

# Isaac Newton and the perils of the financial South Sea

Andrew Odlyzko

odlyzko@umn.edu

<http://www.dtc.umn.edu/~odlyzko>

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**Abstract.** In spite of Isaac Newton’s general brilliance and expertise in finance, groupthink led him to plunge into the South Sea Bubble and lose much of his fortune.

## 1 Introduction

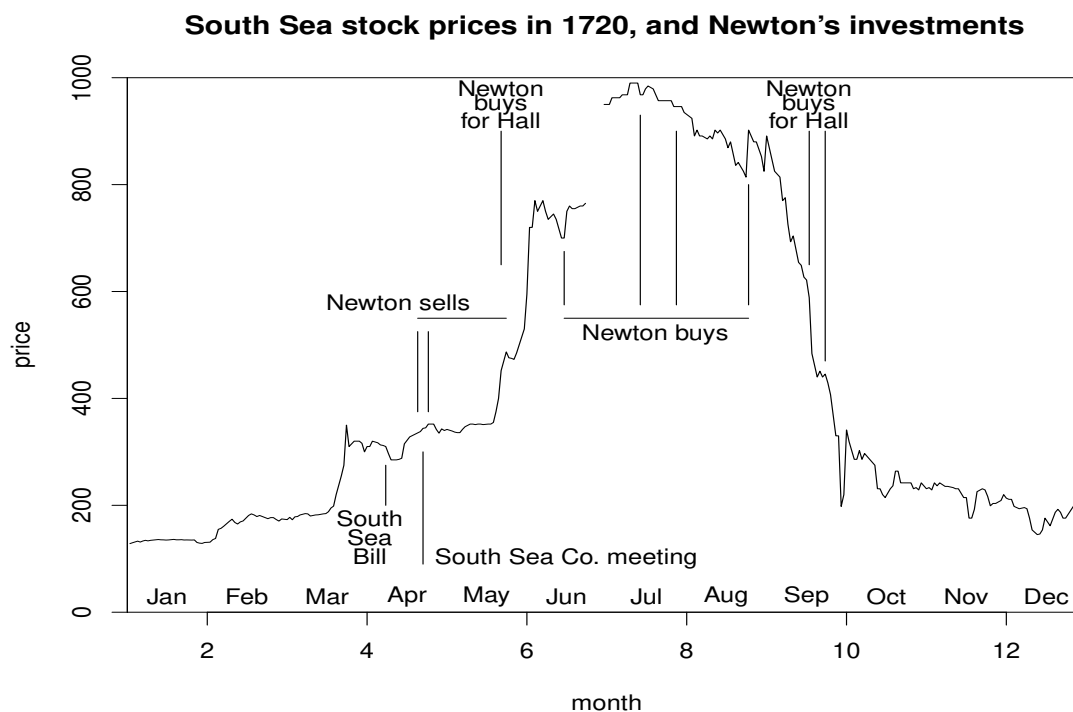
Brilliant scientists have been known to do foolish things. Yet Isaac Newton’s financially disastrous moves in the South Sea Bubble of 1720 deserve special attention. He was among the contrarian minority of investors who decided correctly in the early stages of that mania that it was going to end badly, and liquidated his stake at a large profit. But the bubble kept inflating, and he yielded to the prevailing groupthink and jumped back in, almost at the very top. His experience provides an instructive example of how even brilliant thinkers can go astray in an environment that lends itself to collective delusions as a result of the proliferation of misinformation and disinformation.

The story of Newton’s losses in the South Sea Bubble and how he supposedly said that he could “calculate the motions of the heavenly bodies, but not the madness of people,” is one of the most famous in the popular finance literature. For a long time, it was supported by just a few items of reliable information. Recently, extensive additional information was discovered which provides considerably more detail about Newton’s financial travails [12]. This article is based largely on that paper, plus two additional pieces of concrete information that have turned up since. We still lack a complete accounting of Newton’s investments, but the overall outline of what he did and how much he lost is reasonably full and convincing. Unlike many other anecdotes about famous figures, the colorful story of Newton and the South Sea Bubble as it was retold innumerable times was largely correct. In some ways it even understates the extent of his mistakes.

