

4. The Banque Royale and the South Sea Company: how the bubbles began

We are now to enter upon the year 1720; a year remarkable beyond any other which can be pitched upon by historians for extraordinary and romantic projects, proposals, and undertakings, both private and national; . . . and which, . . . ought to be had in perpetual remembrance, not only as being what never had its parallel, nor, it is to be hoped, ever will hereafter; but, likewise, as it may serve for a perpetual memento to the legislators and ministers . . . never to leave it in the power of any, hereafter, to hoodwink mankind into so shameful and baneful an imposition on the credulity of the people, thereby diverted from their lawful industry.

Adam Anderson, *Origin of Commerce*, Vol. 3, pp. 91–2.

The Mississippi Bubble in France, the South Sea Bubble in England, and similar bubbles in Holland and Germany during the years 1719 and 1720 were parts of the first international stock market speculative boom and bust in capitalist Europe. The legacy of those episodes was substantial. The Bubble Act of 1720 in England limited the use of joint-stock corporations until well into the nineteenth century, and the French collective memory of John Law and his Banque Royale meant that “there was hesitation even in pronouncing the word ‘bank’ for 150 years thereafter,”¹ and, of course, they gave us the word “bubble” for describing purely speculative movements in asset prices. It is useful to present and analyze as clearly as possible these classic bubbles, useful not only for better understanding the economic history of the eighteenth century but also for grasping its significance for economic theory. It is intrinsically interesting for economic theory to observe the activities on capital markets when they were in a relatively pristine state.

The task of quantitative analysis and theoretical understanding is greatly aided by using the data set developed here for the London capital market. It is unfortunate that nothing comparable has yet been found for France or

¹ Charles P. Kindleberger, *A Financial History of Western Europe* (London: George Allen & Unwin, 1984), p. 98.

the Netherlands. Financial initiatives in both countries help explain the peculiar course of the South Sea Bubble in England throughout its duration. Moreover, the repercussions of the South Sea Bubble for those two countries were, if anything, more important for European economic history than were the bubble's effects within England. France had the largest domestic economy in Europe, and the Netherlands dominated the overseas enterprises of Europe. Despite the absence of a data source for either of these two mercantile and financial powers comparable to Castaing's *Course of the Exchange*, there do exist data resources for them that modern economic historians have just begun to exploit. Moreover, much more can be inferred about events in France and Holland from the data available in England.

The bubbles in France, in England, and then later in the Netherlands and Portugal that occurred in the years 1719–21 were part of the same historical process. The governments in all those cases were in the beginning stages of political modernization, with more limited monarchies and more powerful parliaments, but at the same time financially encumbered with antiquated tax systems and debt instruments. Political advantages were readily apparent to whichever party could tap directly into the financial markets and foreign trade opportunities emerging for northwestern Europe. The boldest initiatives were taken, as might be expected, by France, the most backward of the mercantile states. The greatest long-run success was enjoyed, as might also be expected, by England, the best endowed of the mercantile states in terms of both financial markets and foreign markets.

In this chapter, explicit linkages are drawn between the two major stock market crises of 1719–20 and the aftershocks in Amsterdam and Hamburg, using semiweekly exchange-rate data that were published regularly throughout that period. These have never been used before to analyze either the dynamics of the two major bubbles or the linkages between them. Though there has been extensive study of the two bubbles individually, there has been little investigation of the links between them, much less the links with the later bubbles in the Netherlands.² So the data

² William R. Scott, *The Constitution and Finance of English, Scottish, and Irish Joint-Stock Companies to 1720*, 3 vols. (Cambridge University Press, 1910), Vol. 3, pp. 288–362, and John Carswell, *The South Sea Bubble* (London: Cresset Press, 1960), cited subjective statements about the movement of the speculation in Europe. Charles Kindleberger, *Manias, Panics and Crashes* (New York: Basic Books, 1978), mentioned briefly a transmission of the speculative mania. T. S. Ashton, *Economic Fluctuations in England, 1700–1800* (Oxford: Clarendon Press, 1959), took a short but close look at the transfer of capital between London and Paris and Amsterdam and the resulting effects on English exchange

we present in the various charts from both Paris and London provide a unique overview of each stock market bubble and the direct linkages between them.³ The statistical analysis to be presented regarding the daily price data from the Mississippi and South Sea cases also represents the first empirical effort at characterizing the course of these bubbles in terms of the events in the foreign exchanges.⁴

Using quotations from the *Course of the Exchange* for information on exchange rates, gold and silver prices, and stock prices on the London market, we can chart the progress of this first pan-European stock mania. The stock prices are daily for the six trading days in London, whereas the exchange rates and gold and silver prices occur as twice-weekly quotes

rates. Adam Anderson, a clerk for the South Sea Company during the bubble, wrote his account much later in the century. He mentioned the presence of foreigners in both Paris and London during the height of each bubble, but he drew only parallels between the two, making no explicit links: Adam Anderson, *An Historical and Chronological Deduction of the Origin of Commerce, from the earliest accounts*, 4 vols. (London, 1764, continued to 1788 by William Combe and published for the last time in 1801; reprinted New York: Augustus M. Kelley, 1967), Vol. 3, pp. 79–126. John Law explicitly compared the two episodes in 1721, drawing conclusions very much to his favor, but he never addressed the issue of direct financial linkages between them: Paul Harsin, ed., *John Law: Oeuvres completes*, 3 vols. (Paris: Sirey, 1934), Vol. 3, pp. 198–235. Herbert Luethy, *La Haute Banque Protestante en France de la Révocation de l'Edit de Nantes à la Révolution. Vol. 2: De la Banque aux Finances*, (Paris: SEVPEN, 1961), discussed the role of Geneva investors in both bubbles. Andre Sayous, "Les Répercussions de l'affaire de Law et du South Sea Bubble dans les Provinces Unies," *Bijdragen voor vaderlandsche Geschiednenis en Oudheidkunde*, 8:2(1940), pp. 57–86, described the role of Dutch investors in each and the effects of the bubbles on the Netherlands. F. P. Groeneveld, *Economische Crisis van het jaar 1720* (Gröningen: Noordhof, 1940), and Charles Wilson, *Anglo-Dutch Commerce and Finance in the Eighteenth Century* (Cambridge University Press, 1941) detailed the role of Dutch investors in English funds during this period and after. P. G. M. Dickson, *The Financial Revolution in England: A Study in the Development of Public Credit, 1688–1756* (London: Macmillan, 1967), did the most thorough job of making the links, but he relied on contemporary newspaper reports of bullion shipments and exchange-rate movements for his quantitative data. Though he reproduced fortnightly prices of stocks from Castaing (p. 139), the only exchange rate he gave was that on Amsterdam.

³ This chapter is based on an unpublished paper by Larry Neal and Eric Schubert, "The First Rational Bubbles: A New Look at the Mississippi and South Sea Schemes," Urbana, IL, 1985. The exchange-rate movements during the Mississippi and South Sea bubbles were analyzed in detail by Eric Schubert: "The Ties That Bound: Eighteenth Century Market Behavior in Foreign Exchange, International Goods, and Financial Assets," unpublished Ph.D. dissertation, University of Illinois, Urbana-Champaign, 1986.

⁴ Brian Parsons, "The Behavior of Prices on the London Stock Market in the Early Eighteenth Century," unpublished Ph.D. dissertation, University of Chicago, 1974, analyzed daily movements of stock prices on the London Stock Exchange in terms of weak tests of market efficiency during the South Sea Bubble, but ignored the foreign exchanges or questions of rational bubbles.

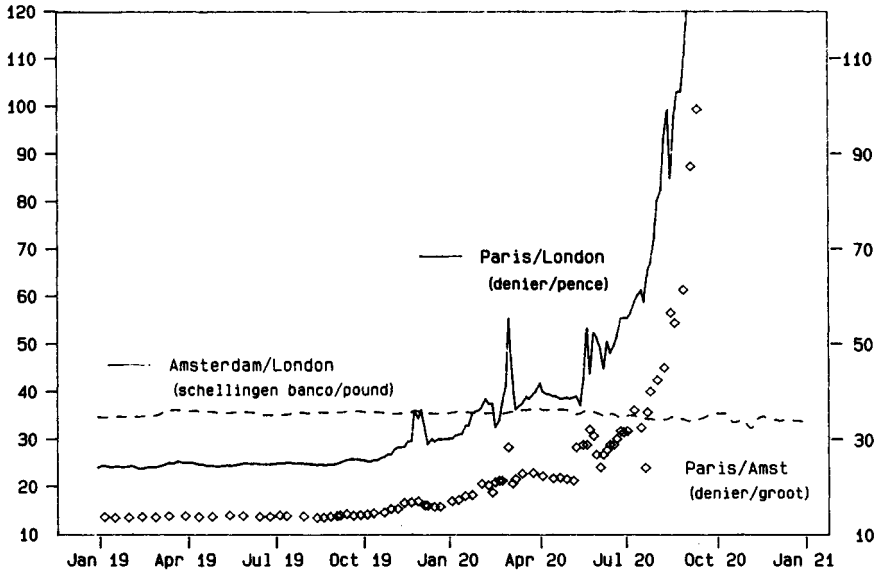


Figure 4.1. Paris exchange rates on Amsterdam and London, 1719–20.

(Tuesday and Friday) in the *Course of the Exchange*. We begin our coverage with January 1719, four months before the Mississippi Bubble started, and end it after December 1720, when the South Sea and Amsterdam bubbles had collapsed. Because the dates in the *Course of the Exchange* were quoted from the Old Style (O.S.) or Julian calendar, all dates listed in this book will be based on that calendar, even though both Amsterdam and Paris were using the New Style (N.S.) or Gregorian calendar.

Shown in Figures 4.1–4.3 are four exchange rates (three from London and one from Paris) and the price of gold. The exchange rates are as follows: the London-on-Paris exchange rate, which was given in pence sterling per French ecu or crown (equal to three livres tournois), but is converted here to be French deniers per English pence; the London-on-Amsterdam rate, in schellingen banco per pound sterling; the Paris-on-Amsterdam rate, measured in schellingen banco per French ecu; and the London-on-Hamburg rate, in schillingen banco per pound sterling. Unless otherwise stated, these are two-month usance rates. Although each exchange-rate series has its peculiarities, all show periods of sustained rises or falls, and all are marked by occasional “blips” (a sudden rise or fall followed quickly by a reversal). A sudden appreciation of a particular

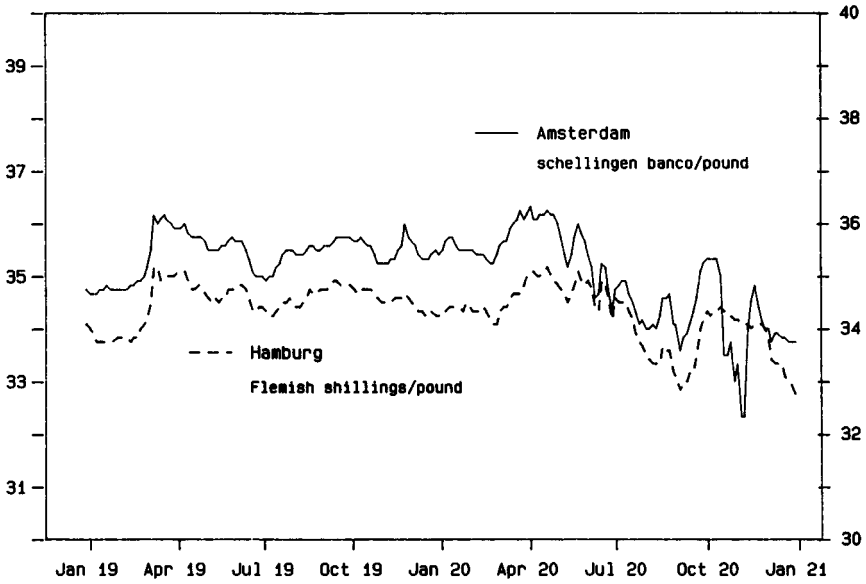


Figure 4.2. London exchange rates on Amsterdam and Hamburg, 1719–20.

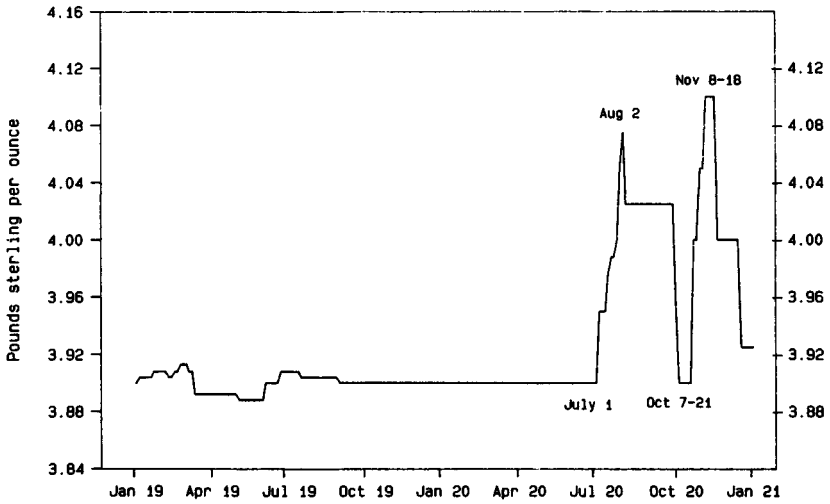


Figure 4.3. Price of gold in bars, London, 1719–20.

currency, followed by a full depreciation back to the normal exchange rate, usually signaled a scramble for liquidity in the country of that currency. Because short-term liquid assets were few, the scramble would focus on existing bills of exchange. That is to say, for any movement from one capital asset to another in any of the European countries at that time, bills of foreign exchange were the dominant devices used to make the transfer, rather than, say, specie, gems, or trade goods. As soon as letters from the country scrambling for liquidity had reached the merchant correspondents abroad and fresh bills had been authorized, the exchange rate would revert to its equilibrium level (which might, of course, not be the previous level, given the currency and credit manipulations of that period). Thanks to the sedate pace of business correspondence relative to the posting of exchange rates semiweekly at the Royal Exchange in London, the time series for each currency for that period show characteristic “signatures” when capital market disturbances occurred.

