after the peak in permitting activity.

The continued climb in construction activity in 2005–06 was not driven by those states most associated with the bubble—California, Florida, and Nevada. Florida, for instance, saw permitting activity decline almost 30 percent in 2006. Climbing residential construction in 2005–06 was driven by states such as Texas and North Carolina.

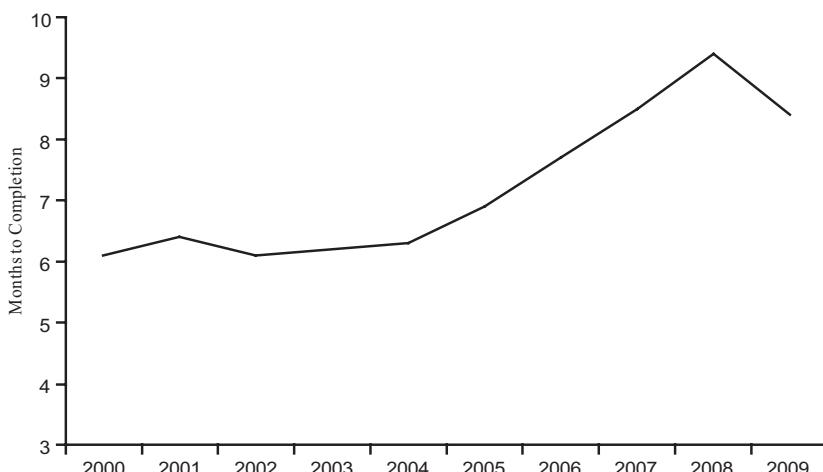
In several states, supply became even more inelastic over the course of the housing bubble. One proxy for the responsiveness of housing supply is the time required to gain authorization for construction and the time to completion. Until 2004, in the western states, the average number of months from when the permit is pulled to when the home was completed was just over six months. In 2004, the time to completion rapidly began increasing (Figure 1).

By 2007, time to completion reached an average of almost 9 months—a 50 percent increase over 2004. Unfortunately the Census Bureau only releases averages and only for broad regions of the country. It is likely that these increasing averages mask even larger increases in specific states.

The differences in interstate housing prices and construction activity cannot be explained solely by national factors. While monetary policy and federal mandates contributed to the crisis, these factors were largely uniform across the states. Both Texas and California were subject to the same monetary policy during the housing boom, yet housing prices in Texas have not fallen and show little relationship to mortgage rates. To account for interstate differences, one must look not to common factors (such as monetary policy) but to the factors that distinguished the Texas housing market from the California housing market.

<sup>1</sup>House prices are based on Shiller (2005, 2007).

FIGURE 1  
TIME TO COMPLETION, WESTERN STATES



SOURCE: U.S. Census Bureau.

Several scholars have pointed to the role played by artificial building constraints, particularly zoning and growth-management laws, in making the short-term supply of housing more inelastic. Randal O'Toole (2009) identifies 18 states as having had housing bubbles. All of these states have some form of urban growth management. Among the remaining states without bubbles, as defined by O'Toole, only one, Tennessee, has a growth-management law, and its law was enacted relatively recently and is by most accounts, nonbinding.

As O'Toole (2009) observes, growth controls limited the extent to which heightened demand could be satisfied through new supply. He also demonstrates that growth controls not only increase the cost of new housing, they make each additional unit constructed more expensive than previous units. The result is that supply becomes more inelastic. A supply curve that is inelastic also cuts both ways—small increases in demand can result in large increases in price, but small decreases in demand can also result in large decreases in price.

Government imposed land-use controls are not the only limitation on housing supply. Glaeser, Gyourko, and Saiz (2008) examine the role of natural constraints on housing supply, using estimates of available developable land, in determining differences in housing

prices across metropolitan areas. They find that during the housing boom of the 1980s there was no boom in areas of the country with an elastic housing supply. Examining the recent boom, they find that even areas of the country they classify as “elastic” witnessed price booms, albeit smaller than those experienced in markets with inelastic supply. In examining whether housing supply is elastic or inelastic, some combination of land-use controls and geography should be considered. Glaeser, Gyourko, and Saiz (2008) puzzle over the recent housing price bubbles found in Orlando and Phoenix, yet O’Toole (2009) notes that both Florida and Arizona instituted growth-management laws between the housing boom of the 1980s and the most recent boom.

