

# Bubble, Toil, and Trouble

by Ben Craig

*"I can calculate the motions of the heavenly bodies but not the madness of people."*

—Sir Isaac Newton, upon losing £20,000 in the South Sea Bubble

During the run-up in prices of Internet stocks, financial commentators of the time argued about whether the higher prices were justified. Once prices fell, the answer seemed all too obvious. Investors had gotten carried away, had not paid attention to the fundamental determinants of value, had overestimated the future return of the assets they were buying. They had succumbed to one of the most mortifying of all investor pitfalls: a speculative "bubble." They should have known better!

But could they have? When it comes to explaining episodes like the dot-com bust, most economists fall into two schools. One school rejects bubbles as an explanation and believes the price of an asset always reflects the market's estimate of the asset's value (except for short-lived deviations); thus the prices of Internet stocks truly reflected the market's estimate of the value of a new technology and the belief that it had opened up new possibilities for profits. Other economists would say that prices can be driven higher when some market participants buy an asset in the hopes that the price will continue to rise and they can sell it before the price drops; they call this scenario a bubble and say such was the case with Internet stocks.

The first school believes that the market price may be temporarily displaced from its long-run value, but arbitrageurs push the price back to the level that can be sustained. (Arbitrageurs make money by buying or selling a stock that is not priced at its long-run value and then closing out their position for a profit when the price returns to this value.

Alternatively, the second school believes that, at times, a few uninformed market participants will induce behavior in the informed participants that actually drives the price away from its long-run value, causing a short-run bubble, which then bursts and causes the price to return to its sustainable value.

The difference between the two schools of thought lies not in whether a temporary shock causes a market price to differ from its long-run value (both schools acknowledge this probability) or whether the market price eventually returns to this value (both schools believe this occurs). The difference depends on the assumed behavior of the informed traders: One theory asserts that informed traders quickly push the price back to its long-run value, the other says these same traders will drive the price temporarily higher than its long-run value. (Strictly speaking, if a bubble is defined as a situation in which the price of an asset is based on something other than the market's assessment of its real value, the first school would say bubbles are unlikely. We'll continue to refer to periods of rapid or significant rise and subsequent fall in the price of some asset as bubbles if they are well-known as such.)

Which school is correct? This *Commentary* explores both explanations in light of an alleged archetypal bubble, the so-called Mississippi bubble. This is the first bubble for which we have reliable price data, and it has been studied for several centuries. (The tulip bubble may be better known, but we have almost no reliable price data for it.) Like the dot-com bubble of recent time, it was the result of a technical innovation, but in this case, the innovation was one of a new macroeconomic theory.

Not everyone believes bubbles occur in stock markets. Many economists do, but others think something else is happening during periods of rapidly rising and plummeting stock prices. This *Commentary* explains the two schools of thought and shows how both can describe a famous historical episode known as the Mississippi bubble.

## John Law and the Mississippi Company

The history of the Mississippi bubble centers around the rise and fall of John Law, a gentleman who could be described as one of the very first macroeconomists. In 1705, he published his remarkable *Treatise on Money*, in which he argued that issuing paper currency should expand commerce, which, in turn, would expand the demand for the currency, so that prices would not rise. In 1710, Law came to France, after learning that his good friend, the Duc d'Orleans, had been made regent of France. The French government was in financial chaos. By the time Law arrived, the crown had already had a partial default on its bonds and was quite susceptible to his suggestion that his ideas be put into practice.

In June of 1716, Law set up the Banque Générale, a company whose shareholders included the crown, private investors, and Law himself. It was like many banks with an important exception. The paper notes it issued on deposits of coins acted as currency. The regent, influenced by Law's views on paper notes, made them legal tender for taxes, required tax collectors to exchange the notes for coins on demand (thus giving the bank what amounted to free branch offices), and

encouraged the wealthy of France to make large deposits of coins in the bank. The Banque Générale followed the conservative policy of backing 50 percent of the notes with government debt (so that the fractional reserve was half the value of the notes kept as coins), and the notes circulated as currency at face value. The operation was very profitable and earned its investors a return of 64 percent per year by the time the crown took it over in December 1718.

