

The Causes and Consequences of Recent Financial Market Bubbles: An Introduction

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On August 12–13, 2005, the department of finance at the Kelley School of Business, Indiana University, collaborated with the *Review of Financial Studies* to host a conference titled “The Causes and Consequences of Recent Financial Market Bubbles.” This article begins with our overview of the themes and findings of the conference, and it ends with the questions that the literature has yet to answer. (JEL G10, G20, G30)

On August 12–13, 2005, the Department of Finance at the Kelley School of Business, Indiana University, collaborated with the *Review of Financial Studies* (RFS) to host a conference entitled “The Causes and Consequences of Recent Financial Market Bubbles.” The program committee consisted of Brad Barber, Utpal Bhattacharya, Markus Brunnermeier, Joshua Coval, John Graham, Craig Holden, Robert Jennings, Steve Kaplan, Alan Kraus, Maureen O’Hara (chair), Thomas Noe, Jay Ritter, David Scharfstein, Matthew Spiegel, Avanidhar Subrahmanyam, Jiang Wang, and Xiaoyun Yu.

This special conference issue contains our overview of the themes and findings of the conference, Maureen O’Hara’s witty and insightful introduction to bubbles, and four of the six papers that were eventually accepted by the RFS. These four papers are “Relative Wealth Concerns and Financial Bubbles” by Peter DeMarzo, Ron Kaniel, and Ilan Kremer; “Mutual Funds and Bubbles: The Surprising Role of Contractual Incentives,” by Nishant Dass, Massimo Massa, and Rajdeep Patgiri; “Analyst Behavior Following IPOs: The Bubble Period Evidence,” by Daniel Bradley, Bradford Jordan, and Jay Ritter; and “Money Illusion and Housing Frenzies,” by Markus Brunnermeier and Christian Juilliard. The other two papers that were accepted by the conference, “The Real Effects of Asset Market Bubbles: Loan and Firm-Level Evidence of a Lending Channel,” by Jie Gan, and “Booms, Busts, and Fraud,” by Paul Povel, Rajdeep Singh, and Andrew Winton, were published in earlier issues of the RFS. The Bradley-Jordan-Ritter paper was submitted to the RFS as a regular submission. We included it because it fits the theme of the conference very well.

We would like to thank Markus Brunnermeier, Maureen O’Hara, Matthew Spiegel, and all our colleagues at Indiana University for their insights on bubbles. Address correspondence to Utpal Bhattacharya and Xiaoyun Yu, Kelley School of Business, Indiana University, 1309 E. 10th Street, Bloomington, IN 47405; telephone: (812)-855-3413; e-mail: ubhattac@indiana.edu, xiyu@indiana.edu.

1. The Genesis of the Conference

The Internet Stock Index (ISDEX), an authoritative and widely cited index, rose from 100 in January 1996 to 1,100 in February 2000 (an increase of about 1,000% in 4 years) only to fall down to 600 in May 2000 (a decrease of about 45% in only 4 months). In the history of stock market prices, this episode ranks among the most spectacular, giving rise to popular speculation about the existence of a bubble. But was it a bubble, and can a bubble actually exist in a modern financial market? Certainly, financial markets had no ready answers. Understanding this aberrant behavior was the first catalyst for the RFS-IU conference.

A second catalyst derived from a more personal experience. In the winter of 1999, at the height of the Internet bubble, the first author of this article was asked by the local television network to explain bubbles to the public. His description is quoted as follows:

I convince my friend Elvis that if he invests 100 dollars with me, I will double his money in a month. Elvis gives me 100 dollars. Next month I convince my friends Simon and Garfunkel. They each give me 100 dollars, and I use these 200 dollars to pay off Elvis. Elvis is impressed. He tells all his friends. His friends come running to me. I take 100 dollars each from only four of them—John, Paul, George and Ringo—and use the 400 dollars to give back 200 dollars each to Simon and Garfunkel. My fame spreads like wildfire. They all want to invest with me. I take money from 8 of them, then 16, then 32, then . . . and so on. When a lot of people are involved, I disappear with their money. The scheme that I have just illustrated is illegal. It is called a Ponzi scheme. It is named after Charles Ponzi, who raked in 15 million dollars in 8 months in Boston in 1920. Versions of such scams had existed before Ponzi and continue to exist after him. When I checked this morning, I found that more than 100 such scams were under investigation. Why has the number of Ponzi schemes dramatically shot up? The answer is one word: Internet. News travels faster. Publicity by word-of-mouth has been replaced by publicity by a “click-of-mouse.”

