THE DUTCH MONETARY ENVIRONMENT DURING TULIPMANIA

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When the economics profession turns its attention to financial panics and crashes, the first episode mentioned is tulipmania. In fact, tulipmania has become a metaphor in the economics field. Should one look up tulipmania in *The New Palgrave: A Dictionary of Economics*, a discussion of the seventeenth century Dutch speculative mania will not be found. Guillermo Calvo (1987, p. 707), in his contribution to the *Palgrave* instead defines tulipmania as: "situations in which some prices behave in a way that appears not to be fully explainable by economic 'fundamentals.'"

Brown University economist, Peter Garber, is considered the modern tulipmania expert. In Garber's view, tulipmania was not a mania at all, but is explainable by market fundamentals. The explosive increases in the price of tulip bulbs, Garber says, can be explained by supply and demand factors. Rare bulbs were hard to reproduce and in the greatest demand. Thus, rare bulbs tended to rise in price. However, this does not explain the price history of the common Witte Croonen bulb, that rose in price twenty-six times in January 1637, only to fall to one-twentieth of its peak price a week later (Garber 1989, p. 556).

Garber admits in more recent works (2000, p. 80) that the "increase and collapse of the relative price of common bulbs is the remarkable feature of this phase of the speculation." Garber in his own words "would be hard pressed to find a market fundamental explanation for these relative price movements."

In addition to his "fundamentals" argument, Garber (1990b, p. 16) points to the Bubonic Plague as a possible cause of tulipmania. "Although the plague outbreak may be a false clue, it is conceivable that a gambling binge tied to a drinking game and general carousing may have materialized as a response to the death threat." This fatalistic extension of Keynes's "animal spirits" hypothesis is less than convincing.

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Economic historian, Charles Kindleberger, in spite of referring to tulipmania as "probably the high watermark in bubbles" (1984, p. 215) gives the episode scant treatment in his *Manias, Panics, and Crashes: A History of Financial Crises* (1989).[1] Kindleberger's view of tulipmania may be gleaned from a footnote on page seven of the second (1989) edition. "Manias such as . . . the tulip mania of 1634 are too isolated and lack the characteristic monetary features that come with the spread of banking after the opening of the eighteenth century."

It is highly probable that in Kindleberger's view the supply of money in 1630s Holland, did not undergo the sudden increase needed to create a speculative bubble. But this paper will present evidence to the contrary; the supply of money did increase dramatically in 1630s Holland, serving to engender the tulipmania episode.

After the fall of the Roman Empire, many different money systems prevailed throughout Europe. Kings were eager to strike their own gold and silver coins. These coins were typically made full legal tender, at a ratio of value fixed by the individual states. This supreme right of coinage was exercised and misused by every sovereign in Europe.

After the fall of Byzantium, coins struck with sacred images disappeared. These sacred images had kept the superstitious masses, not to mention states, from altering the coins. But, without these sacred images, those gold and silver coins underwent numerous alterations, to the point where it was difficult to follow either a coin's composition or value. This "sweating," "clipping," or "crying" of coins continued right up to the beginning of the seventeenth century, with all of Europe's various rulers being guilty. These kings quickly found that an empty state treasury could be filed by debasing the currency.

The powerful Charles V was among the most culpable for altering the value of money. These alterations in the Netherlands came by monetary decree. In 1524, Charles raised the value of his gold coins from 9 or 10, to 11 3/8 times their weight in silver coins. This manipulation created immense displeasure throughout the kingdom and in 1542, Charles returned to a ratio of ten to one, not by lowering the value of his gold coins back to their value before 1524, but by degrading his silver coins. Four years later, in 1546, Charles struck again suddenly raising the value of his gold coins to 13 1/2 times the value of silver coins. These actions served to first overvalue and undervalue gold in relation to its market value to silver,[2] with the result being that the overvalued money drove the undervalued money out of circulation. This is a phenomenon known as Gresham's Law. A silver ducat went from 54

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[1]In the 1996 edition of *Manias, Panics, and Crashes*, Kindleberger added a chapter on Tulipmania. Garber (2000, p. 77) believes that Kindleberger added the chapter "to critique [Garber's] view that the tulipmania was based upon fundamentals."

