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Famous First Bubbles

Peter M. Garber

The jargon of economics and finance contains numerous colorful expressions to denote a market-determined asset price at odds with any reasonable economic explanation. Such words as “tulip mania,” “bubble,” “chain letter,” “Ponzi scheme,” “panic,” “crash,” and “financial crisis” immediately evoke images of frenzied and probably irrational speculative activity. Many of these terms have emerged from specific speculative episodes which have been sufficiently frequent and important that they underpin a strong current belief among economists that key capital markets sometimes generate irrational and inefficient pricing and allocational outcomes.

Before economists relegate a speculative event to the inexplicable or bubble category, however, we must exhaust all reasonable economic explanations. While such explanations are often not easily generated due to the inherent complexity of economic phenomena, the business of economists is to find clever fundamental market explanations for events; and our methodology should always require that we search intensively for market fundamental explanations before clutching the “bubble” last resort.

Thus, among the “reasonable” or “market fundamental” explanations I would include the perception of an increased probability of large returns. The perception might be triggered by genuine economic good news, by a convincing new economic theory about payoffs or by a fraud launched by insiders acting strategically to trick investors. It might also be triggered by uninformed market participants correctly inferring changes in the distribution of dividends by observing price movements generated by the trading of informed insiders. While some of these perceptions might

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in the end prove erroneous, movements in asset prices based on them are fundamental and not bubble movements.

I aim in these pages to propose market fundamental explanations for the three most famous bubbles: the Dutch tulipmania (1634–37), the Mississippi Bubble (1719–20), and the closely-connected South Sea Bubble (1720). Though several authors have proposed market fundamental explanations for the well-documented Mississippi and South Sea Bubbles, these episodes are still treated in the modern literature as outbursts of irrationality. This may be attributable to the influence of Mackay's (1852) graphic descriptions of the frenzied speculative crowds which materialized in Paris and London in 1719 and 1720; from our current perspective, though, such "irrational" speculation probably looked a lot like a normal day in a pit of the Board of Trade.

As a justification for concentrating on these three bubbles, I will briefly explore the modern bubble literature to show that these episodes are frequently invoked as motivation for adopting bubble explanations. Next, I will briefly describe the nature of the asset markets and financial manipulations which occurred in these episodes and provide market fundamental explanations.

The Three Bubbles in the Modern Literature

Standard reference sources in economics typically refer to one or more of these events in defining the term "bubble." For example, Palgrave's *Dictionary* (1926, p. 181) defines a bubble as "any unsound commercial undertaking accompanied by a high degree of speculation." It then provides histories of tulipmania, the Mississippi Bubble and the South Sea Bubble as examples. In his article on "bubbles" in *The New Palgrave* (1987), Kindleberger includes the tulipmania as one of the two most famous manias. (His other example is the British railway mania of the 1840s.) Curiously, the entry on "tulipmania" in the *The New Palgrave* does not refer to the 17th century Dutch speculative episode. Instead, Calvo defines "tulipmania" generically, as a situation in which asset prices do not behave in ways explainable by economic fundamentals, and then develops examples of rational bubbles.

In the past few decades, these historical episodes have passed into the common lore of economics. Samuelson (1957, 1967) refers to the tulipmania and associates it (1967, p. 230) with "the purely financial dream world of indefinite group self-fulfillment," though he is skeptical that such phenomena are important in real markets. Students of Samuelson like Shell and Stiglitz (1967) state, "The instability of the Hahn model is suggestive of the economic forces operating during 'speculative booms' like the Tulip Bulb mania."¹

The "sunspot" literature has revived references to these famous bubbles. For example, Azariadis (1981, p. 380) states that, "The evidence on the influence of subjective factors is ample and dates back several centuries; the Dutch 'tulip mania,'

¹Burmeister (1980, pp. 264–286) summarizes the research activity about "the Hahn problem."

the South Sea bubble in England, the collapse of the Mississippi Company in France are three well-documented cases of speculative price movements which historians consider unwarranted by 'objective' conditions."² In a more recent motivational argument for the importance of "sunspots," Azariadis and Guesnerie (1986) state, "And the reading of economic historians may suggest that these factors (sunspots) have some pertinence for the explanation of phenomena like the Dutch tulipmania in the seventeenth century and the Great Depression in our own."

J. van Horne (1985), influenced by mounting evidence of financial market anomalies, accepts the possibility of bubbles and manias and refers to the tulipmania, where a "single bulb sold for many years' salary." With a reference to the tulipmania, Shiller (1986) argues that asset markets are driven by capricious investors acting on the basis of fads and bubbles. In papers related to this literature, Cutler, Poterba, and Summers (1989) refer to the tulipmania, the Mississippi bubble and the South Sea bubble as examples of how trading dynamics may affect asset prices. Finally, in the exchange rate literature, Meese (1986) refers to tulipmania and Krugman (1985) conjures up the images of both the tulipmania and the South Sea Bubble while building a case for a bubble interpretation of the movements of the dollar exchange rate during the 1980s.

The reader can probably provide other cases where these episodes are cited as clear evidence of bubbles in the past. In contrast, I will argue that none of these episodes should actually qualify as bubbles.

The Fundamentals of Tulipmania

Mackay (1852) passed on to economists the standard description of the tulipmania as a speculative bubble.³ In this description, the Netherlands became a center of cultivation and development of new tulip varieties after the tulip's entry into Europe from Turkey in the mid-1500s. Professional growers and wealthy flower fanciers created a market for rare varieties in which bulbs sold at high prices. For example, a *Semper Augustus* bulb sold for 2000 guilders in 1625, an amount of gold worth about \$16,000 at \$400 per ounce. Common bulb varieties, on the other hand, received very low prices.