Did the Internet make the development of the bubble more likely? In addressing this question, the first author discovered an extensive academic literature on bubbles in different disciplines. The second author discovered the same literature while doing research on the role of the media in Internet IPO returns. If only someone could bring it together and use it to explain our recent market experience. That was the second catalyst. The conference at Indiana University, organized in collaboration with the RFS, was the result.

2. The Questions That Were Asked During the Conference

The conference posed three questions:

1. Was the 1996–2000 episode in U.S. stock prices a bubble? This led to two subquestions: How do you define bubbles *ex ante*? And can you even define bubbles *ex post*?
2. What caused it?
3. Did it matter?

The answers to these three research questions touched upon all subdisciplines of finance: asset pricing, corporate finance, market microstructure, behavioral finance, international finance, law and finance, and real estate finance. We were sure that such an inclusive research question would attract paper entries from financial economists of all stripes. We received 106 papers on bubbles from 26 U.S. states, 17 countries, and 5 continents. They represented the entire spectrum of finance, as well as some subdisciplines of accounting, economics, psychology, and sociology. It was quite astounding to see how the power of an idea—bubbles—can unite so many academics from such diverse backgrounds. Through a double-blind referee process using two referees from the program committee, 12 of these 106 papers were selected for the conference.

3. The Accepted Papers

Was the 1996–2000 episode a bubble? To answer this question, we first have to define a bubble. O'Hara (2008) reviews various attempts to define a bubble, dating it back to the enactment of the “Bubble Act of 1720” by the British Parliament. She concludes that “even this definitional step is problematic.”

In this special issue, DeMarzo, Kaniel, and Kremer (2008) define a bubble situation as occurring when (1) an asset's market price is higher than the discounted sum of its expected cash flows, where the discount rate is the risk-free rate; (2) the cash flows have a non-negative correlation with aggregate risk; and (3) risk-averse investors rationally choose to hold the asset knowing (1) and (2).

What caused the bubble? This seems like a naive question, considering that we still do not know how to determine whether and when an asset price is a bubble or not. However, if we can live with this unanswered question, the pragmatists among us can still go on to address the causes of the so-called Internet bubble.¹

DeMarzo, Kaniel, and Kremer (2008) make the point that a bubble will crash for sure only if rational agents can arbitrage without risk. However, if rational agents care about their relative wealth, they may not wish to trade against the crowd; they may wish to invest in an asset that everyone else in their cohort invests in, even if they know that the asset price is a bubble. This clever paper introduces the notion of “the risk of standing alone.” Since the wealth of others in an agent's utility function is the key feature that drives the results of the

¹ All of us teach our finance undergraduates and MBA students how to compute Net Present Value; few of us blush at the fact that we still do not know how to compute the discount rate accurately.

paper, the authors attempt to endogenize it by developing a side model where the asset is in limited supply and, therefore, others' holdings of that asset will matter for the agent.

Were relative wealth concerns the cause of the Internet bubble in the 1990s? Was market capitalization of Internet firms big enough with respect to the whole market to cause the relative wealth concerns? Why do these concerns not cause bubbles all the time? We now turn to the papers that analyze the possible causes of the recent financial market bubble.

Dass, Massa, and Patgiri (2008) focus on herding. They argue that bubbles are caused by herding among traders. Traders will herd (will not herd) if the incentives for herding (disincentives for herding) are strong. While reputational concerns drive herding, another incentive to herd among mutual fund managers is that their evaluations are based on a scale relative to other fund manager's performance. Therefore, herding can be mitigated if mutual fund managers are evaluated on an absolute scale such as profits. Consistent with their theory, the authors document less herding among mutual fund managers with more high-powered pay-for-absolute performance contracts.