In August of 1717 Law established the Mississippi Company (officially registered as Compagnie d'Occident) in which shares were purchased with a combination of paper currency and crown debt. The Mississippi Company had monopoly rights to the fur trade of the Louisiana and Canadian territories and could essentially manage French North America as its private fiefdom. (New Orleans was named after the regent, a large shareholder of the company.) The company exchanged shares for long-term government debt, intending to develop its North American holdings with the long-term stream of cash provided by the interest payments on the debt. Once the commercial possibilities in North America provided a profit, according to Law's plan, the demand for the currency issued by the Banque Générale would be sustained. The acquisitions of both rights and property that were made by the Mississippi Company soon included all of France's properties in Africa, East India, and China, and monopoly rights to their markets.

By October of 1719, Law's company had privatized most of the financial functions of the crown: His company had the sole right to coin money and the right to collect all direct and indirect taxes, and it held all of the government's debt. Holdings of government debt were financed with successive share issues, although the price of the later shares was higher. These shares were entitled to the same dividend as shares purchased earlier at lower prices. However, there was much that was confusing about these shares. Some of the purchases of the shares were made with the Banque Générale's currency, others with government debt, and some seem to have been options on possible future purchases at a set price. It also remains unclear what the crown owned and what it owed to Law's company. (The crown was a large shareholder at the same time that it was a heavy borrower through the

company's holding of government debt). What we do know is that initially, at least, the public had enough confidence in Law's system to have faith in the future payments on this debt.

At the height of Law's career, in January 1720, he was made France's comptroller general and the superintendent general of finance, in addition to being a large shareholder in the Mississippi Company. Within a month, the company also owned the Banque Générale, whose currency was encouraged by a series of edicts limiting the use of metallic money. At the peak of share value, when shares were heavily traded, the company was worth about one-fifth of all the wealth of France.

Several things are important to note about the Mississippi Company and its shares at this point. First, the company's assets, organizational structure, and functions were poorly understood by perhaps everyone at the time except Law. Indeed, historians who have been studying the company in light of modern financial science have a difficult time sorting out the structure of the company. For example, it is still unclear whether the Mississippi Company used the Banque Générale's assets for its own purposes before the two companies were formally merged in 1720. (Most historians now think that both companies were both almost completely under Law's control). Second, in spite of the impressive list of territorial holdings acquired by the Mississippi Company, these were not the assets that generated the most excitement from investors. For example, similar rights to the North American territories had been given to other investors with little or no profit to show for them. What generated the excitement were Law's new ideas about money along with the endorsement of these ideas by the crown, which owned a share of the company. And excitement there was.

Paris was swollen with investors from all over Europe eager to buy shares in the new company. The price of a share at its height on the unofficial secondary market in December 1719 was 40 times its initial value. It was clear (at least to some) that the revenues from the taxation rights could not possibly pay a 5 percent dividend unless France grew at a tremendous rate, and even then, that dividend would not come for many years. Further, the territories had been only minimally developed and so could not be expected to pay much soon.

Law chose to concentrate his business operations on those functions that are presently performed by government institutions: taxation and the issuing of currency, rather than, say, developing colonial infrastructure. Perhaps investors hoped that Law's economic system could generate such fabulous profits in the short run that they would allow the development of vast territories in the long run. However, in May 1720, prices of goods in terms of the company's currency started rising rapidly. This called into question Law's theory that currency would create the economic conditions that would sustain its purchasing power.

Law tried to force a reduction in the official price of shares from 9000 to 5000 livres. (The secondary market indicated an even more precipitous fall in the price of shares). There were riots, and Law was fired. When it was clear that no one else understood how his company worked, he was brought back. His attempts to maintain the value of the currency by reducing the amount in circulation unraveled, and the share price fell rapidly. By December of the same year, the share price was less than one-tenth of its high value. The company's currency was no longer used in regular transactions, and the crown confiscated all shares that were held in the Banque Générale. There was little value left in the company, and Law fled the country.