This may be called the “Ashton effect,” because T. S. Ashton described it in detail as one of the statistical indicators of financial crises in the eighteenth century.⁵ Whereas one sign of an impending crisis often was an adverse movement in the foreign exchanges, a sure sign of an actual scramble for liquidity was a sudden, short-lived appreciation in a country’s currency. Ashton noted that the same thing occurred in the summer of 1914, when, briefly, there appeared to be a flight from the dollar to the pound, when in reality the outbreak of World War I had caused a sudden liquidity crisis in London. A depreciation in a currency’s rate following the Ashton effect may overshoot the previous rate, in which case it indicates a capital outflow. The overshooting of the exchange rate may be called a “Kindleberger effect,” because it indicates a transmission of the liquidity scramble in the first country to its closest trading partners. When the Kindleberger effect is confined to particular currencies, it enables us, in combination with the Ashton effect, to state where foreign capital flows are going and from whence they are coming at the end of any particular speculative episode. Kindleberger placed special emphasis on the destabilizing consequences of speculative capital movements from one financial center to another and illustrated his argument with historical episodes dating from the 1719–20 bubbles through the late 1970s.⁶

Examining the London–Paris series in Figure 4.1, we first note a small

⁵ Ashton, *Economic Fluctuations*, p. 113. Ashton gave credit, however, to Jacob Viner for the explanation of this nonintuitive result.

⁶ Kindleberger, *Manias*, gave the best exegesis of his argument in the historical perspective.

blip in the spring of 1719. This is easily overlooked, given the violent fluctuations to come, but it is interesting that this coincides with the start of Law's system in May 1719, with the formation of the *Compagnie des Indes*, the general trading monopoly company for France, on the basis of Law's existing *Compagnie d'Occident*. The historical literature suggests that money left London and Amsterdam for Paris in the late summer of 1719. Scott wrote that "Paris became the Mecca of speculators of Europe."⁷ Carswell cited a report that 30,000 foreign speculators had entered Paris in the fall of 1719.⁸ The graph of the London–Paris exchange rate shows a slight appreciation of the livre in mid-August, but the increase was small relative to the "background noise" of the previous two months. In September, at the height of the capital flow to Paris, the exchange rate actually depreciated!

The answer to the apparent paradox is that Law fostered the boom through a systematic money inflation (Table 4.1). The Paris exchange rate started to depreciate in late October 1719, and that continued to March 1720, when a brief period of stability began before the final burst of paper inflation. That depreciation was due to a slowing down and reversal of the capital inflow, along with the continued increase in the issue of bank notes and debasement of the livre by Law. In late November and early December 1719 the pound appreciated sharply with respect to the guilder and the livre. Because of the suddenness of the movements and the sharp drop in the price of French stock, we infer that a fair number of speculators took their profits and departed for England. Scott estimated that 500 million livres in bullion had been carried out in late 1719.⁹ When the share quotations for the *Compagnie des Indes* had reached Law's target level of 10,000 livres (a 20-fold increase) in the middle of November (O.S.), the issuance during the next week of 30 million livres worth of new shares stabilized the price.¹⁰ At the end of that week, stock market speculators left Paris for London.

⁷ Scott, *The Constitution and Finance*, Vol. 1, p. 403.

⁸ Carswell, *The South Sea Bubble*, p. 101.

⁹ Scott, *The Constitution and Finance*, Vol. 1, p. 404.

¹⁰ Edgar Faure, *Le Banqueroute de Law* (Paris: Gallimard, 1977), p. 269, said there were 30 million new shares (*titres*) issued, but that would imply nearly 300 billion livres worth. His source, Paul Harsin, ed., *Dutot: Réflexions politiques sur les finances et le commerce*, 2 vols. (Paris: Les Belles Lettres, 1935), Vol. 2, pp. 257–8, on the other hand, said only "30 millions," without specifying *titres* or livres. Dutot's summary of the total value of *Compagnie des Indes* stock at the end of November, however, was only 4.782 billion livres. The number of new shares issued in mid-November, therefore, must have been only 3,000, with approximate market value of 30 million livres.

TABLE 4.1
Issues of notes by Banque Royale from December 1718 to April 1720
(millions of livres)

Date of commission	Notes added	Total note issue
25 December 1718	18	18
31 January 1719	20	38
21 March 1719	21	59
11 April 1719	51	110
30 May 1719	50	160
14 July 1719	221	381
1 September 1719	120	501
13 October 1719	120	621
18 December 1719	360	981
26 January 1720	200	1,181
15 March 1720	300	1,481
25 March 1720	437	2,195
20 April 1720	362	2,557

Note: At the start of this period there was an estimated 1 billion livres in specie in the country, and 148 million livres in Banque Generale notes outstanding.

Source: Paul Harsin, *Doctrines Monétaires et Financières en France du XVIe au XVIIIe Siècle* (Paris: Libraire Felix Alcan, 1928).

Another exit of speculators' capital from Paris occurred in early February. On 12 February 1720, Law halted all dealings in France in stock, foreign exchange, and bank notes in an attempt to combat inflation and speculation. The price of Mississippi shares plummeted. At the same time, the English Parliament approved the South Sea Company's proposal for funding a large part of the national debt. So money left France and headed for England.

Popular pressure forced Law to reopen the Paris stock market on 23 February, with the purchase and sale of unlimited quantities of shares priced at 9,000 livres, and to reopen the offices where the paper currency, *billets de banque*, could be converted to silver. That restored the stock market boom, but speculation then took place in the *billets de banque*. The reaction of the Paris-London exchange rate at first was a case of the Ashton effect. Because speculators could not convert their shares of Mississippi stock directly into specie, but only into depreciating paper currency on the French market, the uncertainty of the situation led to an appreciation of the livre as holders of English bills of exchange on Paris sold their assets at a discount. Once the stock market in Paris reopened, the livre depreciated sharply, signaling the exodus of speculators.

The stock market gyrations continued in France with mostly domestic speculators until the middle of May 1720. On 10 May, in a fit of desperation, Law announced a deflationary decree, again in an attempt to save his system. Convertibility of bank notes to specie was to end. The official price of shares of the *Compagnie des Indes* was dropped to 8,000 livres, with a target price of 5,000 livres by 1 December. In response, the French exchange rate moved as it had in February, with an initial appreciation, followed by a sharp depreciation. However, the graph overstates the appreciation of the livre, because the quotes in London from 13 May through 20 May were “at sight” instead of the customary usance of two months. Therefore, they incorporated the sight premium as well as any appreciation during that week. Afterward, the quotes were again at usance, but the *Kindleberger effect*, or overshooting of the previous level for the exchange rate, shows up clearly nonetheless. Whether the remaining speculators, French and/or foreigners, took their money from France and put it in England for more profits or whether the French nobility took their specie to safer quarters, this depreciation signaled a capital outflow.

From the deflationary decree in May (which Law lifted a week later, again under public pressure) onward, currency debasements and increased bank-note issues resulted in a continued depreciation of the livre. The bankruptcy of 6 July (O.S.) of the *Banque Royale* shifted speculation in France from shares in the *Compagnie des Indes* to *billets de banque*, which declined in value until the exchange market in France closed in September 1720. The sharp appreciation of the livre in late September was the result of more traditional bankers regaining power and causing a repatriation of gold into France.

Turning to Figure 4.2 and the London–Hamburg and London–Amsterdam exchange rates, we can pick out the repercussions of the French speculative movements as the relative importance of London and Amsterdam shifted either as sources for capital inflows to France or as destinations for capital outflows from France. Carswell linked the speculative fever of the Mississippi and South Sea bubbles only in the late spring of 1720:

Buying orders for South Sea stock poured into London from Holland, 200,000 pistoles arriving in one consignment from Amsterdam towards the end of April.¹¹

And to London that spring were coming a great many of those who, only a few months before, had been crowding the rue Quincampoix [French stock market].¹²

¹¹ Carswell, *The South Sea Bubble*, pp. 147–8.

¹² *Ibid.*, p. 143.

Looking at the London–Amsterdam exchange rate (Figure 4.2) and the graph of South Sea stock prices (Figure 4.5), however, we can see an influx of foreign speculators into England in March. Both the price of South Sea shares and the English pound appreciated throughout the spring of 1720. By the first half of May, both South Sea stock and the London–Amsterdam and London–Hamburg exchange rates leveled off. That was the lull before the next storm, however. On 20 May the South Sea Company announced more conversions of the government debt, both long-term and short-term annuities, at £375, and granted loans to aid buyers of additional stock. The pound appreciated sharply as foreigners entered the market. After those large capital inflows in the spring of 1720, the pound began to depreciate in the summer. That signaled a reversal of the capital flow, first to Amsterdam, then to Hamburg. Carswell stated that “Amsterdam [in] June and July saw a crop of native promotions. . . . Others were on the way to Hamburg, where the Exchange was crowded from morning to night.”¹³

One can explain the sharp fluctuations that highlight this June–July depreciation of the pound as temporary slowings in the capital outflow. Two events in the story of the South Sea Bubble seem to be responsible. The first sharp rise came as the result of another group of subscriptions of South Sea stock sold between 16 June and 22 June. The company offered £5 million in stock at £1,000 per £100 share. This issue pumped £4.75 million into the market, running the total to £11.4 million since April. The second rise, found for early July, was not associated with an issuance of stock, but may have been due to the French connection. The price of South Sea stock was hovering around £850 or more and had not yet begun its final plummet. Whereas the bankruptcy of the *Banque Royale* on 6 July (O.S.) in France caused both the pound and the guilder to appreciate relative to the *livre*, it appears that flight capital from France headed more toward London than toward Amsterdam.

The timing of the capital flows to Amsterdam and Hamburg are illustrated by the convergence of the London–Amsterdam and London–Hamburg rates for June. The pound depreciated relative to the Dutch *schellingen banco*, but the pound fluctuated around the pre-bubble level relative to the German *schillingen banco*. This implies a capital outflow directed toward Amsterdam. For July, the spread between the rates widened as the pound depreciated relative to the *schillingen banco*, signaling a capital flow increasingly headed toward Hamburg.

¹³ *Ibid.*, pp. 164–5.

The sharp rise and fall in Amsterdam and Hamburg rates in mid-August reflected the Ashton effect, signaling the financial panic that had begun. We shall take up in greater detail in Chapter 5 the exact circumstances that caused this panic that marked the end of the South Sea Bubble. Our interpretation differs from the traditional accounts only in terms of the underlying source of the panic, not in regard to its timing. The price of South Sea stock dropped sharply from the last half of August through the middle of October. On 24 September the Sword Blade Company (the bank for the South Sea Company) suspended payments, which intensified the scramble for cash in London's tight money market.

A brief respite came in mid-October as the pound appreciated sharply and gold prices plummeted. Those movements reflected the collapse of the Dutch boom in October and the arrival of 100,000 guineas in gold from Holland at that time.¹⁴ That easing was short-lived. The English financial system faltered and remained precariously weak for the last three months of the year. As can be seen in the London–Amsterdam exchange rate (Figure 4.2) and the London gold price (Figure 4.3), a depreciated pound and high gold prices indicated sharp depreciations in bills of exchange and bank notes, respectively. A substantial widening between sight and usance exchange rates on Amsterdam, over 10 times higher in October 1720 than in 1723, indicated that interest rates in the international money market were very high. The major cause of this was the resumption of a gold standard in France after the fall and expulsion of John Law.

This brief history of the effects of the English South Sea Bubble on the London exchange rates shows clearly that the influence of Law's system in France was paramount at all stages – beginning, speculative boom, increasing liquidity crunch, and final collapse, as well as the protracted period required for recovery. The summary of the system that follows relies essentially on the data and analysis presented by Faure. Faure's study, in turn, drew heavily on the previous work by Harsin, but supplemented it with important new data on the share prices of the *Compagnie des Indes*, exchange rates in Paris on both Amsterdam and London, and the market values of bank notes issued by the *Banque Royale*.¹⁵ These data are incorporated into Figure 4.4 and Table 4.1. Those studies, however, emphasized the singularity of the French experience, rather than its linkages to the

¹⁴ Scott, *The Constitution and Finance*, Vol. 3, p. 323.

¹⁵ Faure, *Le Banqueroute de Law*, added his own delightful appraisal of the high politics of the era, as acted out by principals possessing an amazing variety of sexual idiosyncrasies!

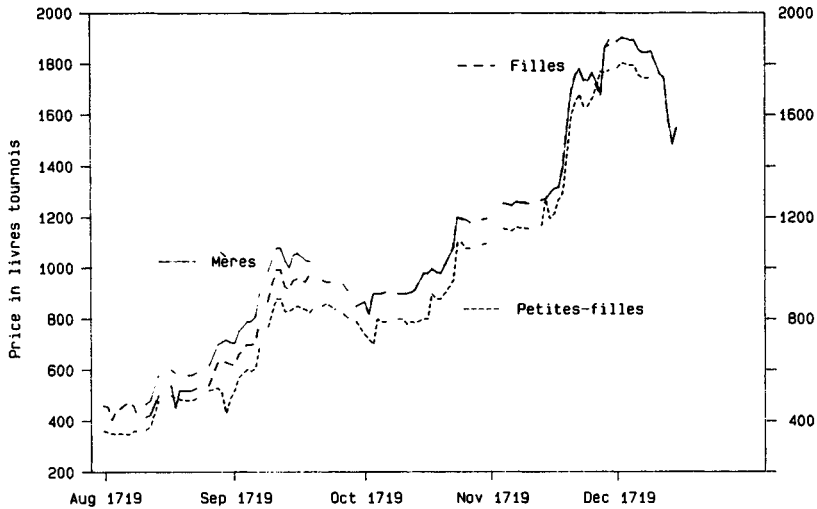


Figure 4.4. Mississippi Bubble, Compagnie des Indes shares.

British experience, which we emphasized earlier. The role of foreigners in their accounts was to come to Paris and marvel, rather than to transmit French economic disturbances elsewhere.

After a large-scale cancellation of government debt at the beginning of the regency of Louis XV, the crown still found it impossible to pay interest on the remaining debt, already discounted 75%. Desperate for solutions, the regent, the duke of Orléans, fell under the sway of the brilliant Scottish financier John Law. In May 1716, Law founded the Banque Generale, the success of which laid the basis for the greater enterprises to come. In August 1717, Law formed the Compagnie d'Occident, which, like the South Sea Company in its original charter of 1711, took over some of the national debt for special overseas trading privileges. Citizens and foreigners could exchange their holdings of government debt for stock in the company. The original nominal capital, par value 500 livres per share, was 100 million livres. The initial market value of the stock was below par at 300 livres. In December 1718, Law converted the Banque Generale into the Banque Royale, whose notes, denominated either in gold ecus or in silver livres, then became the medium for tax payments. In May, the louis d'or was devalued relative to the livre, so that the billets-livre became the preferred form of money for the public to hold. Also, in May 1719, the

Compagnie d'Occident was expanded to include the monopoly of trade with India and China and was renamed the Compagnie des Indes, with a new issue of 50,000 shares. In the summer of 1719, Law put the remaining elements of the system into place, acquiring the right for the company to mint coins and assuming the farming of the indirect taxes.