## 2 South Sea Bubble basics

The South Sea Bubble has a voluminous literature devoted to it, and is cited frequently. But one has to be careful, since many accounts and references are faulty. For example, it is often claimed inaccurately that the South Sea Company was a fraudulent enterprise from the start, or that it collapsed after the crash of the Bubble in the fall of 1720. A short reliable overview is available in a chapter in Chancellor’s book [5]. The main book-length recent treatment is in Carswell’s book [4], and detailed financial and other data are

presented in the older works of Anderson and Scott [1,16] and in the more recent one of Dale [6]. There is also a brief survey in [12], and a more extensive work that explores the post-truth world of 1720 that led British investors astray is in preparation [13].



**Fig. 1.** South Sea stock prices and investments by Newton during the Bubble of 1720. Prices adjusted for stock dividends. The ranges for purchases and sales denoted by horizontal lines are largely inferred and approximate, while vertical lines denote documented dates of either actual transactions or instructions for transactions. The “Newton buys for Hall” label represents some of the purchases of South Sea securities by an estate for which Newton was an executor. The “South Sea Bill” shows the 7 April date that the main legislation authorizing the South Sea scheme was passed, and “South Sea Co. meeting” denotes the 21 April meeting of South Sea investors. The gap in prices at the end of June was a real phenomenon, caused by a change from transactions for immediate cash settlement to what are today called “futures.”

The South Sea Company was established in 1711 as a financial vehicle for dealing with a pressing financial problem. British government had a large backlog of unpaid bills, largely from contractors supplying the armed forces in the long war that was beginning to wind down. Holders of those bills were offered South Sea Stock (which was almost like shares in a modern corporation), which paid investors the same interest they were receiving on their bills, but for an indefinite period, without any promise of full payment of the bills. The South Sea Company received the funds for those payments from the government. The

effect was to convert short-term debt into long-term bonds, and to provide holders of the large variety of bills that were hard to sell with a single liquid instrument, South Sea Stock, which could be traded easily. The name of the South Sea Company was derived from this enterprise's monopoly on British trade with the West coast of the Americas and part of the East coast of South America. This privilege was given to it as a sweetener. The intention was to make the debt conversion more attractive by dangling the prospect of profits from trade that would add to the money paid by the government.

During the late 1710s the South Sea Company was a very respectable operation, with the largest capitalization of any joint stock enterprise in the world. It was also a rather dull operation, basically just passing on the government's payments to its investors. We don't have solid information about the profitability of its trading activities during this period. Those involved supplying the Spanish colonies with African slaves and some British goods. The evidence strongly suggests those commercial operations lost money. However, in any case they were of minor financial importance to the company, although they did help inspire dreams of future riches among the public. Newton was an early investor and generally kept adding to his stake in this company as time went on. He owned some government bonds directly, and, in the joint stock area, he had investments in the Bank of England and the South Sea Company, and the latter did somewhat better. But both of those investments were very profitable, as interest rates were dropping after the long period of draining wars, and peacetime economic activities were growing.

The economic recovery of the late 1710s, together with John Law's Mississippi Scheme in Paris, inspired a project for the South Sea Company to take over most of the British national debt in 1720. The result was the South Sea Bubble, visible in Fig. 1 in the price of South Sea Stock. Various observers, then and later, regarded this operation primarily as a government swindle of holders of that debt. We won't consider that aspect here, as the focus is on investment decisions of Newton and other individual investors. The Bubble lasted basically just half a year, with a precipitous collapse in September 1720. At the end, South Sea Stock comprised the majority of British national debt, and amounted to about 70% of the value of all shares and bonds in Britain. After some financial restructuring, the South Sea Company continued to exist until the middle of the 19th century, almost exclusively as a private agent handling the paying out of government funds to holders of the national debt. Those who bought South Sea Stock before the Bubble, say by mid-1719, and simply held onto it for a few years, did very well, as they were rewarded with a roughly 50% capital gain on top of generous dividends. This was due to a large "Ponzi scheme" element in the financial moves of that company during 1720, in which the early investors gained at the expense of those lured in during the Bubble.