### ■ The Mississippi Company Might Have Been a "Bubble"...

Researchers who belong to the second school described above (bubbles happen) think that the rise and fall of the Mississippi Company was indeed a good example of a bubble. They argue that bubbles begin with a shock that causes the market price of an asset to deviate from its sustainable value. Such shocks are caused by a few uninformed investors who trade based upon poor models of market behavior or on a short history of market performance. The bubble then forms as a result of the dynamics of the behavior of the mostly well-informed traders (the majority of the market). In this view, the informed traders realize that the asset's price is above its value, but they differ from each other in terms of when they find out—some know early, others later. They are also unaware of whether they are early or late learners. Because no one knows who's early and who's late, informed traders gamble that they are

early learners and will be able to ride the bubble up and get out earlier than the late learners. Their problem has shifted from one of making sure the price of an asset equals its long-run value to one of optimal timing: When should one buy to ride a price rise up, and when is the best time to get out of an overvalued asset? The implication of this mechanism is that the price of an asset rises above its long-run value until enough “early leavers” sell the asset so that its price drops by a certain value. At this point, all the speculators realize that it is time to get out and the price falls precipitously to its long-run value.

The theory has much to recommend it as an explanation for the Mississippi bubble. It suggests that only a few uninformed traders are needed for the valuation to be much less than the market price at some time, and it even allows for many of the informed traders getting burned by the price fall when the bubble bursts.

Indeed, the proposed timing of the theory matches well with what we know about the Mississippi bubble. By May of 1719, 30,000 foreigners were in Paris for the express purpose of trying to subscribe to a share in the *Compagnie d'Occident*. In the same month, the British ambassador reported many letters from relatives and friends in Scotland, begging him to buy stock in the company for them. There were reports of people selling their homes in order to buy a share. As the price rose, there is evidence that many of the traders realized that the price was not sustainable. The French banker Martin wrote about the trading, “When the rest of the world are [sic] mad, we must imitate them in some measure.” The question became when to sell to avoid being caught. The hope was, as Carswell, writing about the South Sea bubble, an international echo of the Mississippi bubble, observed, “[to] sell out betimes and so let the Devil take the hindmost.” Experienced financial traders could do very well: The Langedoc bankers got out early enough, as did the canton of Berne, which made a profit of 10 times its original outlay. The Dutch financial community also did extremely well, and Law might have ended very wealthy had he not diversified his shares into French land, which was confiscated after the bubble burst. Thus, the actors required for a bubble seemed to be present, and the rapid rise and fall of the price of shares also are consistent with the bubble story.

Further, experimental studies of bubbles match the Mississippi bubble in several aspects. These studies suggest that bubbles are very likely to occur when more of the market participants are new to trading (as was true in the Mississippi bubble), and match the spectacular price rise and precipitous fall that were observed in share prices of the Mississippi Company.

#### ■ On the Other Hand...

However, the value placed on an underlying physical asset by well-informed market participants can rise and fall quite rapidly. What some describe as a bubble may be nothing more than a period in which an asset's estimated value rises and falls precipitously. For example, oil might increase in price because of an expected war. Buyers of oil desire to buy more in order to store in anticipation of possible shortages during the war, and the price of the oil rises. A peace is negotiated, and oil buyers now realize that they are holding on to an asset that is less valuable than it would have been had a war stopped the wells from flowing. People quickly expect the price of oil to be lower, and the price falls rapidly. Notice in this scenario that speculation has been a beneficial function of the market. In no sense is the rapid increase in price caused by uninformed behavior, for the market's expectations are based on the real possibility of future oil shortages. Uninformed traders who might panic and send the price of oil skyrocketing are not part of this story. The dominating influence on the market of well-informed traders is enough to push the current price back to a point that reflects the future shortage of oil.

Peter Garber, an economic historian, believes that this is all that happened in the Mississippi bubble. He asserts that in this and other so-called stock market bubbles rapid price ascents and descents occur because of corresponding reasonable expectations about the true profit prospects for the underlying property right represented by the asset. It is the rapid reaction to new information about this underlying value that causes the steep decline of prices.

