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Asset price bubbles: What are the causes, consequences, and public policy options?

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This article discusses how the global financial crisis has forced researchers and policymakers to reconsider their understanding of both the economics of asset price bubbles and alternative policy options to address them.

Economists and policymakers have begun to reevaluate what they really know about asset bubbles and whether they can (or should) be managed in the public interest.

Asset price bubbles have generated significant interest, since there have been instances when their bursting has led to turmoil in financial markets and the wider economy. The October 1929 stock market crash is perhaps the most dramatic instance. That said, until recently, the successful performance of the U.S. economy in the post-World War II era, particularly during the "Great Moderation" of 1984–2006, appeared to provide both economists and policymakers with confidence that there was little need for public policy to manage such bubbles. For example, the October 1987 stock market crash had little impact on the real economy, and the bursting of the Internet bubble in 2000 resulted only in a short and mild recession by historical standards. However, the global financial crisis of 2007–09, induced in large part by a crashing of the housing market, had a significant adverse impact on both the U.S. and global economies. As a result, economists and policymakers have begun to reevaluate what they really know about asset bubbles and whether they can (or should) be managed in the public interest.[1]

To advance our knowledge of asset bubbles, Loyola University Chicago hosted a conference in April 2011. Papers were commissioned from experts to reexamine a number of seminal articles on asset bubbles written before the crisis. The ultimate objective was to challenge orthodox thinking on bubbles in light of recent events.

Subsequently, five seminal papers on asset bubbles, five papers commissioned to evaluate and update these influential works, and additional related research were published in a book titled *New Perspectives on Asset Price Bubbles*.[2] The remainder of this article provides a summary of the analyses of bubbles in that volume.

What are asset bubbles?

In general, according to current economic theory, a bubble exists when the market price of an asset exceeds its price determined by fundamental factors by a significant amount for a prolonged period. The efficient market hypothesis asserts that extraordinary movements in asset prices are a consequence of significant changes in information about fundamentals. Thus, actual and fundamental prices are always the same, and bubbles cannot exist unless they are driven by irrational behavior or market rigidities, such as constraints on the short selling of assets. In a seminal article (first published in 1993), Franklin Allen and Gary Gorton examine this critical question: Are stock prices determined by economic fundamentals, or can bubbles exist?

They carefully develop a detailed theoretical model and show that the existence of bubbles can be consistent with rational behavior. This result was not fully appreciated at the time by either economists or central bankers, who often were skeptical about the existence of bubbles. In a review of Allen and Gorton's paper, Gadi Barlevy discusses the current state of theoretical models of asset bubbles. He expresses disappointment with the gap between the theoretical work on asset bubbles and the post-crisis change in views about the appropriate policy response among some policymakers (i.e., to intervene). Little in the theoretical literature supports the contention that intervention is appropriate. Yet empirical evidence suggests that the potential costs of bubbles may be significant. Barlevy concludes that theoretical models of bubbles have not adequately addressed welfare considerations and thus are unable to offer convincing analytical guidance to central banks as to whether an economy will be better off from attempts to manage asset bubbles.

History shows us that asset bubbles occur and that their bursting can be detrimental to the macroeconomy.

Causes and consequences

Among the various types of asset bubbles, stock market and housing bubbles are historically of most interest to central banks, since such bubbles have been associated with the greatest adverse effects.[3] However, before the event, it is difficult to predict if a stock market or housing bubble will grow until it abruptly bursts or if it will develop and then quietly deflate on its own without much macroeconomic impact. It is still too early to fully evaluate the real economic costs of the recent bursting of the U.S. housing market bubble and the accompanying significant decline in stock prices; yet the evidence from Japan is not encouraging. In a seminal article (first published in 2000), Takeo Hoshi and Anil Kashyap discuss in detail the Japanese banking crisis that prevailed for most of the 1990s, following the bursting of bubbles in both the Japanese stock and real estate markets. Andrew Filardo agrees with Hoshi and Kashyap's assessment of the Japanese crisis, and argues that the spillovers from the recent financial crisis to the Asia-Pacific real economies presented daunting policy challenges for central bankers in the region. Globalization has opened up potentially significant international transmission channels. As a result, the rules of the game have changed, and determining optimal monetary policy is now much more difficult. Filardo underscores a larger point that the global financial system needs to be significantly strengthened. Regulatory groups currently evaluating policy options include the Group of Twenty (G20), the Financial Stability Board, the Basel Committee on Banking Supervision, and the Committee on the Global Financial System.

What causes asset bubbles to form? In a seminal piece (originally published in 2003), José Scheinkman and Wei Xiong observe that asset bubbles are characterized by high trading volume and high price volatility. They develop a behavioral model of asset bubbles, assuming short-sale constraints. An asset buyer is willing to pay a price above fundamentals because, in addition to the asset, the buyer obtains an option to sell the asset to other traders who have more optimistic beliefs about its future value. Werner De Bondt reviews Scheinkman and Xiong's paper and offers a detailed overview of asset bubbles from the perspective of a behavioral financial economist—one who studies the effects of social, cognitive, and emotional factors on financial decisions. He challenges the idea that pure fundamentals and rationality drive financial decision-making and pricing. He argues the need to more fully incorporate behavioral aspects (like investor overconfidence) into investor decision-making models.