### 3 Newton's finances

In 1720, Newton was almost 80. His significant scientific achievements were decades in the past, and he was not doing any original research. Still, he was very active. He continued to lead the Royal Society as its President and was a celebrity that foreign dignitaries visiting London were eager to meet. He was called upon for technical advice in various areas (such as that of finding longitude at sea) by both the government and private individuals. His

physical and mental decline apparently started a few years later, as is detailed in the most authoritative biography available today, that of Westfall [17].

Comparing economic circumstances across three centuries cannot be precise. But the population of Britain was around 7 million in 1720, with metropolitan London accounting for about 600 thousand. GDP was on the order of £70 million, so GDP per capita was about £10, while the national debt was about £50 million. To translate the prices and wages of 1720 into modern terms, it is therefore not unreasonable to multiply them by a factor of 1,000. Given the imprecision of any such comparison, the same factor of 1,000 applies whether one is translating into modern pounds sterling, US dollars, or Euros.

Newton left his academic position at Cambridge to become the Warden of the Royal Mint in 1696, where he played an important role in carrying out the great recoinage of the 1690s. From that point on, he was one of the group of professional non-partisan senior civil servants who displaced some of the rapacious political appointees who used to dominate. The new cadre did much to improve the efficiency of the government and thus enabled Britain's rise to its great power and eminence.

From 1699 to the end of his life in 1727 Newton was Master of the Mint. This was a very lucrative post. Whereas his academic position paid about £100 per year, his earnings at the Mint (consisting of a salary and, much more important though more variable, a fraction of the turnover) averaged close to £2,000 per year. By 1720 he was also earning well over £1,000 per year from dividends on his investments. This total annual income of over £3,000, comparable to \$3 million today, put him safely in the top 1% of the population, and not far from the top 0.1%. He was recognized as a member of the British elite, and he lived well, with a horse-drawn coach and a retinue of servants that were marks of the affluent strata. But he did not overspend, was charitable, and saved a substantial fraction of his earnings.

Newton's net worth shortly before the South Sea Bubble was somewhat over £30,000, so can be thought of as comparable to \$30 million today. That is also the approximate value of his estate at his death in 1727, so the claims he was ruined by the Bubble are incorrect. However, he did lose a substantial amount in absolute terms, and far more in terms of what he might have had had he been a bit more astute. By mid-1721, his net worth was down to about £20,000. This represents a loss of about £10,000. A famous anecdote claims he lost twice that much. That is plausible, since there are various ways to count one's investment losses, and one could easily come up with even higher figures for Newton. For example, as will be described below, he made a profit of about £20,000 in the early stages of the Bubble. Had he simply managed to hang onto that gain by abstaining from any further investments in the South Sea Company, he would have emerged from that event worth over £50,000. Instead, he put practically all his money into that doomed venture.

## 4 Newton and the South Sea Bubble

Although it was trade, finance, and industry that propelled Britain's rise, land ownership continued to be dominant in perceptions of political power and social prestige till the end of the 19th century. Newton, on the other hand, never acquired any significant real estate.

He was among the pioneers who put their money primarily into the financial instruments that the Financial Revolution of that period created. Those were primarily government bonds and securities of the large joint stock companies such as the Bank of England and the South Sea Company. Much of the population regarded them with suspicion, as the new-fangled instruments of corruption and upheaval of traditional life.

Our knowledge of Newton's finances appears to be fairly complete for the period after the crash of the South Sea Bubble. At the end of 1720, essentially all his wealth was in South Sea securities. Over the next few years, he diversified by shifting about half of that into Bank of England Stock, and put in additional funds coming from his savings into Bank securities. (In retrospect, this was not the best move, as South Sea securities did slightly better, but the difference was minor, and presumably he got greater peace of mind by spreading his money around.)

Deducing what Newton did during 1720 involves making inferences from the incomplete data we possess. Fig. 1 summarizes the main moves we have evidence for. At the start of that "fatal year," as it was almost universally called for some time after the crash, slightly less than half of Newton's assets were in South Sea Stock, and the rest in government bonds. At that time, as can be seen in Fig. 1, South Sea Stock was around 130, and most of Newton's stake had been acquired much earlier, at 100 or below.