By 1636, the rapid price rises attracted speculators, and prices of many varieties surged upward from November 1636 through January 1637. In February 1637, prices suddenly collapsed, and bulbs could not be sold at 10 percent of their peak values. By

²Actually, the company involved was not called the Mississippi Company. Initially, it was the *Compagnie d'Occident*; and after a series of corporate takeovers, it became the *Compagnie des Indes*.

³Mackay plagiarized his description from Beckmann (1846). Beckmann refers to a long sequence of research about the episode, but all sources are ultimately based on a set of three anonymously written pamphlets in dialogue form published in 1637. These pamphlets were among dozens written just after the collapse by anti-speculative partisans launched by the economic oligarchy which wished to assure that speculative capital was channeled through markets which it controlled.

1739, the prices of all the most prized bulbs of the mania had fallen to no more than 0.1 guilder. This was $1/200$ of 1 percent of *Semper Augustus's* peak price. The story concludes by asserting that the collapse led to economic distress in the Netherlands for years afterwards.

The standard version of the tulipmania neglects discussion about what the market fundamental price of bulbs should have been. Mackay did not report transaction prices for the rare bulbs immediately after the collapse. Instead, he recorded tulip bulb prices from 60 or 200 years after the collapse, interpreting these much lower prices as ones justified by market fundamentals. Yet the dynamics of bulb prices during the tulip episode were typical of any market for rare bulbs, even those existing today. The tulip market involved only bulbs affected by a mosaic virus which had the effect of creating beautiful, feathered patterns in the flowers. Only diseased bulbs were valued by traders and collectors, because a particular pattern could not be reproduced through seed propagation. Only through budding of the mother bulb would a pattern breed true.

A standard pricing pattern arises for new varieties of flowers, even in modern markets. When a particularly prized variety is developed, its original bulb sells for a high price. As the bulbs accumulate, the variety's price falls rapidly; after less than 30 years, bulbs sell at their reproduction cost. This pattern raises two questions. First, why did the price of bulbs increase rapidly? Second, did prices decline faster than should have been expected?

The price increases prior to February 1637 occurred as the status of a variety became clear; and as its renown increased, so would its price. After all, most new varieties were not considered particularly beautiful. This would explain the steady increase in the price of *Semper Augustus*. Similarly, a shift in fashion toward the appreciation of tulips in general over a shorter period would generate rising prices for all the rare bulbs.

To form an expectation about a typical rate of price decline of tulip bulbs, I collected data on 18th century bulb price patterns for various highly valued tulip bulbs. The level of 18th century prices was much lower than during the mania. By 1707, an enormous variety of tulip bulbs had been developed; and the tulip itself had been replaced as the most fashionable flower by the hyacinth. Nonetheless, as Table 1 shows, bulb prices still were falling sharply. The average annual rate of depreciation for these bulbs was 28.5 percent before bulb prices reached floor values.

Table 2 reports prices of those bulbs for which I have been able to gather price data for years immediately after the mania. February 5, 1637 was the day on which peak prices were attained. For these bulbs from February 1637 to 1642, the average annual rate of price depreciation was 32 percent, not greatly different from the 18th century depreciation rate. If the more rapid annual rate of decline for the tulipmania bulbs was attributed entirely to the crash, and not to factors which materialized in the succeeding five years, the crash can have accounted for no more than a 16 percent price decline: large, but hardly the stuff that legends are made of.

Strangely enough, if one is to speak of tulipmania, it would be more accurate to

Table 1
Guilder Prices of Tulip Bulbs, 1707, 1722, and 1739

<i>Bulb</i>	<i>1707</i>	<i>1722</i>	<i>1739</i>
1. Premier Noble	409	---	1.0
2. Aigle Noir	110	0.75	0.3
3. Roi de Fleurs	251	10.0	0.1
4. Diamant	71	2.5	2.0

Source: Garber (1989).

Table 2
Post-Collapse Bulb Prices in Guilders

<i>Bulb</i>	<i>Feb. 5, 1637</i>	<i>1642 or 1643</i>
1. English Admiral (bulb)	700.	210.
2. Admiraal van Eyck (bulb)	1345.	220.
3. General Rotgans	805.	138.

Source: Garber (1989).

speak of the rapid price rise and collapse in common bulbs in the last week of January and first week of February 1637. Common bulbs became objects of speculation among the lower classes in a future market which emerged in November 1636. These markets were located in local taverns, and each sale was associated with a payment of "wine money." In January 1637, prices for some common bulb varieties increased by as much as 25 times. For example, the peak price for a bulb called Switser of .17 guilders/aas was attained on February 5, the apparent peak of the market (1 aas = 1/20 gram). Data from notarized contracts on February 6 and 9 indicate a sudden decline to .11 guilders/aas. This represents a substantial decline from prices in the first five days of February, but it still exceeds the price of .035 guilders/aas attained on January 23. Price increases through mid-January, while rapid, were not as great as in the final two weeks of the speculation; and there is no evidence that they were out of line. Since serious traders ignored this market and participants in this market had almost no wealth, it can have been little more than a mid-winter diversion among tavern regulars mimicking more serious traders.

Finally, there is no evidence of serious economic distress arising from the tulipmania. All histories of the period treat it as a golden age in Dutch development.

A Preliminary View: The Mississippi and South Sea Bubbles

The financial dynamics of these speculations assumed remarkably similar forms. Each involved a company that sought a rapid expansion of its balance sheet through corporate takeovers or acquisition of government debt, financed by successive issues of shares. The new waves of shares marketed were offered at successively higher prices. The purchasers of the last wave of shares took the greatest losses when stock prices fell, while the initial buyers generally gained.