Bradley, Jordan, and Ritter (2008) focus on stock analysts. The popular press, the regulators, as well as many academics have fingered stock analysts for their role in the stock market bubble. Previous literature had hinted that recommendations from analysts whose employer has a banking relationship with the firm they cover are overly rosy, because the market seemed to discount these recommendations, and that analyst coverage can be increased by hiring the analyst's employer as an underwriter for the IPO and/or by increasing IPO underpricing. The authors find that there was no discounting by the market if the timing of analyst recommendations was taken into account, and that the increase in analyst coverage is limited only to small IPOs and occurs only in the earlier quiet period. Taken together, these results suggest that if conflicts of interest exist, they exist for both affiliated and nonaffiliated analysts. Therefore, affiliations of analysts are unlikely to be the cause of the bubble.

Brunnermeier and Julliard (2008) examine a recent bubble in another market: real estate. They postulate that money illusion can fuel real estate bubbles. Inflation declined around the turn of the century lowering nominal interest rates. Potential buyers mistakenly assumed that real interest rates also declined and, therefore, bid up the prices of houses. The smart money could not bring prices back to fundamentals through arbitrage, as short-selling constraints are particularly relevant in the housing market. The authors first theoretically derive the mispricing component of housing stock, which is the part of the price-rent ratio that cannot be explained by the fundamentals. They then empirically estimate the mispricing component and find that it is highly correlated with inflation.

Did the bubble matter? Povel, Singh, and Winton (2007) investigate the effect of the bubble on firms' incentives to commit fraud. In their model, firms with poor investment prospects may fraudulently improve their reported results so as to increase their odds of obtaining funding from investors. Investors, who

monitor to find attractive investment opportunities instead of finding fraud *per se*, decide whether to scrutinize firms more closely based on reported results and on their beliefs about business conditions. When investors believe that business conditions are poor or average, they scrutinize even firms with strong reports. This makes incentives for fraud weak: a fraudulently strong report will probably be monitored and fail to attract funding. When investors believe that business conditions are good, they lessen their scrutiny of firms with strong reports, and incentives for fraud increase. If investors believe that business conditions are extremely good, they may not be put off even by weak reports because they believe that such reports are more likely to represent temporary setbacks rather than poor prospects. Since even weak reports can receive unmonitored funding, incentives for fraud decrease. To summarize, as business conditions improve, the incentives for fraud increase and then decrease.

Gan (2007) empirically examines the real effects of bubbles using as her natural experiment the 50% collapse of land prices in Japan in the early 1990s. This dramatic decline in the collateral that banks held was not caused by adverse firm performance, and so any discovered correlation between firm performance and a bank's real estate exposure has to be interpreted as the effect of the latter on the former. What does she find? At an individual loan level, banks with greater real estate exposure have a greater cutback of their lending. At an individual firm level, the fixed investment of the firm and its market valuation is negatively correlated with the real estate exposure of its primary bank. Further, a firm borrowing from many different banks will receive less funding from the banks with more real estate exposure. The lending channel is seen to be economically significant: the burst of the real estate bubble can explain one-third of loan contraction, one-fifth of the decline in firm-fixed investment, and one-fourth of the decline in firm's market valuation. Bubbles matter.

4. Questions to be Answered

4.1 Can we identify a bubble when it occurs?

Theorists have defined a bubble. For example, Brunnermeier (2007), in the *New Palgrave Dictionary of Economics*, gives a popular definition: "Bubbles arise if the price exceeds the asset's fundamental value." The only problem with this definition is that no one seems to agree on what an asset's fundamental value is.