The decrees of 16–20 August 1719 (O.S.) completed the formation of the system with a bold step toward fiscal reform: the suppression and reimbursement of the *rentes* and many of the offices that had been sold in the previous two decades in order to raise money. The reimbursement took place in *billets de banque* at the offices of the company, which had to offer to the reimbursees as well as all other holders of existing government debt either bearer shares in the company with 4% annual dividends or *contrats de constitution de rente*, which carried a fixed return of 3%, the same reduced rate the government paid the company on the debt it held. Luethy considered that the fatal flaw in the system, because the reimbursements required large new issues of paper money.¹⁶ Faure, on the other hand, believed that the reimbursees would have used their *billets de banque* to purchase one or the other of the company's obligations to avoid further depreciation of their assets. Based on the increased revenues projected from the tax farm on indirect taxes that had been given to the company for the next seven years, as well as revenues from the monopoly of the mint, these obligations, *actions rentières*, could have been very attractive, blue-chip investments. In effect, the elimination of direct taxes, offices, and the *rentes* could have been funded into the permanent capital stock of the company.¹⁷ As it was, Law proceeded to his *plan fou* with three successive new issues of capital stock (the fourth, fifth, and six issues) in the company on 2, 17, and 21 September 1719 (O.S.).

These shares were issued at a face value of 5,000 livres each, with a promised dividend of 4%. Because the first three issues of shares had had face values of 500, 550, and 1,000 livres, the possessors of these *mères*, *filles*, and *petites-filles*, as they were popularly called, profited from enormous capital gains. Those who already held government debt, however, were not accorded any priority in purchasing these new shares, but were forced to buy them at existing market value. This meant that they had to hope for further capital gains on their shares in the company if they were to offset some of the losses they had already suffered on government debts.

¹⁶ Luethy, *La Haute Banque*, Vol. 2, p. 317.

¹⁷ Faure, *Le Banqueroute de Law*, pp. 225–8.

The third step in Law's plan was to raise the market value of the shares to 10,000 livres – this in order to reduce the effective rate of interest to 2%.¹⁸

To facilitate speculation, or, in his view, to mobilize the necessary capital, Law took the following steps:

1. He divided shares into fractions small enough so that modest investors would be able to purchase them.
2. He provided for installment payments, 10% per month, and further provided that the first two months could be deferred to the third. That meant that December and March were the months of reckoning.
3. He provided loans from the Banque Royale on the security of shares, even if only partially paid for.

To stabilize the price of Compagnie d'Occident stock after it had reached the desired level of 10,000 livres, Law took these additional steps:

4. Starting on 19 December (O.S.), he opened an office for the purchase and sale of shares in the company.
5. He later fixed the price of each share at 9,000 livres.¹⁹

All these steps can be seen as establishing the rules for a game whose object was to increase the price of shares of the Compagnie des Indes to 10,000 livres, later reduced in light of international pressures to 9,000 livres.

Law, in other words, manufactured the conditions necessary for a price bubble to occur in the stock of the Compagnie des Indes by encouraging foreign investors, mainly from England and Holland, as well as wealthy Frenchmen, to buy in while the price was being forced up. At the top of the bubble, when the price per share had reached his target level of 10,000 livres, the challenge to Law was to lock-in the foreigners or to offset their exit from the Paris market by bringing in a broader range of French participants. In other words, Law was creating the conditions necessary for a short-lived "rational bubble." This is defined in the current economics literature as a continuing rise in the price of an asset that is generated by market participants anticipating that rises in its price will continue to occur. By their actions, they make these anticipations self-fulfilling, at least for a limited period. The process must end, usually quickly, and when it does the price must return to the underlying fundamental level determined by long-run determinants of supply and demand. The challenge that Law posed for

¹⁸ *Ibid.*, pp. 232–3. Faure cited a number of Law's writings from 1715 to 1724 in which he repeated this sacrosanct number of 2%.

¹⁹ *Ibid.*, pp. 233–4.

himself, and for the French state, was to sustain the high price of *Compagnie des Indes* stock at the top of the bubble so that the French economy might benefit from a higher degree of monetization and a lower long-term rate of interest. He failed that challenge – a result considered inevitable by Richard Cantillon and his cosmopolitan clients.²⁰

The appendix to this chapter provides some statistical tests to determine if the price of Mississippi stock in the fall of 1719 followed a pattern consistent with such a “rational bubble.” The statistical results are mixed, one set indicating that Law had generated a complex form of such a rational bubble if only for the three months from mid-August to mid-November 1719, the other indicating that he was exercising the enormous power he possessed at that time (effectively controlling singlehandedly the fiscal, monetary, and exchange-rate policies of the largest economy in Europe) to shift market fundamentals in an unpredictable way.

These statistical results are not really surprising from a historical viewpoint. The system of John Law contained such a great mixture of elements and controlled directly so many of the conceivable policy variables that it has remained a fascinating question whether or not it could have worked, either in part or with some minor modification. Faure distinguished two parts to it – *le plan sage* and *le plan fou* – and argued that the “wise plan” could have worked very well if left on its own, but the “mad plan” that ensued prevented that. These two “plans” correspond, perhaps, to the “rational” and “irrational” bubbles discussed in finance literature today.

Irrational bubbles are those in which the relationship of an asset to its market fundamental simply breaks down because of overzealous trading or an unrealistic appraisal of the value of the stock. Kindleberger espouses this view of market bubbles. In this scenario, a shock to the economic system changes the perceived profitability of a particular enterprise. When that is coupled with easy credit, a boom ensues. Speculation spreads to sectors of society whose members normally avoid playing the market. These new entrants have little knowledge of the market and thus add an element of irrationality into it. Kindleberger’s analysis suggests a mania that spreads from the market for the original asset to other assets – shares in all sorts of joint-stock companies, real estate, and a madcap variety of alternative assets. The South Sea Bubble fits his analysis as if tailor-made, especially if we rely solely on the analysis of Adam Anderson, who listed

²⁰ See Antoin E. Murphy, *Richard Cantillon, Entrepreneur and Economist* (Oxford: Clarendon Press, 1986), chap. 5–8.

all the frivolous schemes that arose during the height of the speculation on South Sea stock.

The motivation for the South Sea scheme was essentially the same as for the Mississippi Bubble: to refinance the immense debts accumulated by the government during the War of the Spanish Succession.²¹ And the mechanics of the two schemes were very similar. In exchange for their annuities, holders of the existing government debt were offered new South Sea Company stock that promised capital gains. Two-thirds of the annuity owners made the exchange, in response to increasingly attractive terms offered by the directors of the South Sea Company. W. R. Scott, in his classic analysis, divided these directors into two groups: (1) an inner ring of prime movers privy to most of the details of each successive stage of the scheme and (2) the remainder of the directors, who probably were not. This creates the two classes of traders needed for a rational bubble to arise.

The operations consisted of four new issues of stock that were made on 14 April, 29 April, 17 June, and 24 August 1720 (O.S.). These could be purchased for one-fifth down (first and fourth issues) or one-tenth down (second and third issues), with the balance due in equal installments spread over 16 months (first issue), 32 months (second issue), 54 months (third issue), or 36 months (fourth issue). For the last two issues, loans could be obtained from the South Sea Company itself for the market value of the South Sea shares held by a purchaser.²² According to Dickson, the rise in price of the shares occurred in three spurts: the second half of March, the second half of May, and during June. He argues that the first was due primarily to foreign speculation shifting from Paris to London, the second was due to increased participation by Dutch investors and the beginning of loans by directors of the company on security of South Sea stock, and the third was due to an immense increase in loans on stock, on subscription receipts, and even on subscriptions made verbally.²³

The conclusion from our statistical tests, described fully in the appendix, is that a rational bubble in South Sea stock occurred, but only during the period 23 February through 15 June, precisely the period identified by Dickson as the interval when foreign participation was most active. In the periods before the entry of foreigners and after their exit, a rational bubble

²¹ Dickson, *The Financial Revolution in England*, pp. 91–2. Cf. Earl J. Hamilton, “Origin and Growth of the National Debt in Western Europe,” *American Economic Review*, 37(May 1947), pp. 118–30.

²² Dickson, *The Financial Revolution in England*, pp. 123–5.

²³ *Ibid.*, pp. 140–3.

does not appear, nor, using the same statistical techniques, do we find a rational bubble in the price of shares of either the Bank of England or the East India Company at any time, despite the sympathetic rise and fall in their prices during the South Sea Bubble.

In deciding which periods to examine for evidence of rational bubbles, we have used the movements in the foreign exchange rates when there were sudden rises and relapses to mark the entry and exit of outsiders – their exchange-rate signatures. Although the “outsider” category can be further distinguished between “speculators” and “suckers,” implicitly we usually put foreign outsiders into the speculator group and domestic outsiders into the sucker group. In fact, of course, foreigners and natives could be either speculators or suckers, and as the earlier discussion of the Ashton effect demonstrated, both foreign and domestic speculators would have found it most convenient to enter and exit the capital markets of the eighteenth century through the medium of foreign bills of exchange.

The dominant foreigners mentioned at the time in both bubbles were the Dutch, and contemporary accounts credited them with being extraordinarily shrewd in picking their moments to enter and to leave. In fact, English and Irish investors played an important role in the Mississippi Bubble. Luethy mentioned the case of Jean Lambert, a director of the South Sea Company who came to Paris in August 1779 and who was expelled by Law in March 1720 under the charge that he had remitted £20 million to London in order to break the French exchange rate.²⁴ French investors were active in the South Sea episode. Luethy described the role of the Oglethorpe family, members of which moved freely between London and the New World and the Jacobite court in Paris.²⁵ Hamilton gave details of the most amazing example of all: John Law’s short sale of £100,000 of East India stock in late summer 1719 at £180,000 for delivery in August 1720. That had to be covered in the summer of 1720 by buying East India stock at nearly double the agreed sale price. Law lost a fortune in doing that, and his London banker failed by the end of 1720. And all this arose, apparently, from a bet he made with Thomas Pitt in the summer of 1719 when he was initiating his system. The probable basis was to show his assurance that his *Compagnie d’Occident* would cause the fortunes of the British competitor to suffer.²⁶

²⁴ Luethy, *La Haute Banque*, Vol. 2, p. 291.

²⁵ *Ibid.*, pp. 294–5.

²⁶ Earl J. Hamilton, “John Law of Lauriston: Banker, Gamester, Merchant, Chief?” *American Economic Review*, 57(May 1967), pp. 275–6.

The depreciation of the exchange rate of the pound on Amsterdam and Hamburg in the summer of 1720 shows that speculators, whatever their nationality, first took their money to Amsterdam in June and increasingly headed toward Hamburg in July. Groeneveld dated the first joint-stock company proposal in the Netherlands as 10 June 1720 (30 May O.S.). Another scheme was presented in late July, and the remainder after 12 September (i.e., after the collapse of the South Sea Bubble). Although the Dutch schemes followed as hard upon the English bubble as the South Sea had followed the French, this does not mean that all the Dutch withdrew their funds from abroad and invested at home. Groeneveld gave many examples in the inventories of Amsterdam bankruptcies of holdings of South Sea as well as other English securities.²⁷ There are even orders dated 10 and 13 September 1720 (N.S.) from Portuguese Jews in Amsterdam, reputedly the shrewdest speculators of all, authorizing Joseph Henriques, Jr., in London to buy shares in the South Sea Company without limit.²⁸ Nevertheless, our evidence from the exchanges indicates that in September and October 1720, the speculators went home to Amsterdam and Paris. There was only one brief respite in the decline of the London exchange in mid-October, apparently in response to an effort by the Bank of England to draw on its debtors in Amsterdam.²⁹

In sum, in all three episodes, French, English, and Dutch, our exchange-rate data have confirmed the importance of international movements of capital marked by Ashton-Kindleberger "signatures" in dating periods of price explosion, stagnation, and collapse. The suspicions of Dickson and Kindleberger that the bubbles were linked and that the stock mania was international in scope appear to be verified by quantitative techniques, although Kindleberger's argument that this was eventually irrational in the sense of becoming a general mania is not fully supported. The bubbles were serial, not compounding, as his argument would imply. A final note of caution must be sounded. Although the individual bubbles may have had significant periods of rationality, these did not coincide or even overlap. Given the disarray evident in the exchange rates for all three financial centers by the fall of 1720, it is clear that the immediate aftermath of the bubbles was disruptive to the international flow of capital among the European mercantile states, but it appears that the longer-run effects on their domestic economies were minimal and even beneficial, because all

²⁷ Groeneveld, *Economische Crisis*, pp. 79–80.

²⁸ *Ibid.*, pp. 124–5.

²⁹ Dickson, *The Financial Revolution in England*, p. 151.

three countries enjoyed prosperity and expanding foreign trade for the next 15–20 years. More ironic is that the effects of these disruptions served to anchor firmly the financial links that had arisen between Amsterdam and London.

Appendix: Were the Mississippi and South Sea bubbles rational?

The statistical tests of the rational-bubble arguments in this chapter were performed using Faure's data for France and the *Course of the Exchange* data for England. In both cases, we ask if the prices of the shares of the Mississippi Company or the South Sea Company in fact followed a discounted martingale³⁰ during the period we believe outside speculators entered and left using foreign exchange as their intervention asset. The present value of the return above the market fundamental expected by speculators willing to bet that observed price increases will continue can be represented by the following difference equation:³¹

$$\begin{aligned}c_t &= [(1 + r)q_t]c_{t-1} + z_t && \text{(with probability } q) \\c_t &= z_t && \text{(with probability } 1 - q) \\E(z_t | I_{t-1}) &= 0\end{aligned}$$

where c is the return above the market fundamental, r is the period discount, z_t is the deviation of price from the market fundamental in the absence of market rigging, and I_t is the information available at time t .

This model defines a rational bubble. The participants will see a capital gain above the market fundamental in the next period if the bubble continues, or a return to zero expected speculative gain if the bubble bursts. If speculators are certain that the price will rise, we can see that an explosive process is under way. In each successive investment period, the price of the speculative object will rise even further, in a geometric growth process, above the fundamental price. But the longer the bubble lasts, the more probable it is that even the most avid speculators must realize that q , the probability of the bubble continuing, is falling. The speed with which q

³⁰ A martingale is a repeated series of bets where the stakes are raised after each loss, so that with a positive probability of winning on each bet, the gambler may eventually win. The original term refers not to a bird, but to a piece of horse harness designed to keep the horse's head down while running or pulling a load.