[2]The ratio of silver to gold from 1524 to 1546, based on the average for Europe, fluctuated between approximately 10 ½ and 11 (Rich and Wilson, eds. 1975, p. 459).

grains fine down to 35 grains fine (Del Mar 1969a, p. 345). Thus, with silver coins being the primary circulating medium of Holland, the new debased and overvalued silver coins drove the undervalued gold coins from circulation. This action raised the value of gold nearly 50 percent and by this device, Charles was able to replenish his dwindling treasury.

This transgression, in 1546, wrote Del Mar (1969a, p. 348) may have been "the straw that broke the patience of his long suffering subjects." A revolution was then sparked in the Netherlands and although Charles was able to check any upheaval during his reign, with the accession of Phillip the Bigot, the smoldering revolutionary fires burst into intense flames. After the "Confederation of Beggars" formed in 1566, six years later the revolution was proclaimed.

One of the first measures instigated by the revolutionary government was "free" or "individual" coinage. Helfferich (1969, p. 370) explains:

> The simplest and best-known special case of unrestricted transformation of a metal into money is that known as "the right of free coinage," or "coinage for private account." The State will mint coins out of any quantity of metal delivered to it, either making no charge to the person delivering the metal, or merely a very small charge to cover cost. The person delivering the metal receives in coin from the mint the quantity of the metal delivered up by him either without any deduction or with a very small deduction for seigniorage.

The idea of free coinage was brought to the Netherlands from the Dutch East Indians, who inherited the concept from the Portuguese. The practice was originated by the degenerate Moslem governments of India, and was copied by Mascarenhas in 1555 (Del Mar 1969a, pp. 344–51).

Free coinage was an immediate success. Possessors of silver and gold bullion obtained in America, "had vainly sought to evade the coinage exactions of the European princes; now the door of escape was open; they had only to be sent to Holland, turned into guilders and ducats, and credited as silver metal under the name of sols banco" (Del Mar 1969a, p. 351).

As the seventeenth century began, the Dutch were the driving force behind European commerce. With Amsterdam as capital of Holland, it served as the central point of trade. Amsterdam's currency consisted primarily of the coins of the neighboring countries and to a lesser extent its own coins. Many of these foreign coins were worn and damaged, thus reducing the value of Amsterdam's currency about 9 percent below that of "the standard" or the legal tender. Thus, it was impossible to infuse any new coins into circulation. Upon the circulation of newly minted coins, these new coins were collected, melted down, and exported as bullion. Their place in circulation was quickly taken by newly imported "clipped" or "sweated" coins. Thus, undervalued money was driven out by overvalued or degraded money, due to the legal tender status given these degraded coins (Smith 1965, p. 447).

To remedy this situation, the Bank of Amsterdam was originated in 1609. The Bank was to facilitate trade, suppress usury, and have a monopoly on all trading of specie. But the bank's chief function was the withdrawal of abused and counterfeit coin from circulation (Bloom 1969, pp. 172–73). Coins were taken in as deposits, with credits, known as bank money, issued against these deposits, based not on the face value of the coins, but on the metal weight or intrinsic value of the coins. Thus, a perfectly uniform currency was created. This feature of the new money, along with its convenience, security and the city of Amsterdam's guarantee,[3] caused the bank money to trade at an agio, or premium over coins. The premium varied (4 to 6 and 1/4 percent), but generally represented the depreciation rate of coin below its nominal or face value (Hildreth 1968, p. 9).

One of the services that the bank provided was to transfer, upon order from a depositor, sums (deposits) to the account of creditors, by book entry. This is called a giro banking operation. This service was so popular that the withdrawal of deposits from the bank became a very rare occurrence. If a depositor wanted to regain his specie, he could easily find a buyer for his bank money, at a premium, due to its convenience. Additionally, there was a demand for bank money from people not having an account with the bank (Clough 1968, p. 199). As Adam Smith (1965, pp. 447–48) related in the *Wealth of Nations*: "By demanding payment of the bank, the owner of a bank credit would lose this premium." The city of Amsterdam's guarantee, in addition to the requirement that all bills drawn upon or negotiated in Amsterdam, in the amount of six hundred guilders or more, must be paid in bank money, "took away all uncertainty in the value of the bills," and thus forced all merchants to keep an account at the bank, "which necessarily occasioned a certain demand for bank money."