The preceding analysis has argued that a necessary component for the recent housing bubble was the relative inelasticity of housing supply in many states. Comparing states with government imposed growth restriction to those without, or with significantly softer restrictions, suggests that these restrictions were significant, if not primary, contributors to the housing bubble.

## The Dot-Com Bubble

Only a few years before the peak of the recent housing boom, the United States experienced a boom in equities, particularly those associated with Internet and technology stocks. An examination of the dot-com boom reveals that supply-side factors were a major contributor as well.

Beginning in the mid-1990s, the value of Internet stocks, as measured by Morgan Stanley’s list of Internet stocks, showed a steady, yet volatile, increase.<sup>2</sup> By the fall of 1998, Internet stocks barely showed any gains over the broader NASDAQ and S&P indexes. Concurrent with the Federal Reserve’s gradual reduction in both the federal funds and discount rates in the fall of 1998, Internet stocks began to diverge from the overall market, showing a steep increase.

The weakness in non-Internet stocks, coupled with favorable borrowing costs, led many public companies to retire or repurchase stock. Net issuance of corporate equities in 1998 reached a *negative* \$113 billion. Despite trends in the overall equities market, Internet companies chose to meet the demand for stocks with new issuance, particularly in the form of initial public offerings (IPO).

<sup>2</sup>For an index of these stocks, see Ofek and Richardson (2003: 1113).

IPOs present a supply response that is different from the issuance of seasoned stock. Typically in the case of an IPO, somewhere between 15 and 20 percent of the value of the company is initially offered for sale. The remaining shares of the company are generally allocated to insiders and are subject to a “lock-up” period, in which those shares may not be sold to the public. Lock-up periods are generally for 180 days but may run longer (Ofek and Richardson 2000).

Upon the expiration of the lock-up, additional shares, multiples of the original offering, are added to the supply of available shares. Offerings of seasoned companies are generally not followed by a delayed supply that swamps the offering size. While rational investors should of course take these delayed supply responses into consideration when purchasing an IPO, researchers have found that the expiration of lock-up periods do have significant downward price effects, consistent with an increase in supply (see Ofek and Richardson 2000).

Given the differing temporal impacts on supply between IPOs and seasoned offerings, a changing composition of stock offerings can have price impacts that mirror the behavior of a bubble. Between 1997 and 2000, the dollar share of underwritten corporate equities that were IPOs almost doubled, increasing from 22 percent to 37 percent. Total corporate equity underwritten increased by almost 50 percent during this time, from \$153 billion in 1997 to \$204 billion in 2000. So during the years of the dot-com bubble, the United States had both a massive increase in the value of equities issued and an increasing larger share of those offerings in the form of IPOs (Ofek and Richardson 2000).

While causality is difficult to establish in this instance, it is clear that the bursting of the dot-com price bubble occurred immediately after new Internet stock sales to the public doubled on a monthly basis near the end of 1999. From November 1999 through February 2000, there were more new Internet stock sales to the public than the total value of all IPOs in 1998 (Ofek and Richardson 2000). The end of February 2000 also marked the end of the dot-com bubble.

Putting aside the considerable debate within finance as to the nature of demand and supply curves for financial assets, a plausible explanation for the magnitude and timing of the dot-com bubble is the shift of stock issuance to equities with a large delayed supply response (IPOs) from equities where the bulk of supply is felt immediately.

## Fiscal Policy and Supply Constraints

A number of scholars have pointed to the role played by government incentives for homeownership in creating the housing crisis (see, for example, Calomiris 2009 and Ely 2009). Market distortions such as Fannie Mae, Freddie Mac, the Federal Housing Administration, and the Community Reinvestment Act all work to mainly increase the demand for owner-occupied housing.<sup>3</sup> Where these distortions lower the credit quality of borrowers, they will likely result in increases in delinquencies and foreclosures (Pinto 2010). While this increase in credit losses can potentially result in substantial losses and even the failure of financial institutions, in the absence of supply constraints such distortions are unlikely to cause a boom *and* bust in the housing market. Recall that the price impact of a permanent positive demand shock is contingent on the elasticity of housing supply.