The disagreement arises because fundamental value is a function of expected cash flows and discount rates, and neither is observable. They are not even observable *ex post*, although, with the wisdom of hindsight, some bounds may be put on the *ex ante* variables. This is why, 7 years after the dramatic rise and fall of Internet shares, the debate as to whether or not there was a bubble continues on.²

² A sample of papers that question whether fundamentals could explain the dramatic rise and fall of Internet share prices in the late 1990s: Cooper, Dimitrov, and Rao (2001); Ofek and Richardson (2002, 2003); Lamont and

In our view, there would never be agreement about the existence or nonexistence of a bubble *ex ante*. If there were agreement, there would be no bubble. We believe, however, that more agreement could be reached about the existence or nonexistence of a bubble *ex post*. A promising line of research, begun by Ofek and Richardson (2003), looks at a reasonable upper bound of the fundamental value. If the price is higher than the discounted value of cash flows, where the cash flows are the maximum any firm in this industry has achieved, and where the discount rates are the minimum possible (the risk-free rate, or even zero), the price is almost surely a bubble.

4.2 What causes a bubble?

Is it investors or managers or financial advisors or government policies or media or academics or Martians or some other agent that causes a bubble? Shiller (2000) proposes 12 factors that propelled the Internet bubble: the capitalist explosion and the ownership society, cultural and political changes favoring business success, new information technology, supportive monetary policy and the Greenspan put, the baby-boom generation and their perceived effects on the markets, an expansion in media reporting of business news, analysts' optimistic forecasts, the expansion of defined contribution pension plans, the growth of mutual funds, the decline of inflation and the effects of money illusion, expansion of the volume of trade due to discount brokers, day traders and 24-hour trading, and the rise of gambling opportunities.

While the papers from the RFS-IU conference provide a few answers, so do some articles in the prior literature. Among the explanations that have been proposed are limits to arbitrage caused by noise traders (DeLong et al., 1990) or synchronization risk (Abreu and Brunnermeier, 2002, 2003); short-sale constraints (many papers); lack of close substitutes for hedging (many papers); heterogeneous beliefs (Scheinkman and Xiong, 2003); lack of higher-order mutual knowledge (Allen, Morris, and Postlewaite, 1993); delegated investments (Allen and Gorton, 1993); and psychological biases (observed in many experiments).

In our view, the net needs to be cast wider. A promising line of research, seen in Dass, Massa, and Patgiri (2008), is to focus on agency costs in general, and monetary incentives in particular, to find out whether these magnify or dampen bubbles.

4.3 Does a bubble matter?

Are bubbles just a zero-sum game among financial market participants, or do they have real effects on investments, consumption, and employment? If

Thaler (2003); Brunnermeier and Nagel (2004); Loughran and Ritter (2004); and Griffin, Harris, and Topaloglu (2005). These papers provide various other explanations, but some of these explanations have themselves been questioned. For example, Battalio and Schultz (2006) contest the explanation that short sale restrictions prevented traders from arbitraging. A sample of papers argue that fundamentals could explain the dramatic rise and fall of Internet share prices in the late 1990s: DeMarzo, Kaniel, and Kremer (2007); and Pastor and Veronesi (2006, 2007).

bubbles have real effects, how do we measure them? If these real effects are significant, what should policy makers do? If bubbles have insignificant real effects, policy makers should not worry about bubbles, and we should not be telling central banks to deflate bubbles before they become big and collapse.

This, in our view, is the most important question. Gan (2007) attempts to answer this question in the context of the real estate bubble in Japan. Many more such papers are needed.

4.4 What are the welfare effects of bubbles?

It is often assumed that bubbles are bad. But can they increase social welfare? Is it possible that nascent, emerging industries need “animal spirits” and overinvestment for innovation? Or is it more likely that bubbles serve mainly to change the wealth dynamics of society, and through this mechanism affect the investment process? Much more investigation is needed on such welfare effects.

There remain many other questions on bubbles, with perhaps none more important than why do bubbles ever start in the first place. We hope that the RFS-IU conference will spur research into these and other important questions in the behavior of financial asset prices.³

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³ The recent market chaos surrounding sub-prime lending is a case in point. Chuck Prince, the CEO of Citigroup, told the *Financial Times* on July 9, 2007, “We dance as long as the music plays.” However, he believed that “the party would end at some point, but there was so much liquidity, it would not be disrupted by the turmoil in the U.S. sub-prime mortgage market.” The party ended a few weeks later.

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