Smith (1965, pp. 448-49) goes on to explain the mechanics of how the Bank of Amsterdam issued bank money. The Bank would give credit (bank money in its books for gold and silver bullion deposited, at roughly 5 percent below the bullion's then current mint value. At the same time as this bank credit was issued, the depositor would receive a receipt that entitled the depositor, or bearer, to draw the amount of bullion deposited from the bank, within six months of the deposit. Thus, to retrieve a bullion deposit, a person had to present to the bank: (1) a receipt for the bullion, (2) an amount of bank money equal to the book entry, and (3) payment of a 1/4 percent fee for silver deposits, or 1/2 percent fee for gold deposits. Should the six month term expire with no redemption, or without payment of a fee to extend for an additional six months, "the deposit should belong to the bank at the price at which it had been received, or which credit had been given in the transfer books." Thus, the bank would make the 5 percent fee for warehousing the deposit, if not redeemed within the six-month time frame. The higher fee

[3]The City of Amsterdam was responsible for the coin or bullion's security while at the bank, against fire, robbery, or any other accident.

charged for gold was due to the fact that gold was thought to be riskier to warehouse, because of its higher value. A receipt for bullion was rarely allowed to expire. When it did happen, more often than not, it was a gold deposit because of its higher deposit fee.

This system created two separate instruments that were combined to create an obligation of the Bank of Amsterdam. As Smith (1965, p. 450) explains:

> The person who by making a deposit of bullion obtains both a bank credit and a receipt, pays his bills of exchange as they become due with his bank credit; and either sells or keeps his receipt according as he judges that the price of bullion is likely to rise or to fall. The receipt and the bank credit seldom keep long together, and there is no occasion that they should. The person who has a receipt, and who wants to take out bullion, finds always plenty of bank credits, or bank money to buy at ordinary price; and the person who has bank money, and wants to take out bullion, finds receipts always in equal abundance.
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> The holder of a receipt cannot draw out the bullion for which it is granted, without re-assigning to the bank a sum of bank money equal to the price at which the bullion had been received. If he has no bank money of his own, he must purchase it of those who have it. The owner of bank money cannot draw out bullion without producing to the bank receipts for the quantity which he wants. If he has none of his own, he must buy them of those who have them. The holder of a receipt, when he purchases bank money, purchases the power of taking out a quantity of bullion, of which the mint price is five per cent. above the bank price. The agio of five per cent. therefore, which he commonly pays for it, is paid, not for an imaginary, but for the real value. The owner of bank money, when he purchases a receipt, purchases the power of taking out a quantity of bullion of which the market price is commonly from two to three per cent. above the mint price. The price which he pays for it, therefore, is paid likewise for a real value. The price of the receipt, and the price of the bank money, compound or makeup between them the full value or price of the bullion.

The same system that Smith describes above, also applied to coins that were deposited with the bank. Smith (p. 451) does assert that deposits of coinage were more likely to "fall to the bank" than deposits of bullion. Due to the high agio (Smith indicates typically five percent) of bank money over common coin, the paying of the bank's six-month storage fee created a loss for holders of receipts.

The amount of bank money for which the receipts had expired, in relation to the total amount of bank money was very small. Smith (p. 451) writes:

> The bank of Amsterdam has for these many years past been the great warehouse of Europe for bullion, for which the receipts are very seldom allowed to expire or, as they express it, to fall to the bank. The far greater part of the bank money, or of the credits upon the books of the bank, is supposed to have been created, for these many years past, by such deposits which the dealers in bullion are continually both making and withdrawing.

The bank was highly profitable for the city of Amsterdam. Besides the aforementioned warehouse rent and sale of bank money for the agio, each new depositor paid a fee of ten guilders to open an account. Any subsequent account opened by that depositor would be subject to a fee of three guilders. Transfers were subject to a fee of two guilders, except when the transfer was for less than 600 guilders. Then the fee was six guilders (to discourage small transfers). Depositors were required to balance their accounts twice a year. If the depositor failed to do this, he incurred a 25 guilder penalty. A fee of 3 percent was charged if a depositor ordered a transfer for more than the amount of his account (Smith 1965, p. 454).