³¹ Oliver J. Blanchard and Mark W. Watson, "Bubbles, Rational Expectations, and Financial Markets," in Paul Wachtel, ed., *Crises in the Economic and Financial Structure* (Lexington, MA: Lexington Books, 1982), pp. 297–8.

falls determines in the empirical analysis the duration of the bubble, and therefore its final height. So long as the parameter q does not fall too rapidly, a so-called rational bubble can occur in the price of the underlying asset. According to Tirole, a rational bubble with a finite horizon must meet two further stipulations. First, expectations must be myopic; sequential traders look only at the expected trading options in this period and the subsequent period, always believing they are not locked in for any longer time. Law initiated, and the South Sea directors imitated, the practice of paying for stock subscriptions in monthly installments, later changed to quarterly installments. That had the desired effect of creating precisely this kind of myopia by the first purchasers of the new stock issues. Second, there must be several "generations" of traders entering the market.³² The device of issuing several subscriptions of additional stock was an essential element in the capital expansion of both the Compagnie des Indes and the South Sea Company. That also created, as we noted on the foreign exchange graphs, successive "generations" of outside speculators. From the theoretical viewpoint, then, sufficient conditions appear to have been in place to warrant asking whether or not each episode was a rational bubble.

For the Mississippi Bubble, the effective period during which we might find a rational bubble, or the "wise plan" in Faure's words, turns out to be from mid-July 1719 to the end of November (N.S.). However, Faure's daily price data do not begin until 1 August; so that determines the start of our test period for the French episode. Our empirical exercise is to take the first differences of the natural log transforms of the daily price quotes available from Faure and then to search for a detectable time-series pattern that is significantly different from "white noise" or a "random walk." This is equivalent to a weak test for market efficiency in the sense of Fama.³³ For purposes of claiming market efficiency, such searches for time-series patterns should yield (0, 0) autoregressive, moving-average (ARMA) models (i.e., there is only white noise or random, unpredictable movements in the price changes). Formally,

$$d \ln P_t = \alpha(d \ln P_{t-1}) + \alpha(e_t) + u_t$$

so that each period's proportional change in price is just the random variable u_t , with zero mean and a fixed variance and does not reflect the

³² Jean Tirole, "On the Possibility of Speculation Under Rational Expectations," *Econometrica*, 50(September 1982), pp. 1170, 1175.

³³ Eugene Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 25(May 1970), pp. 383-423.

previous period's proportional change in price, in which case it would be autoregressive, or the deviation from the mean proportional change in price (e_t), in which case it would be a moving average.

This is what we hope to find during periods before and after bubbles. During the bubbles, however, we should find a predictable movement, preferably described as an autoregressive movement with positive coefficients. Formally,

$$d \ln P_t = a_1(d \ln P_{t-1}) + o(e_t) + u_t$$

This would be consistent with two or more classes of traders anticipating further price increases with some probability greater than zero. It may also be consistent with a steady growth process in market fundamentals, but changes in market fundamentals during the brief periods we are analyzing here are more likely to show up as moving-average processes. Formally,

$$d \ln P_t = o(d \ln P_{t-1}) + b_1(e_{t-1}) + u_t$$

A predictable pattern that is best described as a moving-average process, then, may be consistent with a rational bubble, but it probably indicates instead an innovation in market fundamentals.³⁴

Table 4A.1 summarizes the statistical results for the Mississippi Bubble. Taking the period from 1 August through 29 November 1719 (N.S.) for prices of the second subscription of shares of the Compagnie d'Occident (the so-called *filles*), we find that the best-fitting ARMA model is a (5, 0), meaning that the log of the change in price had a statistically significant dependence on the log of the change in price in each of the previous five periods. This is with daily data, but ignoring gaps that occurred frequently, not only regularly for each Sunday but also irregularly for religious and state holidays. If missing values for the holidays are filled in either by naive extrapolation from the last quoted price or by linear interpolation in the logarithms of the prices before and after the holidays, then a (0, 2) ARMA is selected. Checking for the best model on the run of prices from 20 November 1719 to 1 March 1720, we find it to be a (0, 0), or a random walk.

If we take the first results, ARMA (5, 0), they may indicate that a *rational bubble* with as many as five separate classes of traders was in progress during the period of the significant price rise in the shares of the Compagnie d'Occident and that an efficient market ruled until the system

³⁴ Moving-average processes are generally found, for example, when ARMA's are estimated on data series with missing entries, entry errors, or outliers.

TABLE 4A.1
Estimated ARMA models for Compagnie des Indes stock
during the Mississippi Bubble

Time period	Version 1 ¹ (n=78)	Version 2 ² (n=103)	Version 3 ³ (n=103)
1 August to 29 November 1719	(5, 0)	(0, 2)	(0, 2)

¹ All missing observations (each Sunday, plus all holidays) were omitted, giving a compressed time series. This may be a valid representation if traders simply halted their expectations or if no new information occurred on nontrading days.

² The missing observations for holidays were interpolated naively by setting each equal to the last observation.

³ The missing observations for holidays were interpolated linearly in logs.

began its collapse in the spring of 1720. This would conform with Faure's judgment that "la folie de Law . . . est une folie raisonnée et raisonnable."³⁵ If we prefer to take the (0, 2) ARMA's, however, we find, when some allowance is made for the missing observations during holidays, that they indicate that Law's frequent interventions in the market to create the rise in prices acted as erratic shifts in market fundamentals to which participants reacted at different speeds. This interpretation conforms better to the more traditional analyses of Luethy and especially Levasseur.³⁶

The same efficiency test used for the stock of Law's Compagnie d'Occident can be used for the major three English stocks – Bank of England, East India Company, and South Sea Company – using the daily price data from the *Course of the Exchange* (Figure 4.5). The results are listed in Table 4A.2. The best models are found for each stock in each of five separate subperiods that can be distinguished by exchange-rate movements. The first is the pre-bubble period for England, but the height of the Mississippi Bubble in France. Both the South Sea stock and the Bank of England stock show evidence of disturbances, but East India stock does not. The next period, 19 January to 5 April, continues to show nothing for

³⁵ "Law's madness was a reasoned and reasoning madness." Faure, *Le Banqueroute de Law*, p. 233.

³⁶ E. Levasseur, *Récherches Historiques sur le Système de Law* (Paris: Guillaumin et Cie, 1854); Luethy, *La Haute Banque*.

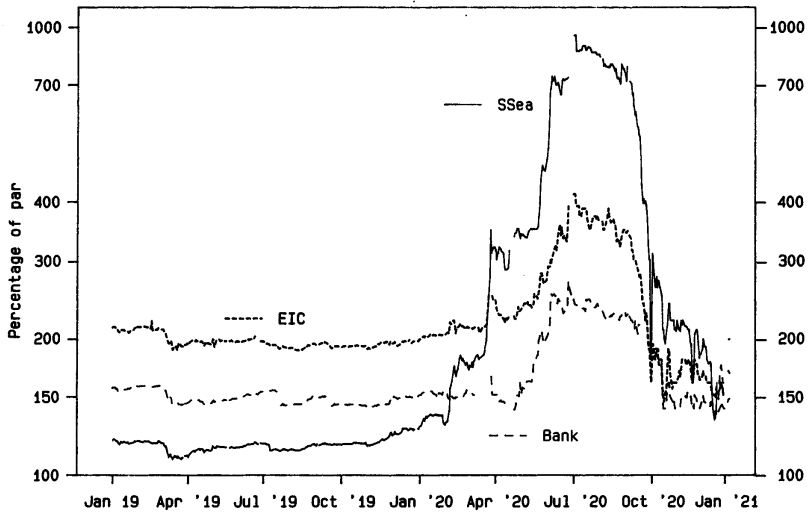


Figure 4.5. London stock prices for Bank of England, East India Company, and South Sea Company, 1719–20.

TABLE 4A.2
Estimated ARMA models for Bank of England, East India Company,
and South Sea Company during the South Sea Bubble¹

Time Period	B of E^2	EIC	SSC ³
4 September - 18 November 1719 ($n = 65$)	(0, 3)	(0, 0)	(0, 1)
19 January - 5 April 1720 ($n = 67$)	(-, -)	(0, 0)	(2, 0)
20 April - 22 June 1720 ($n = 55$)	(0, 0)	(0, 0)	(1, 0)
29 June - 31 August 1720 ($n = 55$)	(0, 3)	(0, 2)	(0, 2)
4 September - 15 December 1720 ($n = 89$)	(-, -)	(0, 5)	(0, 0)

¹ The program searched for the "best" autoregressive (AR) model up to 5 lags on first differences of the natural logarithms of the stock prices. Then the addition of moving-average models up to 5 terms for each AR model was compared. The one that minimized the expression

$$\log [\sigma_k^2 + 2k/n]$$

where σ_k^2 is the sum of squared residuals for the given model, k is the sum of terms in the AR and MA models, and n is the number of observations, was then selected as the best model. E. J. Hannan and J. Rissanen, "Recursive Estimation of Mixed Autoregressive-Moving Average Order," *Biometrika*, 69 (January 1982), pp. 81-94; "Correction," 70 (January 1983), p. 303.

² One missing observation for 18 September 1719 was set equal to previous observation. At this point there is a one-time drop in price of Bank of England stock; without this, the estimated ARMA would be (0, 0). No ARMA was run for the period of the bubble, 19 January - 5 April 1720, or the post-bubble period, 4 September - 15 December 1720 because many observations are missing (5 - 23 March; 16 - 30 September) during those periods when the transfer books were closed for payment of dividends. There was a run on the bank in the period 29 June - 31 August 1720 [ARMA = (0, 3)].

³ The (2, 0) ARMA during the 5 January - 20 April phase had parameter values of 0.097 and 0.313. The (1, 0) ARMA during the 20 April - 22 June phase had a parameter value of 0.48.

East India stock, but a strong second-order autoregressive process occurs for South Sea stock. This implies that different groups of market participants were using the same information at different times - a bandwagon effect with different players for different sets. This conforms to the type of situation Tirole posits as necessary for a bubble period, as well as Scott's portrayal of the market rigging performed by the inner circle of South Sea

Company directors. (No model was picked for the Bank of England stock, because 2.5 weeks of observations were missing during the period they closed the transfer books to pay dividends.) In the following period, which is regarded as the height of the madness, according to the historical accounts, neither East India nor Bank of England stock shows anything but white noise, and though the South Sea stock continues to have a strong autoregressive movement in its growth rate, it is a first-order rather than second-order process. However, the fourth period, which is taken as the lull before the storm in the traditional accounts, shows marked disturbances for each stock. The post-bubble period shows continued disturbances for East India stock, perhaps because the directors of that company began to make loans on the security of East India shares, but none for the South Sea Company stock. During that period, everyone knew that a reorganization and settlement of accounts would take place for the company, but no one knew what it would be until 1721.

Table 4A.3 shows the best ARMA models for South Sea stock and their estimated coefficients during various subperiods of the bubble period when exchange-rate signatures occurred (sudden rises and relapses in the value of the pound sterling). The strongest bubble process appears to involve the period 23 February through 15 June, in the sense that the coefficients are highest in this period for both lagged terms. An anomaly does appear in the period 23 February to 16 May, when the best model is a (0, 2) or second-order moving-average process rather than an autoregressive process. The explanation technically is that the first-order term is very small in the AR process as well as in the MA process, and the selection technique takes the lowest-order AR model before it begins mixing in MA models. The explanation economically may be that in the early stages of the bubble, the second-generation investors were more important for getting the bubble under way. The “insiders” were clearly trying to get the “outsiders” into the game. Their maneuvers to accomplish this may be seen in theoretical terms as shifts in market fundamentals – and therefore are as likely to create an MA process as an AR process. It is interesting that the coefficient for the second-order term in the AR process estimated for the various subperiods is relatively constant, ranging from 0.28 to 0.31, whereas the first-order term is as low as 0.07 and as high as 0.21. This appears to be the statistical counterpart of the phenomenon reported by Dickson – that the bubble kept gathering its own momentum, so that the last two issues of stock were not at the initiative of the inner ring of the directors, but rather

TABLE 4A.3
Comparison of ARMA models for South Sea
stock price changes in different bubble periods

Time Period	Best Model	Estimated Coefficients ¹
19 January - 5 April 1720 ² (n = 67)	(2, 0)	[0.099, 0.31]
23 February - 16 May 1720 ³ (n = 71)	(0, 2)	[0.095, 0.32]
23 February - 15 June 1720 ⁴ (n = 97)	(2, 0)	[0.200, 0.31]
23 February - 22 June 1720 ⁵ (n = 103)	(2, 0)	[0.210, 0.28]
5 July - 17 August 1720 ⁶ (n = 37)	(0, 0)	

¹ The coefficients of the ARMAs were estimated with constant term suppressed. The exact-likelihood method of Ansley was used. Craig F. Ansley, "An Algorithm for the Exact Likelihood of a Mixed Autoregressive-Moving Average Process," *Biometrika*, 66 (1979), pp. 59-65.

² Bubble period between exchange-rate signatures, the sudden rises and relapses described earlier as the combined Ashton-Kindleberger effect.

³ Bubble period between exchange-rate signatures. Linear interpolation of natural logs for missing data on 15, 18, and 19 April. When a (2, 0) ARMA process [a close second choice to the (0, 2)] was estimated for this episode, its parameters were [0.07, 0.29].

⁴ Bubble period between exchange-rate signatures. Linear interpolation of natural logs for missing data on 15, 18, and 19 April.

⁵ Bubble period from exchange-rate signature to data break. Linear interpolation of natural logs for missing data on 15, 18, and 19 April.

⁶ Post-bubble period marked with exchange-rate signatures. When a (2, 0) ARMA process was estimated for this episode, its parameters were [-0.65, -0.32].

were their responses to the tremendous demand for new stock.³⁷ Our confidence in our finding that the South Sea Bubble was rational is strengthened by the fact that despite using the same procedures for identifying a rational bubble in Bank of England or East India Company stock, none was found for either in any of the five subperiods before, during, and after the South Sea Bubble. Although we have not examined prices of other assets, such as land or buildings, Dickson makes the interesting observa-

³⁷ Dickson, *The Financial Revolution in England*, pp. 126-8.

tion that greatly inflated prices sometimes quoted for real assets during the height of the bubble were generally for payment in South Sea stock, implying that the price would have been much less if payment had been made in cash or bank deposits.³⁸ If this is correct, then it is further evidence that the South Sea Bubble, meaning simply the accelerating rise in price of South Sea stock that occurred in the spring and summer of 1720 and nothing more, was a rational bubble. That is, it was not just a response to changes in market fundamentals, at least during the period that foreign money was entering the London market, nor was it irrational in the narrowest sense that our specific definition of “rational bubble” implies.

³⁸ *Ibid.*, p. 147.