Adam Anderson (1787, pp. 123–124) presents a remarkably lucid description of such speculative dynamics in which a sequence of investors buys equal shares in a venture:

A, having one hundred pounds stock in trade, though pretty much in debt, gives it out to be worth three hundred pounds, on account of many privileges and advantages to which he is entitled. B, relying on A's great wisdom and integrity, sues to be admitted partner on those terms, and accordingly buys three hundred pounds into the partnership. The trade being afterwards given out or discovered to be very improving, C comes in at five hundred pounds; and afterwards D, at one thousand one hundred pounds. And the capital is then completed to two thousand pounds. If the partnership had gone no further than A and B, then A had got and B had lost one hundred pounds. If it had stopped at C, then A had got and C had lost two hundred pounds; and B had been where he was before: but D also coming in, A gains four hundred pounds, and B two hundred pounds; and C neither gains nor loses: but D loses six hundred pounds. Indeed, if A could show that the said capital was intrinsically worth four thousand and four hundred pounds, there would be no harm done to D; and B and C would have been obliged to him. But if the capital at first was worth but one hundred pounds, and increased only by subsequent partnership, it must then be acknowledged that B and C have been imposed on in their turns, and that unfortunate thoughtless D paid the piper.

Should we, as outside observers, interpret such a sequence of transactions and prices as a bubble? The intrinsic value of the venture from the point of view of the new investors is the crux of the matter.

First, if the original investor falsely claimed that the venture promised great dividends, though as yet unrealized, he would be committing fraud. The new investors, however, would be basing their decisions on their perception of market fundamentals. This is a situation of asymmetric information in which one player has an incentive to dissemble.

Second, the original investor might use some of the proceeds from the stock sales to pay high dividends to the early investors. This would provide concrete evidence of the great prospects of the venture to new investors. Of course, this twist on the original

fraud is known as a Ponzi scheme; but since the “pidgeons” are acting on their view of market fundamentals, there is still no bubble.

Third, the great future earnings may actually materialize, thereby satisfying all investors. This result is typical of the early stages of successful companies; and the sequence of stock issues at increasing prices would neither surprise a modern investment banker nor raise the eyebrows of the SEC. In this case, the promised market fundamentals would actually materialize.

Fourth, the projected future earnings, though based on the best available evidence, may fail to materialize. If the evidence of failure appears suddenly, the share price will suffer a precipitous decline causing late buyers vociferously to regret their purchases. Hindsight will readily identify the blind folly of the investors and, if it is extreme enough, perhaps categorize the event as a bubble. In fact, the traditional definition of a bubble, as in Palgrave (1926, p. 181) is “any unsound commercial undertaking accompanied by a high degree of speculation.” If the undertaking appeared sound at the start, however, and only looks foolish in hindsight, economists should classify this event as being driven by market fundamentals.

Finally, all investors may perfectly understand that the venture has no chance of paying large dividends, but that a sequence of share buyers at ever increasing prices is available. Investors buy in on a gamble that they will not be in the last wave of buyers. The modern economics literature refers to this scenario as a bubble or chain letter. We now consider if the Mississippi and South Sea episodes can fit only in the last category.

John Law and the Fundamentals of the Mississippi and South Sea Bubbles

John Law’s Financial System

Both the Mississippi and South Sea Bubbles can be best understood in the context of the monetary theory and system created by John Law. Law is not well-known today, but Schumpeter (1954, p. 295), for example, is unreserved in praising him: “He worked out the economics of his projects with a brilliance and, yes, profundity which places him in the front ranks of monetary theorists of all times.”

Law (1705) sketched a monetary theory in an environment of unemployed resources. In such an environment, he argued (1760, pp. 190–91), an emission of paper currency would expand real commerce permanently, thereby increasing the demand for the new currency sufficiently to preclude pressure on prices. To finance a great economic project, an entrepreneur needed only the power to create claims which served as a means of payment. Once financed, the project would profit sufficiently from the employment of previously wasted resources to justify the public’s faith in its liabilities.

Economic policy advocates and their ideas, good or bad, float to the surface only when they provide a convenient pretext for politicians to impose their preferred schemes. Law's idea got its chance in France in 1715. France had been bankrupted by the wars of Louis XIV. In a situation similar to the current debt problems of less developed countries, it had repudiated part of its debt, forced a reduction in interest due on the remainder, and was still in arrears on its debt servicing. High taxes, combined with a tax system full of privileges and exemptions, had seriously depressed economic activity.

The French economic environment was well-suited for Law's scheme, and he quickly convinced the Regent to permit him to open a conventional, note-issuing bank in June 1716, the *Banque Generale*. In August 1717, Law organized the *Compagnie d'Occident* to take over the monopoly on trade with Louisiana and on trade in Canadian beaver skins. (This line of business is the source of the word "Mississippi" in characterizing Law's system.) To finance the company, Law took subscriptions on shares to be paid partly in cash but mostly in government debt. He then converted the government's debt into *rentes*, offering the government an interest rate reduction. The idea was to establish a solid "fund of credit," a certain cash inflow which, when capitalized, could be leveraged to undertake the grand commercial schemes which lay at the heart of Law's economic theory. The nature of Law's scheme was that finance of the operation came first; expanded commercial activity would result naturally once the financial structure was in place.

In effect, the French privatized the treasury under Law's plan, and had only to wait for the general commercial expansion promised by Law's theory to materialize and to support the market prices of the company's shares.

John Law's Finance Operations

The *Compagnie d'Occident* did increase its commercial activity, obtaining the tobacco monopoly in September 1718 and the Senegalese Company (trade with Africa) in November 1718.⁴ In January 1719, the *Banque General* was taken over by the regent and renamed the *Banque Royale*, with a note issue guaranteed by the crown. Law remained in control of the new bank. In May 1719, he acquired the East India Company and the China Company; and he reorganized the entire conglomerate as the *Compagnie des Indes*, an organization which monopolized all French trade outside Europe.