To evaluate the role of monetary policy on the development of asset bubbles, Lawrence Christiano, Cosmin Ilut, Roberto Motto, and Massimo Rostagno construct models to simulate 18 U.S. stock market booms. They show that if inflation is low during stock market bubbles, a central bank interest rate rule that narrowly targets inflation actually destabilizes asset markets and the macroeconomy. The authors note that every stock market bubble of the past 200 years, excepting bubbles in war years, occurred during years of low inflation. Early in an economic boom, the natural rate of interest is often quite high. Most interest rate rules, however, do not include a time-varying natural rate of interest. Accordingly, if the natural rate is high and inflation is low, the central bank may set its target interest rate too low, and the bubble is further fueled. Thus, the authors argue that a central bank that follows a "hands-off" approach to asset bubbles may actually encourage a bubble in its growing phase. To reduce this problem, the authors propose including credit growth (as a proxy for the natural rate of interest) in the interest rate targeting rule to reduce volatility in asset prices and the real economy.

Viral Acharya and Hassan Naqvi examine how the banking sector may contribute to the formation of asset bubbles when there is access to abundant liquidity. Excess liquidity encourages lenders to be overaggressive and to underprice risk in hopes that proceeds from loan growth will more than offset any later losses stemming from the aggressive behavior. Thus, asset bubbles are more likely to be formed as a result of the excess liquidity. They conclude that policy should be implemented to "lean against" liquidity growth.

John Geanakoplos identifies leverage as a major cause of asset bubbles. He cites four reasons why the most recent leverage cycle in the U.S. was worse than preceding cycles. First, mortgage leverage reached levels never seen before. Second, there was an additional leverage effect because of the securitization of mortgages. These two factors reinforced one another. Third, credit default swaps (CDSs), which did not exist in previous cycles, played a major role in the recent crisis. CDSs helped those optimistic about the housing market to increase their leverage at the end of the boom. But perhaps more importantly, they provided an easier means for housing-market pessimists to leverage,

and made the crash come much earlier than it would have otherwise. Finally, because leverage became so high and prices dropped so far, a much larger number of households and businesses ended up underwater than in earlier cycles.

Evidence suggests that some bubbles can have a significant adverse impact on the macroeconomy when they burst. Is there evidence that asset bubbles may have additional adverse effects? Robert Chirinko and Huntley Schaller emphasize the distortive impact of asset bubbles, regardless of whether they burst, on aggregate investment. A fundamental function of the stock market is the efficient allocation of capital to its most productive uses. Chirinko and Schaller find empirical evidence supporting the conjecture that stock market overvaluation—i.e., a bubble—can lead to overinvestment in the bubble sector.

Public policy options

Given that bubbles may adversely affect the macroeconomy, what, if any, is the appropriate public policy response? For at least the past 25 years, the Federal Reserve has tended to follow an approach to asset bubble management in which there is little or no restrictive monetary policy action during the bubble's formation and growth, but there is a prompt easing in the form of quick reductions in market interest rates once the bubble bursts. (This monetary policy easing is aimed at reducing the potential loss of output and employment.) That is, there was little response to changes in asset prices, except insofar as they were seen to signal changes in expected inflation and economic slack. The intellectual foundation for this approach was the seminal piece by Ben Bernanke and Mark Gertler (originally published in 1999). Their paper incorporates exogenous bubbles into asset prices and constructs a financial accelerator model. Asset bubbles affect real economic activity via both the wealth effect on consumer spending and the financial decisions of firms resulting from changes in the value of assets on their balance sheets. Simulations of their model led the authors to conclude that central banks should view price stability and financial stability as highly complementary. This policy strategy became known as the "Jackson Hole Consensus."[4]

Besides the reasons given by Bernanke and Gertler, there are other reasons for the neutrality of the Fed while bubbles grow: 1) It is difficult to identify a bubble and predict its ultimate magnitude; 2) the buildup of a bubble may take several years and the Fed cannot follow a restrictive monetary policy for such a long and uncertain period; 3) the federal funds rate adjustments are a rather blunt instrument, which cannot be directed precisely toward the bubble sector; and 4) there is no need to directly target the bubble because if it increased wealth that stimulated consumption and resulted in inflation, then the Fed would act because of its price targeting policy.

The Jackson Hole Consensus appeared to work well until September 2008, when the financial system came close to a complete meltdown. Kenneth Kuttner offers a detailed assessment of the Bernanke and Gertler results in light of the financial crisis.[5] He raises two points that challenge the policy implications of the Bernanke and Gertler results. First, macroeconomic stability and goods and services price stability, in particular, do not guarantee financial stability. Second, because the bursting of an asset bubble can severely damage the macroeconomy, the central bank's financial stability mandate should not be overlooked.