The two vertical lines marked "Newton sells" represent two instructions he issued in April 1720 for sales of his South Sea Stock, and are discussed in more detail later. The horizontal line marked "Newton sells" represents a period during which Newton was acquiring a large holding of British government bonds. It is assumed that money for this came from the liquidation of his South Sea Stock pursuant to those instructions. The first of the four vertical lines marked "Newton buys" represents his liquidation of almost all of that newly acquired stake in government bonds, and the proceeds of that sale are assumed to have been spent purchasing South Sea Stock. The other three vertical lines marked "Newton buys" denote concrete cases where Newton either bought South Sea Stock directly, or converted some of his other government bonds into it. Thus he continued to pour money into the South Sea Stock even as its price was beginning to slide, before the precipitous collapse in September 1720. By that time, essentially his entire fortune was in that security, and he continued with it until the diversification into Bank of England Stock mentioned above, which started in 1724.

Unfortunately we have no direct evidence of what motivated Newton's financial decisions. However, some additional insights can be obtained from the records of an estate. Thomas Hall was another senior and wealthy civil servant and named his friend Newton as one of the executors of his holdings. Unlike for Newton himself, we have a complete record of the financial transactions of that estate, since the executors had to be able to account for their actions to the beneficiaries and the judicial system. The account book was preserved among Newton's papers and has only been studied recently [12].

The investment decisions of the Hall estate were made jointly by all four executors, not just by Newton, and they involved consultations with Francis Hall, the principal beneficiary. So while they do not represent only Newton's own unfiltered views, he must have been in broad agreement with the group's resolutions. His own thinking surely was also influenced

by the discussions that took place. Fig. 1 shows the first and the two final moves by the estate into South Sea Stock. Those last two occurred as the Stock was more than halfway down its slide, and show real faith in the South Sea project. The first took place just as Newton's purchases of government bonds were ending, and it may be that his sales of South Sea Stock had just concluded. The Hall estate account book does mention that this first move was at the request of Francis Hall. There must have been serious debates about this shift of funds, and they were surely heavily influenced by the rapidly rising price, visible in Fig. 1. Newton took several weeks to decide to follow that example, and by that time prices were much higher, and close to their peak. His later investments were also made at very high prices, and so were that much more damaging.

## 5 Newton's early skepticism and later conversion

Let us now consider in more detail the investment scene in April 1720, when Newton took his profits on his South Sea stake. The project for the South Sea Company to take over almost all of the British national debt was presented to Parliament at the end of January 1720, and after heated debate, was selected over a competing Bank of England proposal at the beginning of February. This led to a noticeable but not giant rise in South Sea Stock price, as is visible in Fig. 1. There was a far larger rise at the end of March, when the final details were being hammered out in the legislation to authorize the scheme, and the South Sea Company won some seemingly small technical points. When the official Act became official on 7 April, there was actually a slight decline. Overall, though, South Sea Stock price did not vary much from late March until the end of May, when it started its vertiginous climb. So what could have induced Newton to sell out in the middle of this period, at a price he could have obtained right at the start?

The analysis of [12] was based on many fragmentary pieces of information about Newton's holdings of various securities, and concluded that he very likely had at least 100 shares of South Sea early in 1720. (We follow here the modern convention and use the term share to denote 100 units of South Sea Stock, which was almost like modern corporate shares, but not exactly that. The prices in Fig. 1 then reflect those of a single "share.") That analysis also deduced that he sold all of that starting in late April. But that analysis involved just one item explicitly about Newton's South Sea holdings, namely his instruction dated 19 April for sale of 30 shares. What had been overlooked in the preparation of that paper was another item that had been published almost a century ago, Newton's instruction dated 23 April for sale of 70 shares ([15], p. 103). This additional item fits in very well with the other pieces of hard data and the deductions in [12]. It strongly suggests that Newton decided to liquidate his entire, or almost entire, stake in the South Sea venture in the space of less than one week, on Tuesday and Saturday, 19 and 23 April. Those two days neatly bracket a meeting of South Sea investors on 21 April. We do not know much about what transpired at that meeting, but according to news reports it was attended by many, and had long discussions and presentations. It could be that those helped strengthen Newton's skepticism shown in the partial sale instructions of two days earlier, and led him to decide to get out with the rest of his paper gains. It is intriguing that Thomas Guy, the person who has long been known to history as making giant gains in the South Sea Bubble started