On July 25, 1719, the *Compagnie* purchased the right to mint new coinage for 50 million livres tournois to be delivered in 15 monthly payments.⁵ To finance this expenditure, Law issued 50,000 shares at 1000 livres per share to cover this acquisition, requiring share buyers to hold five previously issued shares. Share prices rose to 1800 livres.

⁴This necessarily brief outline of Law's experiment is based on descriptions in Harsin (1928), Faure (1977), and Murphy (1986).

⁵The livre tournois was the unit of account and was officially valued at weights of gold or silver which varied during Law's regime. See Figure 2 for changes in the official gold definition of the livre tournois.

In August 1719, Compagnie bought the right to collect all French indirect taxes for a payment of 52 million livres per year. The takeover of the administration of the tax system was in line with Law's views that a simplified fiscal regime would benefit commerce and reduce the costs of collection. Law thought that taxes should be broad-based and few, with no exemptions or privileges. He set about reorganizing the personnel of the tax system, since a reduced collection cost would be a source of company profit. In October 1719, he took over the collection of direct taxes. Share prices rose to 3000 livres.

Finally, Law determined to refund most of the national debt through the Compagnie des Indes, an amount with a face value of 1500 million livres. The face value of the entire debt was estimated by Harsin (1928) at about 2000 million livres; the market value of the debt was well below the par value because of previous defaults and arrearages.

To finance the debt acquisition, Law undertook a sequence of three stock sales on September 12, September 28, and October 2, 1719. In each offering, the Compagnie sold 100,000 shares at 5000 livres per share payable in 10 equal monthly payments. Payment could be made either at par in *rentes* or in the notes of the Banque Royale. Thus, by August 1720, enough would have been raised to acquire the face value of the debt.

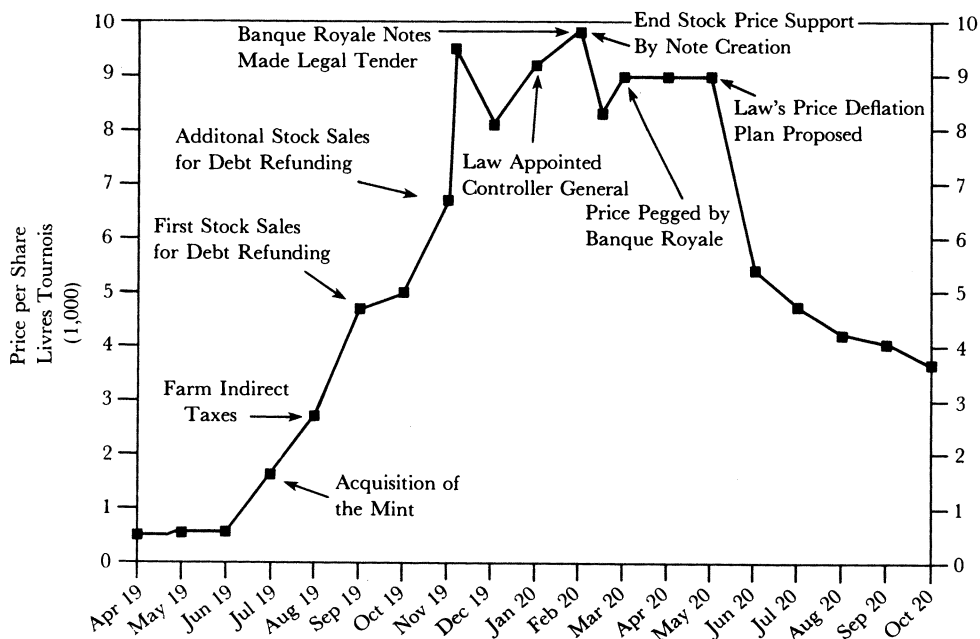
Acquiring the debt would create a huge "fund of credit," a steady income flow from the government, which could be used as equity against any potential commercial venture of the Compagnie. Simultaneously, the Compagnie would reduce the interest paid by the state to 3 percent per year. After these operations, share prices rose to 10,000 livres in October 1719.⁶

Law attained maximum power in January 1720 when he was made France's Controller General and Superintendant General of Finance. As an official he now controlled all government finance and expenditure and the money creation of the Banque Royale. Simultaneously, he was the chief executive officer of a private firm that controlled France's overseas trade and the development of its colonies, that collected France's taxes, that minted its coins, and that held the bulk of France's national debt. The king was a principal shareholder of the firm. It must have been obvious to all that the Compagnie would find no government or financial obstacle to its undertaking any commercial scheme that it chose. Surely no economist has since had as perfect a set of conditions for testing a major economic theory as those possessed by Law. Figure 1 illustrates the Mississippi bubble. The phase of price increase is associated with the expanding activity of the company at this time.

In the end, however, the commercial scheme chosen was to print money. Starting with the July 1719 stock issue, the Banque Royale had increased its note issue to

⁶The approximately 540,000 shares outstanding would then have had a market value of 5.4 billion livres, somewhat less than four times the face value of the *rentes* which were the most tangible assets of the Compagnie. For perspective, Law himself estimated the national wealth of France at 30 billion livres. Of the shares outstanding, the king held 100,000 shares. In addition, the Compagnie held 100,000 shares which it could sell. Researchers of the Mississippi and South Sea episodes treat the quantity of own shares held by the companies as significant.

Figure 1

Compagnie des Indes Stock Price

facilitate the stock sales. Each government authorization of a share expansion simultaneously authorized a note emission. For example, with only 159 million livres in notes previously authorized, the Banque received authorization to emit 240 million livres on July 25, 1719. A further 240 million livre expansion was associated with the September and October share sales. Additional note issues of 360 million and 200 million livres occurred on December 29, 1719 and February 6, 1720, respectively, without new share issues. For comparison, Harsin (1928) estimates the total specie stock of France at about 1.2 billion livres.