In the beginning, the Bank of Amsterdam did not perform a credit function; it was strictly a deposit bank, with all bank money backed 100 percent by specie. The administration of the Bank of Amsterdam was the charge of a small committee of city government officials. This committee kept the affairs of the bank secret. Because of the secretive nature of its administration, it was not generally known that individual depositors had been allowed to overdraw their accounts as early as 1657. In later years, the Bank also began to make large loans to the Dutch East India Company and the Municipality of Amsterdam. By 1790 word of these loans became public and the premium on the bank money (usually 4 percent, but sometimes as high as 6 and 1/4) disappeared and fell to a 2 percent discount. By the end of that year the Bank virtually admitted insolvency by issuing a notice that silver would be sold to holders of bank money at a 10 percent discount. The City of Amsterdam took the Bank over in 1791, and eventually closed it for good in December of 1819 (Conant 1969, p. 289).

The effects of free coinage combined with the stability of the Bank of Amsterdam, created the impetus that channeled the large amounts of precious metals being discovered in the Americas, and to a lesser degree in Japan, toward Amsterdam. The Bank was also prohibited from exporting uncoined precious metals; it had a duty to send its metal to the mint (Van Dillen 1964, pp. 92–93).

After Columbus came to America in 1492 and Cortez invaded Mexico in 1519, an influx of precious metals began to enter Europe, principally through Spain. The output of these fertile mines in the Americas reversed a trend of lower prices in Europe that had been caused by the combination of static metals production in Europe and rapidly expanding industry and commerce. Production in the New World was further increased after the discovery of Peru's Huancavelica mercury mine in 1572. The amalgamation process, which was invented in the mid-sixteenth century, depended heavily on mercury. This process greatly increased the efficiency of the silver production process (Hamilton 1929, pp. 436–43).

The Japanese silver mining industry was also expanding at the same time, but without the benefit of the mercury-amalgam process. The Dutch East India Company had a virtual monopoly on trade with Japan and of course access to their precious metals production from 1611 through the end of the

century. Del Mar (1969b, pp. 307–8) points out that, "from 1624 to 1853 the Dutch were the only Europeans permitted to trade with Japan," managing "to obtain about one-half of the total exports of the precious metals from Japan."

Flynn (1983, pp. 162, 164) indicates that:

> American output of bullion, in conjunction with the output of Central European and Japanese mines, increased the world's supply of silver sufficiently to slowly drive its market value downward. That is, there was price inflation in the sixteenth century. American and non-American mines produced such an enormous quantity of silver that its market value dropped to a level below the cost of producing it in a growing number of European mines.

Francis Walker (1968, p. 135) validates this view: "the astonishing production of silver at Potosi began to be felt. From 1570 to 1640 silver sank rapidly. Corn rose from about two oz. of silver the quarter, to six or eight oz." Walker (1968, p. 135) goes on to quote David Hume:

> By the most exact computations that have been formed all over Europe, after making allowance for the alterations in the numerary value, or the denomination, it is found that the prices of all things have risen three, four, times since the discovery of the West Indies.

The table in exhibit one illustrates this large influx of precious metals into Europe. Bullion flowed from Spain to Amsterdam due to both trade and seizure of treasure. As Violet Barbour (1963, pp. 49–50) relates:

> In 1628 occurred the famous capture of the Spanish treasure fleet by Piet Heyn, which netted 177,537 lbs. Weight of silver, besides jewels and valuable commodities, the total estimated to come to 11 ½ to 15 million florins. More important than such occasional windfalls was the share of Dutch merchants in the new silver brought twice a year to Cadiz from the mines of Mexico and Peru, a share which represented in part the profits of trade with Spain and through Spain with the New World. Just what that share was from year to year we do not know. Only a few fragmentary estimates for non-consecutive years in the second half of the century have come to light. According to these the Dutch usually carried off from 15 to 25 per cent of the treasure brought by the galleons and the flota, their share sometimes exceeding, sometimes falling below the amounts claimed by France or Genoa.

Del Mar (1969b, pp. 326–27) echoes this view:

> The honest Abbe Raynal explains the whole matter in a few words: whilst the Portuguese robbed the Indians, the Dutch robbed the Portuguese. "In less than half a century the ships of the Dutch East India Company took more than three hundred Portuguese vessels . . . laden with the spoils of Asia. These brought the Company immense returns." Much of eastern gold, which found its way to Amsterdam was proceeds of double robbery.

Further evidence of an exceptionally large increase in the supply of money in the Netherlands is provided by an excerpt from a table of the total mint output of the South Netherlands, 1598–1789, which is displayed in Figure 2. These figures point to the explosive increase in the supply of money from 1630–38, the later part of which tulipmania took place (1634–37).