liquidating his stake the day after the stockholder meeting, on 22 April [12]. Perhaps he was also spurred into action by the discussions at that meeting. Unlike Newton, Guy did not get seduced into buying back in. He kept his profits and used them to establish Guy's Hospital, famous for its great contributions to medicine in the last three centuries.

Newton must also have participated in various discussions (which, in the “respectable” London society of that time, were often carried on in coffee-houses), and he must have read the press (which was also read to a large extent in coffee-houses). April 1720 saw the publication of an unusually large number of pamphlets and newspaper articles about the economic fundamentals of the South Sea project. A week after the passing of the South Sea Act, on 14 April, the South Sea Company distributed some of its new shares to the public in the first of four sales. (The last such sale was on 24 August, and Newton's participation in it is denoted by the last vertical line in Fig. 1 that is above the “Newton buys” horizontal line.) Each sale was on an installment basis, with an initial downpayment, and remaining payments spread over an extended period. Surely in order to stir up enthusiasm for this first sale, the managers of that company apparently arranged for the publication of a “puff” article in the newspaper *Flying Post* of 9 April. It was published anonymously, but marked as coming from a “friend” of the company. It attracted much attention, as it presented a wonderful prospect, in which the higher the price at which South Sea Stock was sold, the better it would be for investors.

The *Flying Post* article reached its astounding conclusion by a certain amount of what today might be called “mathiness,” quantitative reasoning that confuses the issue instead of clarifying it. If you own all 500 shares of a company with assets of \$100,000, each share is worth \$200. If you now sell 2,000 new shares at \$400 each, the company has assets of \$900,000 and 2,500 shares, so each share, and in particular each of your original 100, is worth \$360. If you sell the new shares for \$600 each instead, your original shares will be worth \$520 each. So yes, the higher the sale price, the better it is for the original investors. That's how it works with startups today, too. But typically in a legitimate startup there is some justification for the increased price that new investors pay, such as a technological breakthrough that the original investors achieve with their initial funding. The *Flying Post* article offered no evidence of any new ingredient that would produce increased profits, and buried the essence of what was in reality a Ponzi scheme behind confusing arithmetic.

This same article was reprinted a week later in both the *Flying Post* and in *Mist's Weekly Journal*. But on the day of those reprints, 16 April, there appeared the first of the three printed refutations that have survived. The second rebuttal, by Archibald Hutcheson, the most famous of the debunkers of the South Sea project, appeared on 21 April, the date of the South Sea Company stockholder meeting. It is possible that Newton was influenced by those refutations, or he may have reached their conclusion himself, as it was not difficult to figure out the fallacy of the puff article. He may have decided that any venture that concocted such preposterous arguments should be avoided. Unfortunately it is unlikely we will ever learn what motivated Newton. But whatever it was, it did not act on the bulk of British investors, as the price of South Sea Stock did not change much until it started climbing towards the end of May.

How could people disregard the refutations of the *Flying Post* puff? Well, in a mania people do strange things. Among other factors, FOMO (“fear of missing out”) warps judgment. And then there is the thought that if everyone around you is panicking, while you stay cool, perhaps they know something you don’t. There is a nice illustration of this phenomenon in a letter from a prominent private banker in London in June 1720, when (after a long period of personal skepticism about the South Sea project) he wrote that “when the rest of the world is mad we must imitate them in some measure” [14]. Further, even those who acknowledged the fallacies of the *Flying Post* article could argue that the South Sea Company would be able to make huge profits from its commercial activities, which that article did not even mention. Skeptics such as Archibald Hutcheson, Richard Steele, and others pointed out that there was no plausible way for this company to gain enough to justify the high price of its stock. But the great bulk of the investing public managed to convince themselves otherwise.