By the end of January 1720, share prices had begun to fall below 10,000 livres because of increasing attempts to convert capital gains into a gold form. The falling price of shares threatened Law's ability to use his "fund of credit" to begin a commercial expansion.

In January 1720, Law began to act against the use of specie in payments by prohibiting payments above 100 livres in metallic money. On February 22, 1720, the Compagnie took over direct control of the management of the Banque Royale; and the Banque Royale's notes were made legal tender for payments above 100 livres.⁷

⁷Simultaneously, the king sold his 100,000 shares back to the company at 9000 livres per share. Three hundred million livres would be deposited in the king's accounts in the Banque immediately with the rest to be paid over 10 years.

Simultaneously, the Compagnie ceased supporting the price of its shares with banknotes, precipitating a sharp price decline.

Law criticized unsophisticated share holders trying to convert shares to the concrete form of gold because there was not enough gold in the kingdom to satisfy such an attempt. He believed that the high share value was justified by the Compagnie's prospects. Law stated that the shares had high value only if they were regarded as a capital investment, to be bought and sold infrequently, held by people content to receive their yields as a flow of dividends which he claimed was somewhat higher than the prevailing interest rate.⁸

On March 5, 1720, share prices were pegged at 9000 livres: the Banque Royale now intervened directly to exchange its notes for Compagnie stock. Effectively converting shares into banknotes with a denomination of 9000 livres, this policy was a realization of Law's theory that a commercial enterprise could finance itself with emissions of circulating debt. Until its termination on May 21, 1720, the pegging scheme generated legal tender note expansions of 300 million, 390 million, 438 million, and 362 million livres on March 25, April 5, April 19, and May 1, respectively, to absorb sales by shareholders. Thus, the Banque's legal tender note circulation doubled in about one month.

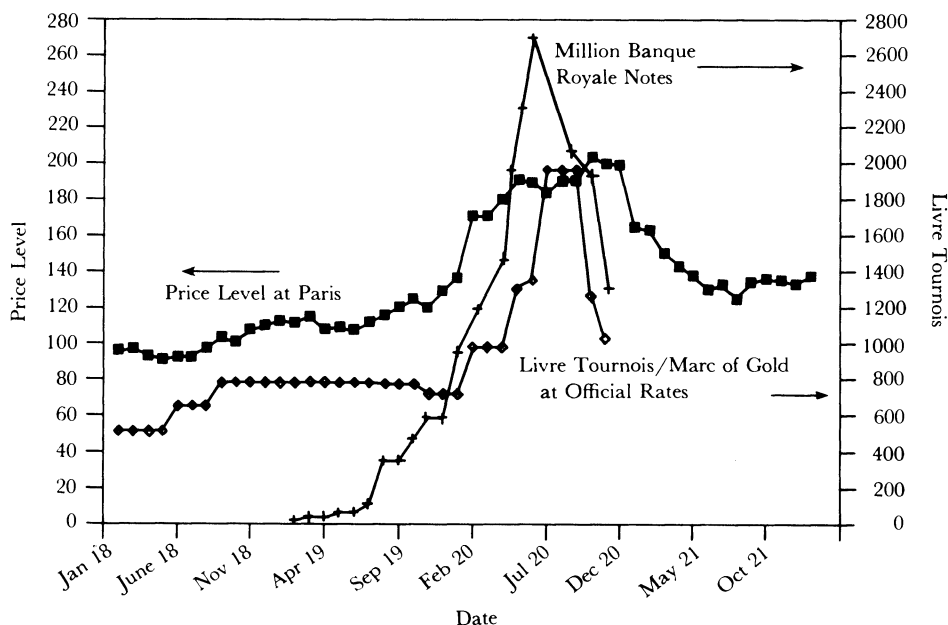
This also was a doubling in the money stock, since the metallic stock had disappeared. In an effort to drive out metallic currency and to maintain the facade of note convertibility, Law had simultaneously imposed a series of drastic devaluations of specie in terms of livre tournois. As a result of this dramatic monetary expansion, the average monthly inflation rate from August 1719 through September 1720 was 4 percent, with a peak of 23 percent in January 1720. The index of commodity prices increased from 116.1 in July 1719 to 203.7 in September 1720 (Hamilton, 1936). See Figure 2 for a time series of the price level and the Bank Royale notes in circulation.

Deciding that he had fixed the price of shares at too high a level, Law proposed a drastic deflation on May 21, 1720. Share prices would be reduced from 9000 to 5000 livres in seven stages ending on December 1. Notes would be reduced in value to 50 percent of their face value. Thus, by December, there would remain only 2.3 billion livres in paper (1.3 billion in notes and 1 billion in stock). This reduction was actually accomplished by various other means. Law's plan simply to write down the value of the notes in terms of livre tournois was abandoned when he was thrown from office at the end of May 1720. He was, however, quickly reappointed and presided over the deflation.

By October 1720, only 1.2 billion livres of notes remained in circulation (of a peak of 2.7 billion) and 1.2 billion livres of specie reappeared. Specie was rapidly revalued to the definition that it had at the start of 1720. By December 1720, the price level had fallen to 164.2. Thus, the share price decline starting in 1720 represents a period of share price pegging by the bank—that is, the monetization of shares—and the purposeful monetary deflation undertaken by Law.

⁸See Harsin's (1928, p. 180) citation of Law's *Deuxieme Lettre sur le nouveau system des finances*.

Figure 2

Mississippi Bubble Money and Price Data

The price of the Compagnie's shares fell to 2000 livres in September 1720 and to 1000 livres by December. Law's enemies were now in a position to impose policies hostile to the Compagnie, notably a confiscation of two-thirds of the shares outstanding. The share price fell to 500 livres by September 1721, approximately its value in May 1719.