5. The Bank of England and the South Sea Company: how the bubbles ended

Adam Anderson's detailed description of the events of the South Sea Bubble has remained the authoritative source for all subsequent analysis of this fascinating episode at the dawn of financial capitalism.¹ Anderson's theme was simply that an inner ring of the South Sea directors had bribed the government into allowing them to hoodwink the holders of the existing government debt. That was the immediate, politically palatable, verdict reached as well by Robert Walpole. Because of his leadership in the financial reconstruction that followed the collapse of the bubble, Walpole became prime minister, and his term of office (1720–42) remains the longest in British history. All subsequent historians have echoed his verdict, with minor variations of emphasis on the political intrigues of the time, general corruption in the government and the society, the peculiar nature of the South Sea Company, or the infections from international speculative fevers.²

It is clear that the South Sea episode included a swindle by a subset of the directors of the company, as well as widespread bribes to high officials, court favorites, and members of Parliament that were in some cases quite large. It is not clear, however, that swindling and bribery were the primary elements in the situation. Although the directors of the company were fined severely, all of their estates being expropriated save for the £5,000 to £10,000 capital necessary for an eighteenth-century London gentleman,

¹ Adam Anderson, *An Historical and Chronological Deduction of the Origin of Commerce, from the earliest accounts*, 4 vols. (London, 1764, continued to 1788 by William Combe and published for the last time in 1801; reprinted New York: Augustus M. Kelley, 1967), Vol. 3, pp. 91–126.

² In addition to Adam Anderson, the standard accounts are John Carswell, *The South Sea Bubble* (London: Cresset Press, 1960), P. G. M. Dickson, *The Financial Revolution in England: A Study in the Development of Public Credit, 1688–1756* (London: Macmillan, 1967), Viscount Erleigh, *The South Sea Bubble* (New York: G. P. Putnam's Sons, 1933), William R. Scott, *The Constitution and Finance of English, Scottish and Irish Joint-Stock Companies to 1720*, 3 vols. (Cambridge University Press, 1910), and John G. Sperlring, *The South Sea Company: An Historical Essay and Bibliographical Finding List* (Boston: Harvard Graduate School of Business Administration, 1962).

the company retained its charter, the government debt exchanged from South Sea stock remained converted, and foreign investors who had been attracted to the London stock market during the bubble continued to invest in English securities on a much larger scale after the end of the bubble. If the shrewd foreigners sold out before the bubble burst and took their gains with them abroad, as tradition has it, it is odd that investments by the Dutch and other foreigners in the English funds rose sharply in the next quarter century.

My interpretation, based on analysis of the daily stock prices, transfers and mortgages of Bank of England stock, and exchange rates, emphasizes, by contrast, the technical aspects of the bubble and the structural features of the securities and money markets of the time. In my interpretation, a good deal of the traditional evidence on the South Sea Bubble takes on a different meaning. It appears to be a tale less about the perpetual folly of mankind and more about the continual difficulties of the adjustments of financial markets to an array of innovations.

After the Glorious Revolution of 1688, British government finances were gradually reorganized during the next 25 years of wars on the Continent, and the London capital market responded to these changes. A new financial system based on large-scale use of foreign bills of exchange, easily transferable shares of joint-stock corporations, and securely serviced long-term government debt grew up to accommodate the government's financial needs. But its inadequacies and innovational vigor led directly to the South Sea Bubble. What this financial system required was another financial instrument to complete the existing structure. But such an instrument was created only in the aftermath of the bubble in the form of "South Sea Annuities." These were the first perpetual, as opposed to term or life, annuities issued to individuals as government debt.

Starting a bubble: the pipe, bowl, and soap

The motivation for the South Sea scheme in England was essentially the same as for the Mississippi Bubble in France that began in 1719: to refinance the immense debts accumulated by the governments during the War of the Spanish Succession (1702–13).³ That war increased the British national debt from £16.4 million to £53.7 million.⁴ For the British, the new

³ Dickson, *The Financial Revolution*, pp. 91–2. Cf. Earl F. Hamilton, "Origin and Growth of the National Debt in Western Europe," *American Economic Review*, 37(May 1947), pp. 118–30.

⁴ Hamilton, "Origin and Growth," p. 127.

long-term debts were accumulated largely as the £10 million capital of the South Sea Company, formed in 1711, and the £13.33 million of “long annuities.”⁵

The South Sea Company was proposed in 1710 by George Caswall, a London merchant, financier, and stockbroker, and John Blunt, a London scrivener turned stockbroker. These two individuals remained the leading forces in the company until the collapse of the bubble in October 1720. In 1710 they proposed to the new government of Robert Harley that the £9.47 million of outstanding short-term war debts not secured by a specific tax be converted into equity in a new joint-stock company. This was the South Sea Company, which would enjoy the future profits anticipated from a monopoly on English trade to the Spanish Empire *and* the current cash flow on a perpetual annuity from the government paying £576,534 annually.⁶ This was the same technique that underlay the founding of the Bank of England in 1694 and the New East India Company in 1698. The intention was to relieve the government’s debt burden by substituting annual payments of 6% on long-term debt for redemption of an overwhelming amount of short-term debt. The new company could raise working capital on the security of its annuity from the government to exploit its monopoly privileges. The stockholders of the company thus exchanged their short-term government debentures, which were written in odd sums, deeply discounted, and difficult to transfer, for fungible and easily transferred shares in the company. These new shares were worth at least the annuity held by the company and promised further gains if the company made profits from its trade monopoly. The South Sea Company proved to be a success as a long-term funding operation of the government debt – 97% of the short-term debt was subscribed into its stock by the end of 1711. However, the government quickly fell into arrears on its payment of the annuity to the company, and so its stock did not reach par until October 1716.⁷ It is clear that from the start the value of the stock was driven by the expected value of the annuity payments. These were simply 6% on the nominal capital of the company, which in turn paid a 6% dividend to its stockholders. But while the original short-term debt was selling at one-third discount, the shares of the South Sea Company gradually rose to a

⁵ These required annual payments of £666,566 by the government until the end of the century. Evaluating the payments at 20 years’ purchase gives the capital sum of £13.33 million.

⁶ This annuity from the government yielded 6.09% to the company on its nominal capital of £9,471,324.

⁷ Sperling, *The South Sea Company*, pp. 1–3, 25.

premium of one-third. The implied difference in yields to public holders of government debt, 9% on annuities versus 4.5% on South Sea shares, measures in large part the advantages of liquidity that the South Sea Company shares provided to the public holders of government debt.

By contrast, the company's trade with the Spanish Main was not successful, and the company failed to turn a profit on this monopoly. Trade did not begin until 1714 and was severely restricted in the years 1714–16 by Spanish officials in the New World. By mid-1716, negotiations with Spain directly had resolved most issues in favor of the company, but hostilities quickly arose between the English and Spanish governments. Although these culminated in a decisive English naval victory in the battle of Cape Passero in late 1718, some of the South Sea Company's ships and assets were seized by Spain.⁸ The directors subsequently turned their attention fully to the further conversion of government debt, the one thing they could do well.

The second form of government debt incurred during the War of the Spanish Succession concerned annuities. These financial instruments had been introduced into British finance by William III in 1694. A stated amount of pounds sterling, which could be set at any level by the purchaser at the time of sale, was guaranteed to be paid to the registered owner of the annuity. These fixed payments were made so long as the nominee was alive, in the case of life annuities, or so long as the stated term of the annuity, in the case of term annuities. The owner of either was given a "Standing Order" to be presented at the Exchequer to claim the semiannual payments. In the case of life annuities, each time the owner, or the owner's agent, generally one of the London goldsmiths, collected the payment, evidence had to be presented that the nominee was alive. This usually was a note from the parish priest or local justice of the peace. All the life annuities created during the War of the Grand Alliance (1688–97) had a reversionary clause that enabled annuitants to convert to a fixed-term annuity on payment of an additional lump sum. Because the life annuities required semiannual notes that the nominee was alive, they were all voluntarily converted to long-term annuities within a few years. Only term annuities were offered to the public during the War of the Spanish Succession.

The Standing Orders for any annuity, life or term, at the Exchequer were assignable, but only in whole, not in part. That made them awkward to

⁸ *Ibid.*, p. 24.

handle as legacies in cases involving more than one heir. It also meant that they were not easily traded, a defect made worse by the variety of odd and often large sums in which they were denominated. Moreover, the assignments or transfers of the Standing Orders were not recorded by the Exchequer. The Exchequer maintained only the initial subscription ledgers and recorded the payments made against the Standing Orders presented at each payment period. So while transfers were possible, they were very cumbersome, and it was expensive to prove title after a transfer or assignment had been made. As a result, transfers of Exchequer annuities were few compared with transfers of shares in the joint-stock companies, occurring probably at one-tenth the rate.⁹

After the Treaty of Utrecht in 1713, a substantial boom occurred in the London stock market that affected the shares of all the joint-stock corporations and raised the average price of a share from 100% to 120% of par by early 1717.¹⁰ Consequently, the government expected that it could reduce its debt service by buying up high-interest, but difficult-to-trade, debt with new issues of low-interest, readily marketable debt. It began that operation with the Conversion Acts of 1717, initiated by Walpole, then chancellor of the Exchequer. The final legislation enacted after he left office in 1717 permitted the conversion of several minor types of government obligations – the “Lottery Loans” of 1711–12 and the “Banker’s Annuities” of 1705 – to redeemable annuities yielding 5%. These were managed by the Bank of England instead of the Exchequer. That meant that transfers were recorded, and the annuities could be assigned in part as well as in whole. Overall, the floating debt of Exchequer bills was reduced substantially, a sinking fund was established for reducing the national debt, and annual debt service was reduced 13%.¹¹

Walpole had originally proposed that the long annuities, with terms of 99 years, issued during the War of the Spanish Succession, also be converted into the new redeemables, but that part of his proposal was dropped after he was forced to resign from the government in April 1717.¹² The long annuities could not be redeemed without the consent of the holders, and so

⁹ Dickson, *The Financial Revolution*, pp. 457–67. Based on the only remaining transfer books from the Exchequer for that period, those of bankers’ annuities created in 1705, only 4% of the nominal capital was transferred annually, compared with 44–50% of capital transferred for the Bank of England, the East India Company, or the government stock of 1717 administered by the bank in the same manner as its own stock.

¹⁰ Dickson, *The Financial Revolution*, chap. 3.

¹¹ *Ibid.*, p. 87.

¹² *Ibid.*, p. 85.

they were known as the “irredeemables.” Because these annuitants received nearly 7% yield on the original capital lent, they needed a guarantee of substantial capital appreciation to compensate for the lower interest of 5% that the government was proposing to pay. But it still is not clear why that part of Walpole’s conversion proposal was dropped. Much has been made of the high interest received by the annuitants, but more, it seems, should be made of the annuitants’ relative inability to cash in on the capital gains that other asset holders were enjoying in the rising market of the time. The new 5% redeemable annuities managed by the Bank of England had risen 4% above par by the end of 1717, and their owners could readily cash in, as contrasted with the difficulties faced by the holders of irredeemables. It may be that the London goldsmiths who held so many of the Standing Orders saw conversion as a loss of the substantial fees they charged to the owners and were able to muster enough political force to block conversion. Or it may be that the supporters of the former Tory government were especially concentrated among the annuitants and resisted having parts of their portfolios administered by Whig institutions. At any rate, the failure to convert the irredeemables was a major piece of unfinished business that became more irksome as the stock market continued to advance (to between 130% and 140% of par by the end of 1719). It even became a source of strategic weakness relative to France when the success of John Law’s “system” for converting France’s debt became apparent.

From its beginning, the South Sea Company was primarily an organization for the conversion of government debt. It resumed its activities in that arena after Walpole was removed from office. In 1719, it carried out a conversion of the Standing Orders from the 1710 Lottery Loan into new stock issued by the company. That was a simpler version, indeed a trial run, of the grandiose operations the company was to attempt the following year. It is outlined in Table 5.1. In early 1719, the Treasury proposed to the company that payments of £135,000 annually on the annuities created by the Lottery Loan of 1710 should be capitalized at 11.5 years’ purchase (i.e., the various annuities, being in different sums, would all be priced at 11.5 times the annual sum they paid to their annuitants) and an equivalent £1,552,250 of South Sea stock offered instead to the annuitants. The annuitants would gain only a small percentage (3.48%) over their original investment of £1.5 million. But that was a higher price than they could get on the market for their annuities, because the annuity payments had fallen into arrears. Moreover, they would gain a permanent asset in exchange for

TABLE 5.1
The South Sea conversion of Lottery Loan Annuities to company shares in 1719

Before	After
Public debtholders (actual conversion)	
Initial investment (1710)	
£1,048,111	£1,048,111
Annual receipts (for next 23 3/4 years)	(perpetual)
£94,330	£54,221
Present value (1719)	
(@9%) £912,139	£1,236,666
(@5%) £1,294,447	(£94,330 x 11.5 x 1.14)
	Gain (@ 9%) £324,527
	(@ 5.48%) £-0-
Government (actual 69.85% conversion)	
Initial receipts (1710)	(1719)
£1,048,111	£1,048,111
Annual payout (until 1742)	(perpetual)
£94,330	£54,221
Present value (1719)	
(@9%) £912,139	£602,456
(@5%) £1,294,447	£1,084,420
	Gain (@ 9%) £309,683
	(@ 5%) £268,458
South Sea Company (actual 69.85% conversion)	
Initial capital (Jan. 1719)	(Dec. 1719)
£10,000,000	£11,746,844
Annual receipts from government	
£508,000	£596,739
Present value	
(@9%) £5,644,444	£6,630,436
(@5%) £10,160,000	£11,934,784
	Capital increase (@9%) £985,982
	(@5%) £1,774,784
	Receipts
	(sale of 95.56% of excess stock) £592,800
	Less payments to Exchequer £544,142
	Net £48,658
	Value of 4.44% excess stock £27,522
	Immediate gain £76,180

one due to expire in 23.75 years, and they would be able to sell it more easily whenever it rose in value. In fact, South Sea stock was selling at 114% of par when the annuitants who converted received it in December 1719. Nearly 70% of the Lottery Loan was converted on those terms. By that voluntary conversion, the government reduced its annual payments of £94,330 on the Standing Orders to £54,240, and moreover it could then repurchase the debt it owed the South Sea Company whenever it chose. That gave the government the prospect of eventually retiring all its debt,

which was seen as a great virtue at the time. But it also gave the government the power to undo the South Sea Company if its trade monopoly or financial influence was abused.