So given the significant adverse consequences of the recent financial crisis, there has been a reconsideration of whether central banks should address asset bubbles. But even if a decision is made to address bubbles, it is not obvious that monetary policy is the most appropriate policy tool. Monetary policy tools are rather blunt instruments, which are intended to affect the overall level of economic activity. A more targeted tool, directed at the bubble sector, might be preferred. In a seminal article (first published in 2003), Claudio Borio recommends the use of macroprudential tools to protect against financial instability (resulting from bubbles bursting or other sources). He argues that it is important to move beyond microprudential regulation—which concentrates on individual firms—and to account for cross-firm interconnections and any adverse externalities created when financial institutions encounter problems. Such macroprudential tools include countercyclical capital requirements, credit constraints, credit-to-gross-domestic-product (credit-to-GDP) ratio monitoring, and margin requirements.

Directions for research

Benjamin Friedman observes that the recent crisis clearly challenges both the assumption of rationality employed in much of the previous analysis and the efficiency of the financial system to optimally allocate capital. He calls for additional research to evaluate the allocative efficiency of the financial sector and estimate what misallocations may be costing society. William Poole stresses that research on asset bubbles has essentially ignored much of the results from control theory from the 1960s and the rational expectations literature from the 1970s. Based on those two bodies of research, he argues that it may be a mistake to have policymakers attempt to manage what are suspected to be developing bubbles. Additionally, Poole argues that the buildup of the bubble may be less of a concern

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than the ability of significantly leveraged financial firms to withstand its bursting. That is, poorly capitalized financial firms may hold large amounts of the bubble asset whose price falls sharply when the bubble bursts. Addressing the low capital levels at financial firms may be a more direct means of addressing the potential financial instability.

Summing up

There are a number of key observations about asset bubbles to note from the 2011 conference and accompanying book. First, history shows us that asset bubbles occur and that their bursting can be detrimental to the macroeconomy. Given these potential adverse effects, the current state of knowledge about bubbles is lacking. We still do not have a good definition of an asset bubble; and we still do not know how to identify them, what causes them to grow or burst, or what their welfare implications are. More research needs to be conducted to address these questions. Second, in the post-World War II era, particularly during the Great Moderation, it was widely believed that another economic depression and deflation like those of the 1930s were highly unlikely. However, the recent global financial crisis has demonstrated that there are very large risks to the macroeconomy from the bursting of housing and equity bubbles. Additionally, evidence suggests that bubbles are not "black swan" events; they occur relatively frequently. However, some are more damaging than others. Third, the crisis has challenged the consensus that it was sufficient for monetary policy to pursue goods and services inflation targeting as a means to achieve financial stability. Thus, the Jackson Hole Consensus, favoring not "leaning against" potential bubbles as they form, may need to be reevaluated. Alternative policies need to be more fully developed and critiqued. Alternatives could include additional elements in interest rate targeting rules (e.g., credit-to-GDP ratios). Fourth, policymakers may need to reconsider the importance of financial stability as an explicit goal—and achieving it may require additional policy tools. Macroprudential regulation and its associated tool set may be more effective at addressing bubbles than traditional monetary policy instruments, since macroprudential tools can be used to directly target the bubble sector. The changes in process in the U.S. financial regulatory framework are a step in this direction.

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[1] A good review of the state of knowledge on asset price bubbles before the recent crisis can be found in a book based on a 2002 Chicago Fed and World Bank conference: W. C. Hunter, G. G. Kaufman, and M. Pomerleano (eds.), 2003, *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*, Cambridge, MA: MIT Press.

[2] Unless indicated otherwise, the authors' papers discussed from here on are contributions to D. D. Evanoff, G. G. Kaufman, and A. G. Malliaris (eds.), 2012, *New Perspectives on Asset Price Bubbles*, New York: Oxford University Press. Bibliographic details for each paper, including original details for reprinted articles, are available at www.us.oup.com/us/catalog/general/subject/Finance/Theory/?view=usa&sf=toc&ci=9780199844401.

[3] Accordingly, the stock and housing markets represent the two most important components of household wealth. Bubbles of the magnitude of that associated with the 1929 U.S. stock market crash may be infrequent; however, evidence suggests stock market and housing bubbles do occur fairly frequently. See International Monetary Fund, Research Department, 2003, "When bubbles burst," *World Economic Outlook: Growth and Institutions*, April, pp. 61–95, and Hunter, Kaufman, and Pomerleano (2003).

[4] For a description of the consensus and its underpinnings, see O. Issing, 2009, "Asset prices and monetary policy," *Cato Journal*, Vol. 29, No. 1, Winter, pp. 45–51.

[5] A. G. Malliaris offers an overview of the arguments behind the Jackson Hole Consensus in Evanoff, Kaufman, and Malliaris (2012).

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