A Rehash of Mississippi Market Fundamentals

Should economists sum up the increasing stock prices of the Compagnie des Indes only as the "Mississippi bubble"? After all, behind the price rise lies Law's program to revitalize the French economy through financial innovation and fiscal reform. Law's theory was plausible and even has many modern manifestations, and he was an effective propagandist. Investors also could readily observe Law's astounding rise to power. At each stage, as the implementation of the economic experiment became ever more likely, they had to factor the possibility of success into the share prices of the Compagnie de Indes.

The downward slide of share prices is even easier to understand, given the radical shifts in monetary policy and the intimate connection of Compagnie shares to Banque Royale note emissions. The final fall to original share values was driven by Law's fall from power and the accession of his enemies, who aimed to dismantle the Compagnie.

That Law's promised expansion never materialized does not imply that a bubble occurred in the modern sense of the word. After all, this was not the last time that a

convincing economic idea would fracture in practice. One respectable group of modern economists or another have described Keynesian economics, supply side economics, monetarism, fixed exchange rate regimes, floating exchange rate regimes, and the belief in rational expectations in asset markets as disastrously flawed policy schemes. Indeed, elements of the first three were primary components in Law's scheme.

Only after the experiment had been run could investors have known that the idea was flawed. That they referred to the ensuing collapse and their after-the-fact foolishness as a bubble should not confuse economists' interpretation of the event. According to the modern definition, the event is easily explainable on the basis of market fundamentals. For a finance operation to be successful always requires a certain degree of sustained confidence from investors. Finance serves as the spearhead of corporate rationalization. In any leveraged buyout or corporate acquisition, high securities prices come first and are followed only gradually by expanded revenues. If investors suddenly lose confidence, they may turn a potentially profitable restructuring into a bankruptcy.

Law's scheme was more audacious than the normal Wall Street operation in that he was attempting a corporate takeover of France. But Law's principle was also that finance came first; the financial operation and the expansion of circulating credit was the driving force for economic expansion. From a modern perspective, this idea is not flawed. It is the centerpiece of most money and macroeconomics textbooks produced in the last two generations and the *lingua franca* of economic policymakers concerned with the problem of underemployed economics.

Law's Shadow: The South Sea Bubble

Following Law's scheme to refinance the French debt, the South Sea Company launched a similar plan to acquire British government debt in January 1720.⁹ The financial operations of the British scheme, however, were much simpler than those of Law: the South Sea Company was not involved in large-scale takeovers of commercial companies nor in government functions such as the mint, the collection of taxes, or the creation of paper money.

The British debt in 1720 amounted to approximately 50 million pounds. Of this, 18.3 million was held by the three largest corporations: 3.4 million by the Bank of England, 3.2 million by the East India Company, and 11.7 million by the South Sea Company. Redeemable government bonds held privately amounted to 16.5 million; these could be called by the government on short notice. About 15 million pounds of the debt was in the form of irredeemable annuities: long annuities of between 72 and 87 years and short annuities of 22 years in maturity. Neal (1988) discusses the nature of these annuities.

⁹I have taken the factual information in this section primarily from Scott (1911) and Dickson (1967).

The Refunding Agreement

In 1720, the assets of the South Sea Company consisted of monopoly rights on British trade with the South Seas—that is, the Spanish colonies of South America—and its holdings of government debt. It was well-known that British trade with the South Americas was effectively blocked by the Spanish, so only the holdings of government debt are important to the economic story. After competitive bidding between the South Sea Company and the Bank of England, the bill permitting the South Sea Company to refund the debt had its first passage in Parliament on March 21, 1720. To acquire this right, the company agreed to pay the government up to 7.5 million pounds if it managed to acquire the 31 million pounds of debt in noncorporate hands.

To finance the debt acquisition, the Company was permitted to expand the number of its shares, each of which had a par value of 100 pounds. For each 100 pounds per year of the long and short annuities acquired the company could increase the par value of its shares outstanding by 2000 pounds and by 1400 pounds, respectively. For each 100 pound par value of redeemables acquired, it could increase its stock issue by 100 pounds.¹⁰ The interest to be paid by the government on the debt acquired by the Company was 5 percent per year until 1727 and 4 percent per year thereafter. This would imply a substantial reduction in the annual debt servicing costs of the government.

The Purchase of Parliament

Conditional on the passage of the refunding act, the South Sea Company paid bribes to leading members of Parliament and favorites of the king totalling 1.3 million pounds (Scott, 1911, p. 315). Also, in the sequence of stock subscriptions through August 1720, numerous members of Parliament and of the government participated; and most received large cash loans from the Company on their shares. For example, 128 members of Parliament acquired shares in the first cash subscriptions for shares, 190 in the second subscription, 352 in the third subscription, and 76 in the fourth subscription. The total par value of shares acquired by them was 1.1 million pounds. For peers, the participation was 58 in the first subscription, 73 in the second subscription, 119 in the third subscription, and 56 in the fourth subscription. The total par value for peers was 548,000 pounds. Prior to the refunding operation, the par value of South Sea shares outstanding was 11.7 million pounds; and this was increased to 22.8 million pounds by the end of the speculation. Thus, people in powerful positions in Parliament took 17 percent of the additional shares created. In addition, as Dickson (1967, pp. 108–109) explains, 132 members of Parliament received 1.1 million pounds and 64 Peers received 686,000 pounds in loans against shares.

¹⁰Quantities of shares were designated in terms of total par value issued. Most research on the episode has continued this convention and has emphasized the difference between the market and par value of shares. The company was free to set the exchange rate between shares and debt. It valued the shares exchanged at well above the par value, leaving it an excess of authorized shares which it was free to market. Scott (1911) labelled these surplus shares the company's "profits" from the conversion. The curious view that a company's holdings of its own shares represents an asset has been replicated in recent examinations of South Seas; for instance, Dickson (1967, p. 160) lists the company's holdings of its own stock among its assets.