The South Sea Company benefited as well. It had contracted to increase its capital by £2.5 million if all the annuities were converted (by adding to the £1,552,500 of annuities converted a sum of £168,750 for arrears, and by a permanent loan to the government of £778,750). Because only 69% of the annuities were turned in, all these amounts were scaled down proportionately: The company's capital was increased by £1.75 million; £1.08 million went to the former annuitants, along with another £117,912 for arrears of interest; and the Treasury was paid £544,142. The latter sum was obtained by selling £520,000 of new stock at the current price of 114%, realizing £592,800. So the company was left with an immediate profit of £76,180.¹³

Everybody – proprietors, government, and the company – seems to have gained, and substantially, considering the modest amount of debt converted. If we compare the present value of the gains of all the participants using a 9% discount rate (Table 5.1), the proprietors gained £324,527 (the excess of the market value of their South Sea stock over the old value of their annuities), the government saved £309,683 (the difference in present values of their annual payments), and the company gained an increase in its minimum fundamental value (that derived solely from the annual payments received from the government) of £985,982, with an immediate gain of £76,180. No one was worse off, save perhaps the London goldsmiths, part of whose income had been derived from helping the former annuitants extract their annual payments from the intricacies of the Exchequer.

Part of the overall gain was due to a general rise in the securities market of the time, but it was achieved principally by substituting a more modern financial instrument – the perpetual, funded, and easily transferable share in a government chartered joint-stock company – for an instrument equally recent but encumbered by antiquated procedures for payment and transfer – the term annuity administered by the Exchequer. The improved liquidity of

¹³ This is derived by subtracting the £544,142 paid to the Treasury from the £592,800 realized from the sale of the £520,000 stock (£48,658) and then adding the value of the remaining £24,142 stock at 114% of par (£27,522). Dickson (p. 89) gave a figure of £242,240 for profit on the whole operation, but he included £193,583 of claims the company had against the government that the company wrote off as part of its payment. That would be appropriate only if the company had already written off its claims previously and then had found a way to realize them.

government debt provided a gain that was shared by all parties. Nevertheless, that left the great bulk of the annuities outstanding. Therefore, much larger opportunities for financial improvement were still present, and the South Sea Company intended to exploit them in the plan it offered the government in late 1719.

Blowing up bubbles

The mechanics of the new scheme were very similar to the 1719 conversion, only on a much grander scale, with much greater possibilities of profit for the South Sea Company. All the government's remaining debt, except that owed to the Bank of England and to the East India Company, the other two chartered companies entrusted with administering the national debt, was to be subscribed into South Sea stock – provided the annuitants would accept the terms offered by the company. Holders of the £16,546,202 of redeemable government stock handled by the Bank of England would have no choice but to subscribe or else be bought out by the government on worse terms. The annuitants holding £15,034,688 worth of irredeemables would have to see the same attractions in the new South Sea Company stock they would receive as had the Lottery Loan annuitants in the new stock they received in 1719. The South Sea Company was authorized to issue new stock up to the nominal par value of the redeemable government debt they converted and whatever proportion of the long annuities (value nominally set at 20 years' purchase) and short annuities (value nominally set at 14 years' purchase) they induced to convert.¹⁴

¹⁴ There is historiographic dispute on this point. My interpretation agrees with those of Scott (*The Constitution and Finance*, Vol. 3, p. 308) and Adam Anderson. Eli F. Heckscher, "A Note on South Sea Finance," *Journal of Economic and Business History*, 3(1931), pp. 321–4, however, asserted that Scott was mistaken and that the South Sea Company could have increased its capital stock without limit. Dickson (*The Financial Revolution*, p. 129, fn. 4) apparently agreed with Heckscher. Heckscher's argument was based on his reading of the authorizing statute: 6 George I, c. 4, section 48. That section allowed the company to raise "any Sums" it might need by calls on existing stockholders. That followed section 47, which stated the penalty to be paid by the company if it failed to take in long annuities and clearly referred to the recourse available to pay the penalty. That was not an issue of new capital stock but a call, or tax, to be levied on existing stock and was a feature also of the East India Company and the Bank of England. Section 30 of the act clearly set the limit on the new capital stock that could be issued. Section 58 went further and specified that the government could cancel the augmented capital from section 30 in whole or in part after 24 June 1727: *The Statutes at Large from the Fifth to the Ninth Year of King George I*, Vol. 14 (Cambridge: Joseph Bentham, 1765). It appears that Heckscher's English, though no doubt better than Scott's Swedish, was not as good as Scott's English.

TABLE 5.2
Key dates during the South Sea Bubble

1	1 February	Parliament passes the South Sea bill
2	14 April	First money subscription (£2,250,000)
3	28 April	Registration of two-thirds of irredeemable annuities
4	29 April	Second money subscription (£1,500,000)
5	19 May	Announcement of terms for registrants (£400 per share)
6	17 June	Third money subscription (£5,000,000)
7	22 June	Books closed for two months to pay £10 dividends per share
8	14 July	Registration of redeemable annuities (at Bank of England)
9	4 August	Registration of remainder of irredeemable and redeemable annuities (at Exchequer)
10	12 August	Announcement of terms for registrants of 14 July and 4 August
11	14 August	Fourth money subscription (£1,250,000 at £1,000 per £100 share)
12	15 & 17 October	Notification to South Sea directors of the amounts registered on 14 July and 4 August

The fatal attraction and duplicity of the scheme lay in the fact that the South Sea Company could set whatever conversion price it wished for the shares given to the debtholders in exchange for the old annuities. The higher the price the company could charge without discouraging the irredeemables from converting, the more of the new capital issue would be left to the directors to be used as they wished. If, for example, they set the conversion price of South Sea stock at the current market price of 135, £20 million of debt could be converted by issuing only £14,814,815 of new stock, leaving £5,185,185 for other uses. In the initial proposal presented 22 January 1720, they envisaged enough profit to warrant paying the

government up to an additional £1,500,000 on the redeemables, and another £1,578,752 if all the irredeemables were turned in, for the privilege of carrying out the scheme. The Bank of England, on 27 January, countered with an even more generous proposal. The South Sea Company, in its response on 1 February, raised its ante to over £7,500,000.¹⁵ The competition from the bank had forced the South Sea Company into committing well beyond its initial offer to a level that only its most optimistic calculations of what the market could bear could justify. The House of Commons accepted the South Sea Company's proposal, and it was enacted into law 7 April 1720.

The formal operation of the conversion operation began with the first subscription of stock on 14 April. That issue of new stock was intended to raise some working capital for the company, and so only money payments were accepted. None of the annuities were converted in this operation. The intended amount of new stock was £2 million, but it was quickly over-subscribed – the first quantitative sign of the extent of public enthusiasm for the scheme based on the proven advantages of increased liquidity and the prospect of monopoly profits. It was also the first indication of the inadequacy of the company's bookkeeping facilities for carrying out the conversion scheme. The amount of new stock issued was small relative to the total that was foreseen, but it was large enough to pay the bribes that had been promised to members of Parliament and officials in the government and to buy up enough redeemables to satisfy the government's requirement. Converting the redeemables purchased into new equity would increase the value of the company so long as the new shares commanded a premium. That could be maintained if the old shares maintained a premium over par, and that was likely, because the working capital obtained from the first subscription could be used to support the price of the existing stock. The new stock was not actually entered into the ledgers and available for transfer until December 1720; so only demand for the existing stock was increased, not the supply. The price rose correspondingly, from 288 on 13 April to 335 by 27 April.¹⁶

On 28 April the company held the first registration of the irredeemables. These were in two categories: the long annuities that had been issued for

¹⁵ The clearest description of the proposals is given by Sperling, *The South Sea Company*, p. 28.

¹⁶ These figures are in percentage of par value or, in the convention of the time, as the pounds sterling required to purchase £100 par value of stock. Stock could, however, be purchased in smaller units or even fractions, because all transfers were made simply by recording ledger entries under the accounts of both buyer and seller.

terms of 99 years and the short annuities issued for terms of 30 years. The government had agreed it would owe the company 20 years' purchase (20 times the annual annuity amount) on all the longs it converted and 14 years' purchase on the shorts. In its turn, the company offered the long annuitants 32 years' purchase, and the short annuitants 17 years' purchase, meaning that it offered both classes better terms than it was getting from the government, but with much better terms to the longs. However, it then took away that concession by charging both classes of annuitants £375 for each £100 of new South Sea stock subscribed. On that day, however, shares in the existing South Sea stock were selling between £335 and £343 for each £100;¹⁷ so the price charged the annuitants for their new South Sea stock was reasonable if the current market price could be expected to rise further. So it is not surprising that £9,454,744 of the irredeemables, or 63%, were subscribed, nearly the same proportion as with the Lottery Loan conversion the year before. That was an overwhelming response, and the redeemables were still awaiting their deliverance!

A second "money subscription" was held the day after the first registration of annuities, 29 April, and it was quickly oversubscribed, even though the price per £100 share was raised to £400, whereas the current price of original stock was only £340. The announced issue was only £1 million, but the amount actually issued came to £1.5 million. The enthusiasm of investors (or speculators) for the South Sea conversion was mounting, and rightly so. The amount of new capital, at a minimum, would be the amount of redeemable debt outstanding plus the irredeemables subscribed, or £25 million. The first two money subscriptions were together only £3,750,000, well below the eventual total of new stock that would be created. The terms of purchase for the money subscriptions were very generous and amounted to buying on margin, albeit with fixed margin calls at regular intervals. Only one-tenth to one-fifth of the sale price was paid at the time of subscription, and the remaining payments were stretched up to three years. So these subscriptions would have been most attractive to speculators anticipating further rises in the price of South Sea stock and wanting to leverage their purchases as much as possible. But because the total sold on margin at that time amounted to only slightly over 10% of the total capital that would be in existence at the end of the debt conversion, it does not

¹⁷ Castaing, *The Course of the Exchange* (London: 1720), no. 36. Freke's competing price list, used by Scott in his classic history of the bubble, shows the range to be £332 to £344: *The Price Of the Several Stocks, Annuities, And other Publick Securities, Ec. with the Course of Exchange* (London), no. 89.

seem plausible that the money subscriptions were the primary contrivance used to blow up the bubble. They were the main device for speculators, but not the primary cause of the bubble itself.

Yet bubble there was. The price of South Sea stock continued to rise sharply, while the price of the underlying annuities remained stable. The bubble seems to have reached its peak just after the third money subscription on 17 June. The highest price, often quoted, was 1,050, found for 24 June in Freke's *Price of All Stocks*, but the more reliable source, Castaing's *Course of the Exchange*, gave a peak of 950 on 1 July. Freke's price included the dividend, which had been announced as 10% in stock,¹⁸ whereas Castaing's price did not include it. But the jump was remarkable in both sources, and we can have no doubt that a new element was operating in the market. The new factor was that the transfer books for existing South Sea stock were closed on 23 June to prepare to pay the midsummer (29 June) dividend. So the price from 24 June until 22 August, when the transfer books were reopened, was not the spot price, as before, but rather the price "for the open[ing]" of the transfer books.

If we imagine that the spot price was unchanged throughout the summer, the difference between the time price (for delivery two months hence) and the spot price reflects the implicit interest rate or expected dividend rate. If the spot price was constant throughout, this gives a truly enormous forward premium by any standards, modern or historical, which cannot be accepted easily. But it seems not unreasonable that the spot price was constant, given that the next spot price on 23 August (740) was only slightly less than the last spot price on 22 June (765), and that the final sums to be converted were known within very narrow limits after the registration of irredeemables on 28 April.¹⁹ Moreover, the prices of the underlying annuities began to sag at that time (Figure 5.1), and the prices of Bank of England and East India stock also began to fall (Figures 5.3 and 5.4). So it is likely that one of the most dramatic parts of the bubble, the final leap upward after 22 June, was in large part illusory and reflected not so much a buying mania as a desperate credit crunch in the London money market.

The foreign exchange rates of the period give us other evidence that a liquidity squeeze of unprecedented magnitude was pressing upon the bub-

¹⁸ Anderson, *Origin of Commerce*, Vol. 3, pp. 95, 97.

¹⁹ Whereas the first registration of the redeemables on 14 July brought in only £11,240,145 of them, or two-thirds of the total possible, the second registration of both the redeemables and the irredeemables on 4 August brought in together £5,371,071 of additional government debt, only slightly more than the £5,306,057 possible if all the remaining redeemables (mostly held at the Exchequer) had been forced to convert.

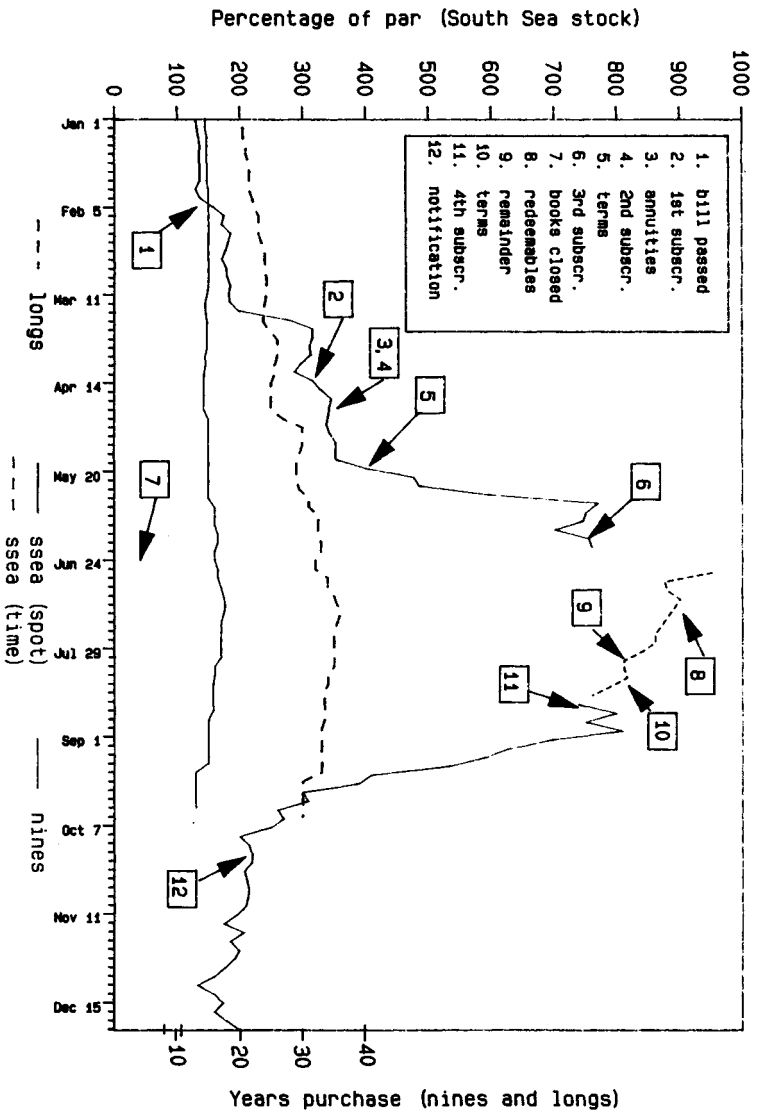


Figure 5.1. South Sea Annuities and stock.