What is most remarkable is that while the South Sea Company managers did drop various hints, did manipulate stock prices, and handled the financial engineering of their offerings so as to sustain the public’s illusions, they never presented to the public a business plan of how they might succeed. There was nothing comprehensive that was announced other than the article in the *Flying Post*. In fact, we can say with confidence that South Sea promoters did not even have a plausible business plan internally. The one they were forced to present to Parliament after the collapse of the Bubble showed that they were planning to pay the high dividends they promised mainly out of the funds they expected to obtain from sales of shares ([7], pp. 215–222; [8], vol. 3, pp. 231–235). But this was not known to the public before the collapse. The mania reached a new level of intensity in June, and Newton was swept up in the groupthink that ruled the British investing public,

## 6 Newton as investor

It is noteworthy that once Newton decided to go back into South Sea Stock, he moved essentially all his financial assets into it, and he did it very quickly, with most of his investments in mid-June. Thus he must have been really and truly convinced this was a promising venture. In contrast, the Hall estate, even though it moved funds there earlier, did not “put all its eggs in a single basket,” as much of it remained in Bank of England Stock. The discussions among the executors and Francis Hall must have been interesting!

Newton was definitely making his own investment decisions, and not simply following advice from others. His choices were different from those of the Hall estate, and also from those of Dr. John Francis Fauquier. Fauquier is an intriguing figure. One of the many Huguenot refugees on the London financial scene, he acted as Newton’s broker, and many of Newton’s financial records that have been preserved are instructions to Fauquier to carry out various transactions. Fauquier was also Newton’s relatively low-paid deputy at the Mint. At the same time, though, he was far richer than Newton, and spent many years as a director of the Bank of England. Like Newton, he did move much of his assets into South Sea Stock, but he did not commit all his funds to that security, and he invested on a schedule different from Newton’s.



In general, Newton was intimately familiar with commodities and finance. He had to be, since his job as Master of the Mint required him to make many decisions that depended on market prices and conditions. The detailed report on currencies that he prepared at the request of the British government in 1717 was an element in the subsequent major alteration in monetary policy. The Hill estate papers do cite his activities on behalf of that estate, and the archives at the Bank of England record a variety of occasions when he appeared personally at the Bank to sign the transfer documents. Did he also visit Exchange Alley, where financial dealings were concentrated in those days, many decades before a formal Stock Exchange was created in London? It was not regarded as reputable, and reports of visits to it by the aristocracy, especially by aristocratic ladies, scandalized “proper” society. There is a claim in the literature that Newton was seen there ([10], p. 191). However, the reference for that is a letter of the famous London publisher Jacob Tonson, and the actual letter, available in the archives of the British Library, only refers to the possibility of meeting some “Mr. Newton.” It seems likely that an established figure like Tonson would observe the conventions of the time and would refer to the famous mathematician and physicist only by his full appellation “Sir Isaac Newton.” So he probably had another Newton in mind in his letter. (There were several affluent Newtons in Britain at that time.)

Whether Newton frequented Exchange Alley or not, we do have direct evidence of his paying attention to details of operations of individual companies. This is shown by another item of direct evidence that has come to light since the paper [12] was written. It is a letter from Newton to his friend, the mathematician Nicolas Fatio [11]. In that letter, Newton responded negatively to Fatio’s solicitation to invest in a company that Fatio was promoting. He noted not only the low price of that company’s stock, but also that its fundamentals were not good, since he had learned its “rents in Scotland are ill paid & difficultly collected.”

The letter to Fatio also states that “I lost very much by the South Sea company which makes my pockets empty, & my mind averse from dealing in these matters.” This is not quite as memorable as the famous anecdote that Newton lost so much that he could not bear to hear the words “South Sea.” However, it is in Newton’s own words, as opposed to those of that anecdote, which has only been traced to a period about two generations after Newton’s death [12]. (Newton’s statement is also not very accurate, as his pockets were not empty, he was still quite rich. But this was a handy excuse.)