Members of the government acquired 75,000 pounds of shares at par value in these subscriptions.

While these bribes add a sinister appearance to the episode, they were not themselves a signal of impending fraud. At the time, bribery was not an unusual practice for a company seeking favors from a Parliament well-positioned to block any profitable venture unless its members received their cut.

Indeed, that Parliament and the government supported the refunding so enthusiastically must have served as a signal that official cooperation in South Sea's ventures had been purchased. To the extent that members of Parliament held shares, they would have no interest in thwarting any commercial projects that the Company might propose in the future. Given Law's influential theories of commercial expansion, the equity in the South Sea Company could then have been leveraged to undertake those commercial projects that would drive the economy to a higher employment equilibrium. The income generated, accruing to the Company without hindrance of Parliament, could then have justified the initial value of the equity.

South Sea Finance Operations

Figure 3 depicts the movement of South Sea share prices during the speculation. Starting at about 120 pounds per 100 pound par value share in January 1720, prices moved upward as the refunding proposal was negotiated. With the passage of the refunding act on March 21, prices jumped from about 200 to 300.

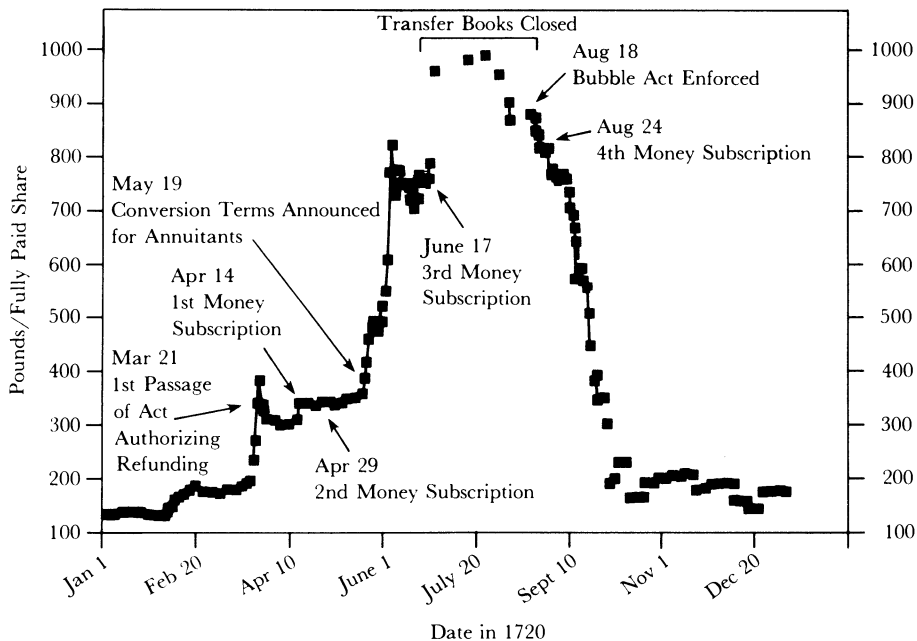
To finance the contracted bribes and to make loans to shareholders, the Company offered two subscriptions of shares for cash on April 14 and April 29. In the first subscription, 22,500 shares were issued at a price of 300 pounds per share; one-fifth of the price was required immediately in cash with the remainder due in eight bimonthly installments. In the second, 15,000 shares were subscribed at a price of 400 pounds; one-tenth was required immediately in cash with the remainder due in nine payments at three or four month intervals. From these issues, the Company immediately realized about 2 million pounds to pay its bribe commitments.

The first debt conversion aimed at convincing the holders of the irredeemable annuities to agree to an exchange for South Sea shares. Subscriptions began on April 28. The Company announced its conversion terms on May 19, allowing holders of the debt one week to accept or reject the offer.

Scott (1911, Vol. III, pp. 308–314) extensively discusses the conversion terms, which depended on the type of annuity. As an example, the holders of 100 pound long annuities were offered 700 pounds par value of stock (7 shares) and 575 pounds in bonds and cash. At the time of the offer, South Sea shares were selling for about 400 pounds, so the value of the offer was about 3375 pounds for a long annuity. Scott (p. 310) estimates the market value of the annuity at about 1600 pounds prior to the conversion attempt. Since annuity holders would not lose unless share prices fell below 146 pounds, the offer was highly attractive.

All government creditors who had subscribed prior to the announcement assented to the Company's terms. According to Dickson (1967, pp. 130–132) the Company therefore absorbed about 64 percent of the long annuities and 52 percent of the short

Figure 3
South Sea Shares



annuities outstanding in this subscription. As it became clear that the Company would succeed in accumulating most of the outstanding debt, share prices rose rapidly to 700 pounds.

To permit it sufficient cash to engage in market price manipulation and to make loans to its shareholders, the Company undertook a third cash subscription on June 17, 1720, in which it sold a par value of 5 million pounds (50,000 shares) for a market price of 1000 pounds per share. Purchasers had to pay one-tenth down in cash (5 million pounds), with the remainder to be paid in nine semi-annual payments. Share prices immediately jumped from 745 to 950. The final cash subscription occurred on August 24. The Company sold shares with a par value of 1.25 million pounds at a price of 1000 pounds per share. One-fifth was required immediately in cash, with four additional payments at nine-month intervals.¹¹

Finally, the Company offered two additional bond subscriptions; terms for subscribing the remaining irredeemables and the redeemables were announced on August 4 and August 12, respectively. Of the outstanding 16.5 million pounds in redeemables, 14.4 million pounds were exchanged for 18,900 shares of stock. At

¹¹From June 24 to August 22, the transfer books of the Company were closed in preparation for a dividend payment, so the market prices depicted in Figure 3 for this period were future prices. Neal (1988) argues that the peak price was 950 on July 1. Scott (1911) indicates a peak price of 1050, but this apparently includes the announced stock dividend of 10 percent. Following Neal, I have used the peak price of 950.

market prices of 800 pounds per share, this amounted to a price of 105 pounds per 100 pound bond. The remaining irredeemables were to be exchanged for varying amounts of stock and cash. By means of all the debt conversions, the South Sea Company acquired 80 percent of the public's holdings of the irredeemables and 85 percent of the redeemables.