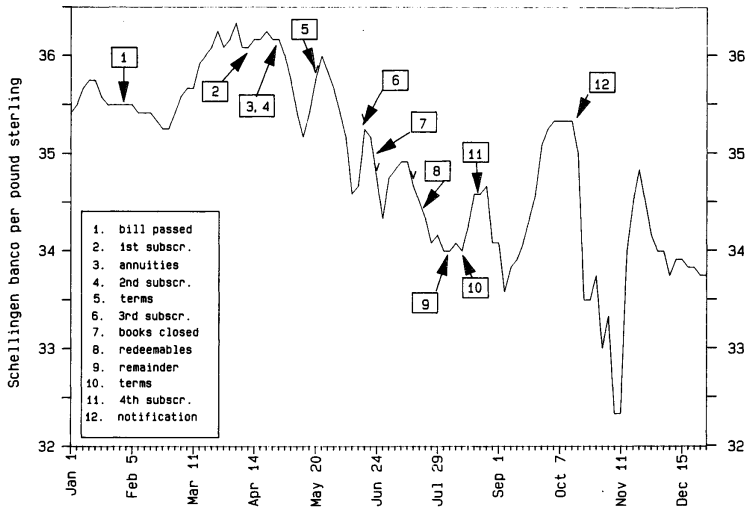


Figure 5.2. London-Amsterdam exchange rate.

ble in the price of South Sea Company stock. The rates of London on Amsterdam plotted in Figure 5.2 indicate a credit crunch in London from the time of the third money subscription on. Comparing the London–Amsterdam exchange rate and the graph of South Sea stock prices, it appears that there was an influx of foreign speculators to England in March. Both the price of South Sea shares and the English pound appreciated throughout the spring of 1720. By the first half of May, both South Sea stock and the London–Amsterdam exchange rates leveled off. There then followed a marked decline in the pound sterling from 36*s.* 3*d.* on 22 April to 32*s.* 4*d.*²⁰ on 8 and 11 November, the lowest level of the century. Note that the first major fall of the pound sterling occurred just before the third money subscription, and the pound reached a very low level at that time. This dates the beginning of the credit crunch in the London market.

The prolonged fall of the pound was interrupted by at least five sudden appreciations of the pound, including one at the time of the third money subscription. Those appreciations, however, were always followed by equally sudden depreciations back to the original exchange rate or lower. Such shocks in eighteenth-century exchange rates usually signaled a scramble for liquidity in the country whose currency appreciated, discussed as the Ashton effect in Chapter 4. So the foreign exchanges provide us strong evidence that credit became increasingly tight at the peak of the South Sea Bubble. This supports our thesis that the sharp increase in the forward price of South Sea stock on 24 June was due to an inward shift of the supply of credit to the South Sea Company caused by external drains to promotion schemes in the Low Countries and internal drains due not so much to alternative promotions in the bubble companies, as the South Sea directors suspected, as to the withdrawal of loans made on their stock by the Bank of England, the East India Company, and the Million Bank. Those reversals will be discussed in detail later. It was this inward supply shift of credit that caused the forward premium on South Sea stock to rise enormously at the end of June. An alternate explanation is that it was due to continued outward demand shifts for South Sea stock. But that is inconsistent with the exchange-rate evidence, which shows scrambles for liquidity occurring at each call made on the subscribers to the first, second, and third subscriptions.

²⁰ These are the amounts of Dutch bank money at two months usance that could be purchased for £1 in London. See John J. McCusker, *Money and Exchange in Europe and America, 1600–1775: A Handbook* (Chapel Hill: University of North Carolina Press, 1978), pp. 42–5, for a full discussion.

Before 23 June, however, there undoubtedly were demand shifts for South Sea stock, fueled, according to most accounts, by the increasing amounts the company loaned on its stock. It was that injection of fresh funds into the stock market that apparently caused the bubble in South Sea stock that occurred in the preceding month of May, before the transfer books were closed, and while prices were still based on spot transactions. The first lending on stock began 21 April, or as soon as cash became available from the first money subscription on 14 April. The terms were that for each £100 of stock deposited, £250 would be loaned, repayable in four months at 5% interest. A limit of £500,000 was set to be loaned, but the actual amount loaned was nearly £1 million.²¹ That, according to Scott, had a double-barreled effect. It withdrew some £400,000 of stock from the supply available to the market, and it pumped another £1 million of purchasing power into the demand for South Sea stock.²² Dickson emphasized the demand aspect more than the supply – the stock mortgaged clearly was unlikely to be sold in any event – but lacked specific evidence on stockjobbing by the South Sea directors or their agents. On 19 May the South Sea Company announced the next conversions of debt and the very favorable terms that were being given to the long-term and short-term irredeemables registered on 28 April. The company continued to grant more loans to aid buyers of additional stock. Those fresh loans were made at £400 for each £100 of shares. It was no doubt the demand for those loans that caused the third money subscription of 17 June to be taken. That was the bubble mania at its peak. Five millions of stock were subscribed (but, as in the first two subscriptions, not actually delivered) at 1,000%. Because 10% was required as down payment, the company took in exactly £5 million of cash. According to Anderson, of that sum, “the managers lent out in one day three millions, for supplying the stock market with cash.”²³ By the end of June, another £1,750,000 was loaned out, and by 1 August the total that had been loaned by the South Sea Company on its stock *and on its subscription receipts* amounted to over £11,200,000.²⁴

It is important to note here that the South Sea Company was forbidden by its charter from engaging in banking activities; so those loans had to be financed somehow by the South Sea Company. The Sword Blade Company

²¹ Scott, *The Constitution and Finance*, Vol. 3, p. 318. But Anderson puts the amount actually loaned at £900,000 (*Origin of Commerce*, Vol. 3, p. 95).

²² Scott, *The Constitution and Finance*, Vol. 3, p. 318.

²³ Anderson, *Origin of Commerce*, Vol. 3, p. 97.

²⁴ Sperling, *The South Sea Company*, p. 32.

had been taken over by Elias Turner, George Caswall, and Jacob Sawbridge in 1712. The latter two were directors of the South Sea Company during the bubble. Sword Blade became the major stockbrokerage firm of the period, issuing its own notes and bonds, which were accepted by the South Sea Company as cash payment. So the Sword Blade Company became the bank lending on demand to the South Sea Company to support its loans. But whereas the South Sea Company would accept Sword Blade promissory notes as cash payment, they were certainly not legal tender or bank notes. They should not be considered money, either, because they had little use as means of payment outside Exchange Alley.²⁵ When the Sword Blade Company failed on 24 September under the pressure of the Bank of England demanding redemption of its notes in specie or Bank of England notes, the South Sea scheme came to an end. It is doubtful that the bank ended the scheme deliberately in that way, because it had received the Sword Blade's notes as payment for new shares the bank intended to issue to take on part of the debt that the South Sea Company had converted. But it was that action that revealed to all participants that credit was indeed very tight.

To recap, the bubble blowing to 23 June was driven primarily by the lending of money on the mortgage of existing stock, and partly by the third money subscription. We can see the effects of these devices in Figures 5.3 and 5.4, which compare the prices of South Sea shares with those for East India Company and Bank of England shares. Each rose in three spurts: the second half of March, the second half of May, and during June. The first was due primarily to international speculators moving from Paris to London. The second was due to increased participation by Dutch investors and the beginning of loans by directors of the company on security of South Sea stock. The third arose from an immense increase in loans on stock, on subscription receipts, and on subscriptions made verbally.²⁶

Bursting bubbles: an early scramble for liquidity

There are two things that bear emphasis from this account: (1) the importance of the market's expectation of the proportion of the irredeemables that would be converted and (2) the importance of knowing the premium over par that South Sea stock would command in the market. Also evident

²⁵ See the excellent discussion by Antoin E. Murphy, *Richard Cantillon: Entrepreneur and Economist* (Oxford: Clarendon Press, 1986), p. 168.

²⁶ Dickson, *The Financial Revolution*, pp. 140–3.

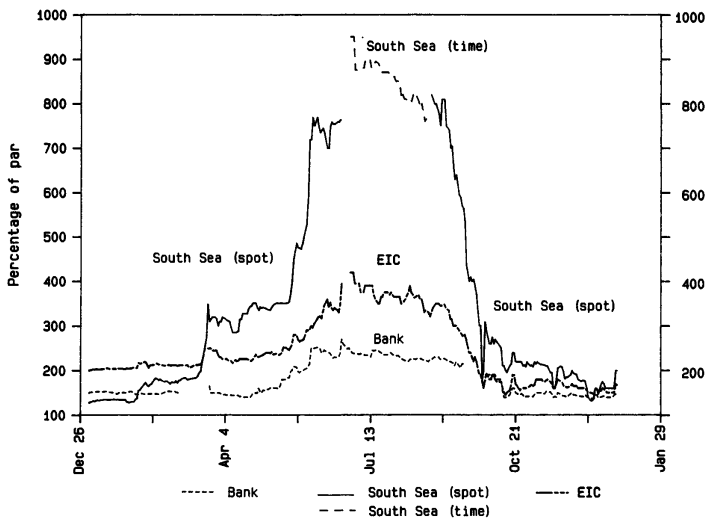


Figure 5.3. Castaing's share prices for Bank of England, East India Company, and South Sea Company.

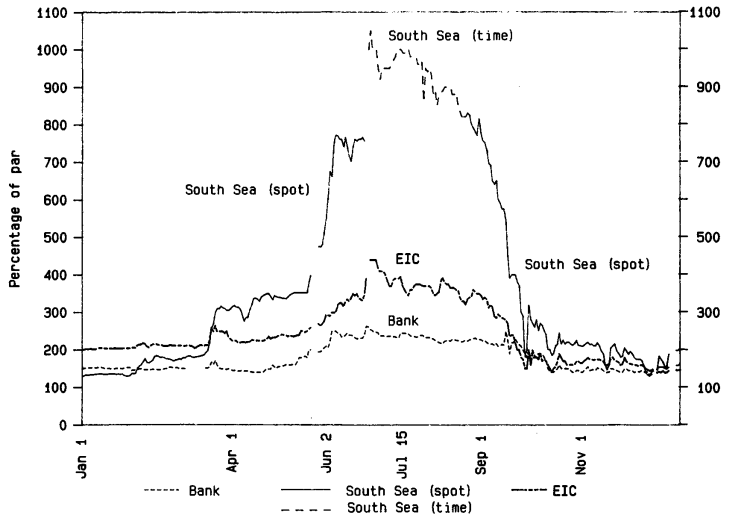


Figure 5.4. Freke's share prices for Bank of England, East India Company, and South Sea Company.

is the importance of timing, which all accounts have emphasized. My reinterpretation comes from asserting that the very favorable proportion of the irredeemables that were subscribed very early in the bubble and the favorable terms given to those annuitants removed most of the uncertainty about the market fundamental. Those terms were markedly more favorable than had been foretold, and they created a mob-like impulse to participate among a rapidly growing community of investors. The actions of the South Sea directors from the third money subscription on can be interpreted as an effort to limit participation. But it appears that in midsummer the General Court of the South Sea Company reflected more the urges of the mob than the machinations of Blunt, Caswall, and Sawbridge. The third money subscription was a mistake, unlike the first and second subscriptions, which were appropriate steps at the time and very conservative compared with the third. And the third was a mistake primarily because the very high price that was demanded for the stock, which may have been intended to discourage the mob from further participation, backfired by draining £5 million from an already overextended money market. Even lending out as soon as possible all the proceeds failed to offset the liquidity scramble that had been caused. By that time, new investment opportunities had arisen in competition with the South Sea Company: the so-called bubble companies that began to be promoted in the London stock market. The most important of these were two marine insurance companies that received their charters in June and began to be traded on 1 July. And then payments on the first and second subscriptions in South Sea stock – the equivalent of margin calls – came due as well. My evidence on this point comes not only from the high forward premium on South Sea stock from 23 June to 22 August but also from the jolts experienced in the foreign exchanges.

The sharp rise and fall in Amsterdam rates in mid-August gave a clear signal of the financial panic that had begun. It had been produced unintentionally by the directors of the South Sea Company when they invoked a writ of *scire facias* on 18 August against the York Buildings Company and the New River Company. They were old chartered companies, like the Sword Blade Company, that had changed activities from building waterworks to underwriting insurance. They had been attracting speculators away from the South Sea Company, which then charged them with violating the Bubble Act enacted in June, which prohibited any chartered joint-stock company from engaging in activities outside those authorized in its original charter. That was ironic, because the charter of the Sword Blade Company, which had long acted as banker for the South Sea Company,

authorized it only to make sword blades. So it, too, was technically operating in violation of the Bubble Act. The price of South Sea stock dropped sharply from the last half of August through the middle of October. On 24 September the Sword Blade Company bank suspended payments, intensifying the scramble for cash in a tight money market. That marked the final collapse of the South Sea Bubble.

The interpretation of the South Sea Bubble offered here tries to remove a good part of the irrationality of the participants, as characterized by most previous accounts, but it does not go so far as to argue that it was not a bubble at all, but just an example of a venal government manipulating market fundamentals. The argument that the bubble was really a reflection of shifts in market fundamentals supposes that the South Sea Company was being allowed by the English government to pursue by private funds the achievement of a general trade monopoly in England that the *Compagnie d'Occident* had been assigned by government decree in France. Antoin E. Murphy has justly noted that the excess capital stock the South Sea Company could offer to the public after the conversion of government debt into shares priced at 4 to 10 times par value did not constitute a current "profit" to the company, as argued by Scott and Dickson. Rather, it was a huge capital fund, a potential pool of credit amounting to £75 million, that would enable the company to exploit quickly any new profit opportunities that might arise in foreign trade or exploitation of marine resources – fishing, salvaging shipwrecks, insurance, and so on.²⁷ Its competitors nervously petitioned the House of Commons on 23 March 1720 to limit the future activities of the South Sea Company to the trading areas named in the act of 1 February so that it would not "oppress all private merchants in any branch of trade."²⁸ But the future fund of credit would have had to have been raised by selling the excess stock on the London stock market in competition with other uses of loanable funds. Without an enormous inflation in the economy, the South Sea Company's fund of credit could never have amounted to £75 million (derived by selling the stock at 10 times par). It seems even less likely that the general rise in stock prices of other companies and the proliferation of new bubble companies had been caused by the attempts of the South Sea Company to buy them out. A hostile takeover of the Bank of England and the East India Company by the South Sea Company could have been a possible future use of the fund of credit it

²⁷ Murphy, *Richard Cantillon*, pp. 161–2.

²⁸ Dickson, *The Financial Revolution*, p. 103.

was trying to create, but in mid-1720 it still was only a potential fund, not one currently disposable.