There is also something attractive about this “nonbubble” explanation of the Mississippi bubble. Indeed, how does one value the potential profits of the assets of the Mississippi Company even with the benefit of hindsight of almost

three centuries? The company owned the economic potential of the entire Louisiana Territory and Canada, as well as the French possessions in Africa, India, and China, although these holdings do not seem to have been the major driver of the price increase of the shares. In addition to its world holdings, the company had all of the debt and the ability to issue currency and collect taxes for the largest economy in Europe. What was the true value of all of these privileges? Even with the benefit of modern economic science it is difficult to decide on a clear value for the potential profits of these rights in 1720. In addition, a purchaser of a share in the company had to evaluate the potential of Law's economic theory, which seemed promising even to hardened financial experts in London in 1719. Garber argues that the contemporary market for the shares of Law's company could very well have been evaluating this “new economy” with the best means available, and the prices could have reflected that value in a rational price. However, the price was volatile: It went up and it went down as the market's assessment of the underlying asset's profitability changed.

#### ■ Bubble? Hard to Tell

Even though the Mississippi bubble has been studied for nearly two centuries, economists still debate whether it was even a bubble. Some say that the inexperience of a few investors in the market led to speculative behavior that drove the price much higher than most informed investors would have valued it. Others say the price of the shares rose and fell as new information was evaluated about the worth of Law's theory. Both explanations can be applied to other, more recent episodes called bubbles, such as the Internet bubble. Settling the debate is made most difficult by the fact that we know very little now about what reasonable expectations of the “true valuation” should have been, given only the information available to the market traders when they were trading. Just because the price ultimately fell when more information arrived does not mean that shares had been valued unreasonably high. Some researchers of the recent dot-com episode point out that the price-to-earnings ratios for stocks rose far above their historic levels and then fell back to these levels after the price fall, suggesting traders had not been attending to the right determinants of value. However, other researchers suggest that this

temporary deviation may have reflected a new valuation paradigm that depended less upon price-to-earnings ratios and more on other factors.

The debate continues to be unresolved because it depends on a concept that is unmeasured, given the present state of economic science: the market's assessment of long-run value. The argument centers around whether this assessment is reflected in the price. A nonbeliever in bubbles asserts that the price is the assessment and delivers anecdotes to suggest that the high price is not preposterous. Either a new invention or a new paradigm has made the notion of extraordinary profits quite reasonable, justifying a high price. A believer in bubbles, on the other hand, uses anecdotes or historical measures of reasonable prices to argue that most participants in the market know that the high prices are not sustainable. Until there is an ability to measure the sustainable price that is acceptable to both sides, the argument is likely to remain unresolved.

### ■ Recommended Reading

Peter M. Garber, 2000, *Famous First Bubbles: The Fundamentals of Early Manias*. Cambridge, Mass.: MIT Press.

François Velde, 2002, "Government Equity and Money: John Law's System of 1720," presented at the Economic History Association's 62nd Annual Meeting, "Private versus Public Institutions," October 11–13, 2002.

Dilip Abreu and Markus Brunnermeier, 2003. "Bubbles and Crashes," *Econometrica*, vol. 71, no. 1, pp. 173–204.

William C. Hunter, George G. Kaufman, and Michael Pomerleano (eds.), 2002, *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*, Cambridge, Mass.: MIT Press.

*Ben Craig is an economic advisor at the Federal Reserve Bank of Cleveland.*

*The views expressed here are those of the author and not necessarily those of the Federal Reserve Bank of Cleveland, the Board of Governors of the Federal Reserve System, or its staff.*

*Economic Commentary is published by the Research Department of the Federal Reserve Bank of Cleveland. To receive copies or to be placed on the mailing list, e-mail your request to [4d.subscriptions@clev.frb.org](mailto:4d.subscriptions@clev.frb.org) or fax it to 216-579-3050. Economic Commentary is also available at the Cleveland Fed's site on the World Wide Web: [www.clev.frb.org/research](http://www.clev.frb.org/research), where glossaries of terms are provided.*

*We invite comments, questions, and suggestions. E-mail us at [editor@clev.frb.org](mailto:editor@clev.frb.org).*

**Federal Reserve Bank of Cleveland  
Research Department  
P.O. Box 6387  
Cleveland, OH 44101**

**Return Service Requested:**  
Please send corrected mailing label to the above address.

Material may be reprinted if the source is credited. Please send copies of reprinted material to the editor.

**PRSR STD  
U.S. Postage Paid  
Cleveland, OH  
Permit No. 385**