Had the increase in housing demand resulting from the expansion of federal involvement in the housing market been offset with increased supply, the result would have been substantial credit losses, without large increases and subsequent declines in house prices. The magnitude of the housing boom and bust suggests that federal efforts to expand homeownership (increase demand) interacted with local supply constraints to increase the volatility of house prices. This article argues that a full understanding of the financial crisis requires a study of both demand-side and supply-side factors.

## Policy Implications

The preceding has argued that price bubbles are more likely to occur in the context of inelastic supply or where there are significant differences between short-run and long-run supply. This implies that policymakers conducting monetary policy need to be particularly attuned to the supply behavior of interest-rate sensitive assets. Policymakers also need to be sensitive to the outsized role that particular segments can play within the larger asset markets. For instance, the boom and bust of Internet stocks had significant effects on the economy even though the Internet sector represented only

<sup>3</sup>While Fannie Mae, Freddie Mac, and FHA all have construction-oriented programs, those programs are relatively small compared to their mortgage purchase and insurance efforts.

6 percent of the market capitalization of all U.S. public companies. Similarly less than half of U.S. states actually experienced a housing bubble in the 2000s. When Alan Greenspan suggested that some regional and local housing markets were exhibiting “froth,” he underestimated the impact that a boom and bust in select markets can have on the broader economy.

To the extent that policymakers can help asset supplies become more elastic, the potential for asset bubbles is reduced. Given the role of government in contributing to the inelastic nature of housing supply in many markets, this goal should be an immediate area of policy change. Had California been Texas, much of the housing bubble could have been avoided.

## Conclusion

Observed prices are always the interaction of demand and supply. While appropriate attention should be paid to demand-side factors, comparable attention must be devoted to the supply side as well. To avoid or moderate bubbles, policymakers need to pay particular attention to supply conditions as well as make efforts to remove obstacles to timely supply responses.

## References

- Calomiris, C. (2009) “Financial Innovation, Regulation, and Reform.” *Cato Journal* 29 (1): 65–91.
- Ely, B. (2009) “Bad Rules Produce Bad Outcomes: Underlying Public-Policy Causes of the U.S. Financial Crisis.” *Cato Journal* 29 (1): 93–114.
- Glaeser, E.; Gyourko, J.; and Saiz, A. (2008) “Housing Supply and Housing Bubbles.” *Journal of Urban Economics* 64 (2): 198–217.
- Ofek, E., and Richardson, M. (2000) “The IPO Lock-Up Period: Implications for Market Efficiency and Downward Sloping Demand Curves.” Working Paper, Stern School of Business (January).
- \_\_\_\_\_. (2003) “DotCom Mania: The Rise and Fall of Internet Stock Prices.” *Journal of Finance* 58 (3): 1113–38.
- O’Toole, R. (2009) “How Urban Planners Caused the Housing Bubble.” Cato Policy Analysis No. 646 (October).
- Pinto, E. (2010) “High LTV, Subprime and Alt-A Origins over the Period of 1992–2007 and Fannie, Freddie, FHA and VA’s Role.”

## TALE OF TWO BUBBLES

- Working Paper, American Enterprise Institute. Available at [www.aei.org/paper/100181](http://www.aei.org/paper/100181).
- Shiller, R. (2005) *Irrational Exuberance*. 2nd ed. Princeton, N.J.: Princeton University Press.
- \_\_\_\_\_. (2007) “Historic Turning Points in Real Estate.” Presidential Address, Eastern Economic Association, 33rd Annual Conference, New York.
- Taylor, J. B. (2009) *Getting Off Track: How Government Actions and Interventions Caused, Prolonged, and Worsened the Financial Crisis*. Stanford, Calif.: Hoover Institution Press.