The general conclusion is that Newton was financially sophisticated, and was making his own decisions. However, unlike Thomas Guy and a small number of other investors, he was not astute enough to avoid the disaster of the South Sea Bubble. But in that he was just part of the immense crowd, which can be estimated at 80% to 90% of all British investors, who did venture into the financial South Sea. This included many of the most sophisticated figures of British commercial life. As an extreme example of that phenomenon, we can consider the Bank of England. It competed with the South Sea Company at the start of 1720 for the privilege of converting the national debt. Then, when Parliament decided in favor of the South Sea Company, the Bank tried to hobble the scheme of its rival, since it threatened its own position on the banking scene. But when that failed, and the

bubble kept inflating, the Bank humbly requested to have its own holdings of government securities accepted for conversion. After the collapse, when records of this transaction were read in the House of Commons, it “occasioned a great laughter, to see gentlemen of so great penetration, and who had exclaimed against the proceedings of the [South Sea] Company, should at last been found to have been nibbling with the bait” (*Caledonian Mercury*, 22 December 1720). Thus all we can say is that unlike astronomy, mathematics, and physics, finance was not an area where Newton towered over his contemporaries.

## 7 Newton, finance, and crowd psychology

There is much evidence that most of the British public was taken in by the Ponzi argument published in the *Flying Post*, and in other forms in a variety of venues. This reflected the relatively low level of financial sophistication in the early modern society that had only recently been introduced to new financial institutions and products. On the other hand, those financial instruments were pretty simple, nothing like the derivatives that have been implicated in the Global Financial Crisis of 2008. And, just as in 1720, we have plenty of modern examples of the bulk of the investing public being bamboozled by specious claims, such as that stock options cost shareholders nothing, or that derivatives serve to disperse risk among those best able to bear it. Thus the key issue is the sophistication of investors relative to the sophistication of financial engineers. There is little sign that this has changed over the ages.

In Newton’s time, there was considerable expertise in valuing conventional financial deals. As an example, his friend Abraham de Moivre was an important mathematician who was at the forefront in the development of probability theory and actuarial science. He never obtained an academic position, but contrary to many reports that claimed he lived in poverty, he had a comfortable life tutoring children of the wealthy and providing advice on gambling wagers and on valuations of leases and annuities [3]. There were also the frequent government lotteries, which spawned a subindustry of intermediaries that enabled people to vary their levels of risk. So the society of 1720 did have non-trivial levels of financial expertise.

The South Sea Bubble posed a more challenging problem. There were no well-defined money flows, or even probability distributions. Aside from the Ponzi arguments, which deceived many, but were seen through by others, there were all sorts of vague rumors of flourishing trade, strategic alliances, and the like. Some, such as Archibald Hutcheson, saw those were not realistic, but most of the public, including Newton, fell for the humbug. While Newton was generally a careful and successful investor, he did not surmount the challenge of the South Sea Bubble.

Newton was brilliant, but he was not a universal genius. He did much to improve the efficiency of the Royal Mint by reducing the variation of gold coins in weight and fineness, for which purpose he discovered the famous “cooling law” [2]. However, he did not come up with sound statistical techniques that might have demonstrated his achievement. He played an important role in setting up the Longitude Prize, and helped dispose of many crackpot submissions to the body in charge of awarding that prize, but he was wrong in being skeptical about the feasibility of using clocks in that setting [17]. And, or course, he

spent years on alchemy and theology, with little to show for that effort. In the words of John Maynard Keynes [9],

Newton was not the first of the age of reason. He was the last of the magicians, the last of the Babylonians and Sumerians, the last great mind which looked out on the visible and intellectual world with the same eyes as those who began to build our intellectual inheritance rather less than 10,000 years ago.

That he was able to achieve so much in astronomy, mathematics, and physics was due largely to his coming at the right time, when solid foundations had been laid by people like Tycho Brache, Descartes, Galileo, Huygens, Kepler, and Pascal. In those areas he really was able to “stand on the shoulders of giants.” In the finance of the South Sea Bubble, as in astrology, he was standing in a swamp, and so even his brilliance did not save him from losses.

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