The Price Collapse

South Sea share prices collapsed from about 775 on August 31 to about 290 on October 1, 1720. Shares outstanding or to be issued to the public after subscribers were entered on Company registers numbered 212,012. Thus, the market value of all shares on August 31 was 164 million pounds and about 103 million pounds of that total evaporated in one month, an amount exceeding twice the value of the original, burdensome government debt.

Researchers of the episode like Dickson (1967, pp. 148–152), Scott (1911, vol. III, pp. 324–328) and Neal (1988) are vague about the reason for the speed and magnitude of the decline, though they generally attribute it to the appearance of a liquidity crisis. The South Sea speculation had triggered a simultaneous upsurge in the prices of other Companies along with the creation of numerous “bubble companies.” The emergence of these companies, many of which were fraudulent, generated most of the amusing anecdotes that have been transmitted to us about this speculation. Many of the companies born in the 1720 speculation were quite sound, however, notably the Royal Assurance Company and the London Assurance Company. The channeling of capital into these companies alarmed the directors of the South Sea Company, who, having paid a high price to buy the Parliament, did not wish to see potential South Sea profits dissipated by the entry of unauthorized commercial corporations. Consequently, Parliament passed the Bubble Act in June 1720 to ban the formation of unauthorized corporations or the extension of existing corporate charters into new, unauthorized ventures.

When the act was enforced against some of the Company's competitors on August 18, 1720, immediate downward pressure was placed on the price of shares of the affected companies. Since the shares were mostly held on margin, general selling hit the shares of all companies, including South Seas, in a scramble for liquidity. Simultaneously, there was an international scramble for liquidity with the final collapse of Law's *Compagnie des Indes* in September 1720 and of a Dutch speculation. Liquidity may have been drained from English markets by these international events. Neal and Schubert (1985) provide evidence on large scale capital movements during this period.

With the collapse of share prices, the Company faced the hostility of its shareholders who had participated in its debt and cash subscriptions. Parliament quickly turned against the Company, eventually forcing it to sell off part of its debt holdings to the Bank of England. Parliament eventually stripped the Directors of the Company and several government officials of their wealth (2 million pounds) and directed the payment of the proceeds to the company. Also, adjustments were made to redistribute shares among the different waves of subscribers, so that losses to later

subscribers were reduced. Finally, Parliament forgave payment of the 7.1 million pounds which the Company had contracted on receipt of the conversion privilege.

Fundamentals of the South Sea Company

At the beginning of September 1720, the market value of South Sea shares was 164 million pounds. The visible asset supporting this price was a flow of revenue from the Company's claim against the government of 1.9 million pounds per year until 1727 and 1.5 million pounds thereafter. At a 4 percent long term discount rate, this asset had a value of about 40 million pounds. Against this, the Company had agreed to pay 7.1 million pounds for the conversion privilege and owed 6 million pounds in bonds and bills for a net asset value of 26.1 million pounds. In addition, the Company's cash receivables were 11 million pounds due on loans to stockholders and 70 million pounds eventually due from cash subscribers. Thus, share values exceeded asset values by more than 60 million pounds. Given the dubious value of the company's cash claims, share values exceeded tangible net assets by five times or more.

What intangible assets could have justified this value of the Company? Again, the answer lies in Law's prediction of a commercial expansion associated with the accumulation of a fund of credit. The Company succeeded in gathering the fund and obviously had the support of Parliament in its ventures. On this basis, Scott (1911, p. 313–314) believed that a price of 400 was not excessive:

It may be added too that the great need of commerce in the first quarter of the eighteenth century was a sufficiency of capital, and so it is scarcely possible to estimate adequately, under the different conditions of the present time, the many promising outlets there were then for the remunerative employment of capital. In fact capital, organized in one single unit, might be utilized in many directions, where no single fraction of the same capital could find its way, and therefore some premium on South Sea stock was justified and maintainable Thus, it will be seen that the investor, who in 1720 bought stock at 300 or even 400, may have been unduly optimistic, but there was at least a possibility that his confidence would be rewarded in the future.

The experiment was terminated with the liquidity crisis and the withdrawal of parliamentary support while it was still in its finance stage. In retrospect, anyone projecting commercial returns high enough to justify the higher prices of South Sea shares was probably too optimistic. Nevertheless, the episode is readily understandable as a case of speculators working on the basis of the best economic analysis available and pushing prices along by their changing view of market fundamentals.

Conclusions

Fascinated with the brilliance of grand speculative events, economists have huddled in the bubble interpretation and have neglected an examination of potential

market fundamentals. The ready availability of a banal explanation of the tulip-mania, compared to its dominant position in the speculative pantheon of economics, is stark evidence of how bubble and mania characterizations have served to divert economists from understanding those outlying events highest in informational content. The bubble interpretation has relegated the far more important Mississippi and South Sea episodes to a description of pathologies of group psychology. Yet these events were a vast macroeconomic and financial experiment, imposed on a scale and with a degree of control by their main theoretical architects which has not since been experienced. True, the experiment failed, either because its theoretical basis was fundamentally flawed or because its managers lacked the complex financial skills required to undertake the day-to-day tactics necessary for its consummation. Nevertheless, investors *had* to take positions on its potential success. It is curious that economists have accepted the failure of the experiments as proof that the investors were foolishly and irrationally wrong.

■ *I have benefited from several conversations with Hershel Grossman and comments of the editors.*

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