The question still may be asked whether or not we can measure to what degree the South Sea Bubble was a movement in fundamentals, a rational bubble, and an irrational surge. In fact, we cannot do that in the broadest sense implied by such a question: How many participants were gullible, how many shrewd investors, and how many sly manipulators, and what were the amounts invested by each? But we can refer back to Figure 5.1 and divide up the price movements into five phases. The first lasted from 1 February (131) through 19 May (355), or from the first acceptance by the House of Commons of the South Sea Company's proposal to its first announcement of terms for the debt conversion. The first phase was basically an upward shift in fundamentals caused by a proven financial innovation to be implemented on an unprecedented scale. The corresponding upward movement in the price of the long annuities, with a lag, helps confirm this assessment. The second phase, 19 May (365) to 22 June (765), was a rational bubble driven mainly by foreign investors providing an external infusion of credit to the London stock market and prompted precisely by the announcement of terms on 19 May that showed shrewd speculators what market rigging the South Sea directors were attempting. The third phase, 23 June (950) through 23 August (740), was the period when the South Sea Company's transfer books were closed and the prices were forward prices, or time prices, rather than the spot prices given before 23 June and after 23 August. The sudden jump from 765 to 950 was not part of the rational bubble, but rather a shift from spot to forward prices that revealed an enormous forward premium that reflected the pressures of the tightening credit market on the manipulators of the South Sea stock. The decline over the next two months merely reflected the convergence of the forward price to the spot price as the time of delivery shrank to zero. The fourth phase, 24 August (820) through 24 September (370), was the collapse of the bubble, caused by the unwinding of speculative positions taken during the run-up of prices under the pressure of very tight credit conditions. The final phase, 26 September (300) through the end of the year (200), reflected the uncertainties of the reorganization schemes being proposed for the company and what protection would be given various classes of subscribers and stockholders so that the price would sink below the fundamental level achieved in mid-May. Despite the collapse of the bubble and the volatility of the stock's price in the aftermath, however, it is useful to recall that the stock had begun the year at the level of 128. Any

stockholders who had ignored the whole episode and simply held on to their original holdings would have realized a 56% annual yield if they had awakened 31 December 1720 and sold.

Cleaning up: the Bank of England's final victory

What role was played by the Bank of England in all this? Most accounts simply say that the bank was fortunate that its counterproposal to Parliament was not accepted on 1 February and that it withdrew in the nick of time from taking over a large part of the South Sea stock in mid-September. It was not until 1723 that the bank engrafted part of the South Sea stock into its own capital on much more favorable terms. But bank stock participated in the general stock market rise, even if the bubble in its price was very mild compared with that in South Sea stock (Figure 5.3). And on 10 May the bank allowed its stockholders to borrow on security of their shares. The terms were conservative, compared with those imposed by the South Sea Company, but were quickly liberalized, so that eventually a total of 962 mortgages were made, amounting to 29% of the bank's transferable stock.²⁹

An analysis of the pattern of mortgaged stock indicates that the heaviest demanders of credit were stockbrokers. The leader far and away was Samuel Strode, with a total of £75,000 mortgaged. Another major borrower was Matthew Wymondesold, infamous as the broker for John Aislabie, chancellor of the Exchequer, who bought heavily into South Sea stock at the outset of the bubble and took £20,000 of South Sea stock as late as the third subscription.³⁰ The striking thing about the large sums borrowed by the brokers, however, is that they were all repaid promptly upon the calls made by the bank in late September (25%), despite evidence that a large number of borrowers failed to respond in a timely fashion and had 25% of their stock sold off from the end of October through the next April.³¹

Legend, incorporated into the standard accounts of the South Sea Bubble, has it that the knowledgeable and canny investors, meaning wealthy City of London men, represented by the Bank of England's directors and wealthy

²⁹ Computer analysis of Bank of England transfer books M and S, 2nd series, no. 35 and 41. For transferable capital, see William Fairman, *The Stocks Examined and Compared . . .*, 7th ed. (London: John Richardson, 1824), p. 51.

³⁰ Dickson, *The Financial Revolution*, p. 96.

³¹ Bank of England, General Court book H; entries for 29 September, 13 October, and 25 October 1720 and 6 April 1721.

Dutch merchants, sold their South Sea stock at high prices and invested their speculative gains in safe, staid Bank of England stock.³² The transfer records of stock in the Bank of England, however, tell a different story. To analyze how the South Sea Bubble was burst, it is most relevant to view the trading activities of the directors of the bank and the 163 individuals who gave addresses in the Netherlands. For these two groups, I have calculated the number and value of their purchases and their sales on a daily basis. The trading activities of the directors are summarized in Figure 5.5. The directors took longer positions in the stock of the bank immediately before the closing of the transfer books on 8 March and up to 20 May, after the transfer books were reopened on 8 April. After that, it appears that they reduced their holdings, perhaps to increase their purchases of South Sea stock or annuities. After the end of August, they reduced their holdings considerably, presumably to cover speculative losses in other assets. In sum, the directors of the bank stayed with their investment in bank stock in the early stages of the South Sea Bubble, abandoning it only in the most exciting period of the bubble, and then were forced to liquidate increasingly after August as the final collapse of South Sea prices and the other bubble companies occurred.

Legend also has it that the canny Dutch bought into South Sea stock at later stages of the bubble and sold out at the peak. That is consistent with their behavior on the bank stock, as they bought during the price rise, sold during the price plateau of early summer, and then bought back heavily during the low prices of the autumn. In fact, they ended up with cumulated holdings exceeding those of the directors. Does this mean that as a group they were even smarter than the bank's directors, or even the South Sea directors, because they did not get fined for illegal participation in the South Sea fraud or in any of the dubious bubble companies? Perhaps, but it seems more likely that they found themselves as a group locked into holding South Sea stock because of the paper losses they had sustained. The sales of bank stock could have been to cover subscription calls on South Sea stock. We saw earlier that fluctuations in the Amsterdam–London exchange rate coincided with subscription payment dates on South Sea stock, and the buildup of bank stock may have been in anticipation of the engrafting of South Sea stock onto the bank's capital, a scheme suggested in September 1720 but not realized until 1723, and then on much

³² Fairman, *The Stocks Examined*, p. 51: "Amidst the general speculation excited by the subscription scheme, some of the more cautious persons sold out of South Sea Stock at very high prices, and bought into Bank Stock; this naturally caused a considerable rise of the latter, which got up to 260 per cent."

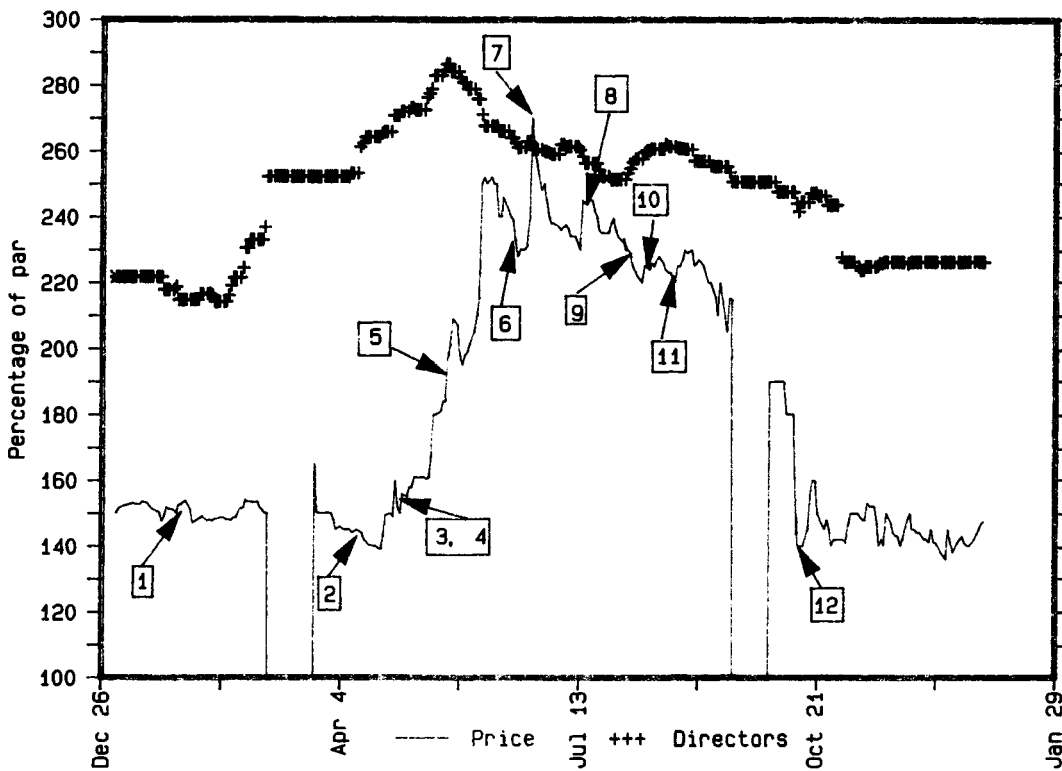


Figure 5.5. Bank directors' holdings of bank stock.

better terms for the bank than for the company. The bulk of the Amsterdamers' purchases were in units of £1,000, exactly that amount required to vote in the semiannual General Court that would decide what role the bank should play with respect to the South Sea Company and the remainder of the government's debt conversion. By the end of November, the accumulated shares of the Dutch exceeded the total held by the bank's directors (Figure 5.6). That pattern was less consistent with cautious or canny behavior on the stock market than with investors feeling that they were locked into a dubious investment and resolving to influence the eventual outcome by voting on decisions then being made by the strongest institution to emerge from the collapse: the Bank of England.

The minutes of the directors' meeting in the General Court show that the bank's relation with the South Sea Company was generally accommodating before the bubble and most likely until the suspension of payments by the Sword Blade Company bank on 24 September. There is no mention of the South Sea Company as such in the year 1720 until the minutes of the emergency meeting of 24 September. The bank was then taking in payments for subscribing £3,775,000 of new stock that would be used to buy up part of the South Sea Company's stock valued at 400%. Notes taken in payment drawn on Turner and Caswall and company, when presented to the Sword Blade Company, were not accepted, and notice of that turn of events was given to the General Court. A note was written in the margin of the General Court's minutes: "Sword Blade Company don't pay"!

During the next week, the bank's directors took action on all fronts to confront the obvious liquidity crisis caused by the failure of the South Sea Company's banking affiliate, but they did so by accumulating their own resources, and in the process made the crisis worse. By 10 November the bank had gained strength, and the directors made a bold move. They agreed to advance to the South Sea Company the deposit money remaining from their mid-September subscription, but the bank governor, John Hanger, reported that he "did not think fit for the proposal to proceed further in that manner." By 17 November a formal offer to the South Sea Company was approved that insisted on much stiffer terms to the South Sea directors. Part of the bank's aggressiveness appears to have stemmed from large loans arranged in November through Andrew Pels & Sons in Amsterdam, the leading Dutch merchant bankers. Dutch influence was being exerted from the much larger presence of Dutch merchants or their attorneys in the General Court at that time.

The next two years were given over to extended negotiations between

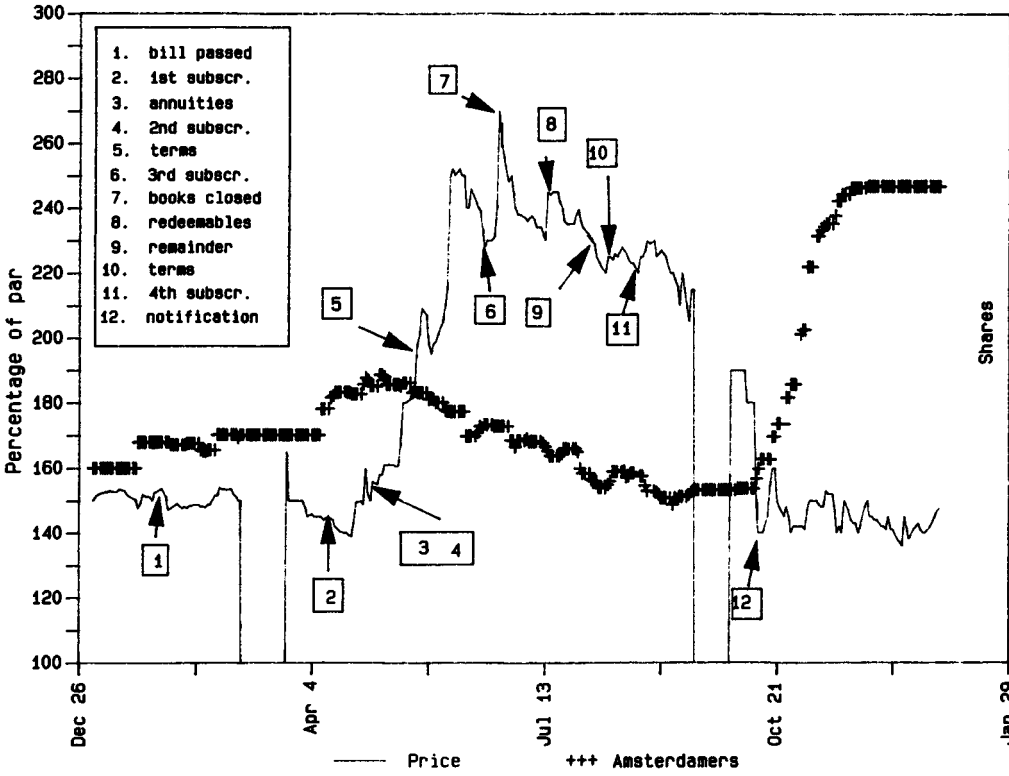


Figure 5.6. Amsterdaners' holdings of bank stock.

the bank and the South Sea Company. It was not until the end of 1722 that the new set of directors of the South Sea Company could bring themselves to acknowledge the control then being exercised by the bank. The bank's capital was increased by £3,409,000, and that of the South Sea Company was further reduced by £4 million. The final step in reconstruction was to split the £32 million of capital stock in half in midsummer 1723. One half remained the trading stock of the company, but the other half became fixed-interest stock, called the "South Sea Annuities." These were, in fact, perpetual annuities and were greatly favored by conservative Dutch investors over the next quarter century. That was the final financial innovation to emerge, and it completed a structure of financial instruments for the British government that proved its worth in each war for the next two centuries. Henceforth, the Exchequer and the army and navy could issue bills in times of emergency, and the bills could then be retired from the proceeds of selling new issues of perpetual annuities, which in turn could be retired at the government's discretion or left in circulation. The Bank of England created its first perpetual annuities in the Three Per Cents of 1726, but they were still irredeemable. The bank followed up with issues of redeemable, perpetual 3% annuities in 1727, 1731, 1742, 1743, 1744, 1745, 1750, and 1751. The latter issues were the basis for the most popular government security of the next 150 years when they were combined into the Three Per Cent Consol by the Consolidating Act of 1751.