Figure 3 displays the balances of the Bank of Amsterdam. Total balances more than doubled from less than four million florins in 1634 to just over eight million in 1640. More specifically from January 31st 1636 to January 31st 1637—the height of the tulipmania—Bank of Amsterdam's deposits increased 42 percent.

As the above evidence indicates, free coinage, the Bank of Amsterdam, and the heightened trade and commerce in Holland served to attract coin and bullion from throughout the world. As Del Mar (1969a, p. 351) writes:

> Under the stimulus of "free" coinage, an immense quantity of the precious metals now found their way to Holland, and a rise of prices ensued, which found one form of expression in the curious mania of buying tulips at prices often exceeding that of the ground on which they were grown.

Del Mar (1969a, p. 352) goes on to discuss the end of Tulipmania:

> In 1648, when the Peace of Westphalia acknowledged the independence of the Dutch republic, the latter stopped the "free" coinage of silver florins and only permitted it for gold ducats, which in Holland had no legal value. This legislation discouraged the imports of silver bullion, checked the rise of prices, and put an end to the tulip mania.

Del Mar concedes in a footnote that the mania had already been discouraged on April 27th, 1637 by a resolution of the States-General that canceled all contracts.

By 1636, a formal futures market had developed for the tulip market. Trading took place in taverns in groups, known as "colleges" where rules governed bidding and fees (Garber 2000, p. 44). As Garber (2000, p. 45) explains:

> Neither party intended a delivery on the settlement date; only a payment of the difference between the contract and settlement price was expected. So, as a bet on the price of bulbs on the settlement date, this market was not different in function from currently operating futures markets.

The crash of tulip prices in 1637 left the growers of the bulbs to absorb the majority of the financial damage of the mania. With the government basically canceling all contracts,[4] growers could not find new buyers or recover money owed them by buyers supposedly under contract. As Simon Schama (1987, pp. 361–62) describes:

[4]The Court of Holland judged the tulip sales to be bets under Roman law (Gelderblom and Jonker n.d.).

> In any event, the magistrates of the Dutch towns saw niceties of equity as less pressing than the need to deintoxicate the tulip craze. Their intervention was hastened by the urgency of returning the genie speculation to the bottle from which it had escaped, and corking it tightly to ensure against any recurrence. To some extent, they could feel satisfied that the ineluctable operations of Fortuna had already punished the foolhardy by taking them from rags to riches and back again in short order. But they still felt impelled to launch a didactic campaign in tracts, sermons and prints againstfolly, since its special wickedness had been in leading the common people astray.

In spite of the short duration of the tulip craze, and assertions by other authors to the contrary, there is evidence of financial pain that resulted from Tulipmania. A chart depicting the number of annual bankruptcies in Amsterdam, Leiden, Haarlem, and Groningen from 1635–1800, presented by Messrs. van Houtte and van Buyten (1977, p. 102), reflects a doubling in the number of bankruptcies in Amsterdam from 1635 to 1637. It would be hard to imagine that only tulip growers made up this increase in the number of bankruptcies. I suspect some of the "foolhardy masses" were among this group.

The story of Tulipmania is not only about tulips and their price movements, and certainly studying the "fundamentals of the tulip market" does not explain the occurrence of this speculative bubble. The price of tulips only served as a manifestation of the end result of a government policy that expanded the quantity of money and thus fostered an environment for speculation and malinvestment. This scenario has been played out over and over throughout history.

Like other periods of heightened speculation, Dutch interest rates "declined sharply" in the seventeenth century according to Homer and Sylla (1996, p. 141) and tulip bulb futures could be traded with no margin required (Garber 2000, p. 44). The tulip trading clubs were "soundly organized" and "proved very effective in smoothing transactions" (Gelderblom and Jonker n.d.). Dash (1999, p. 110) writes that the masses speculated in the tulip trade as an outgrowth of "an increasingly feverish boom in the Dutch economy as a whole, which began in 1631 and 1632 and gathered pace toward the end of the decade and meant that in many cases there was more money around than ever before."

As more novice florists became interested in tulip speculation, professional growers introduced "an unusually large number of new varieties in 1634, which had the effect of depressing prices," but provided an avenue for commoners to participate in the mania (Dash 1999, p. 111).

But what made this episode unique was that the government policy did not expand the supply of money through fractional reserve banking which is the modern tool. Actually, it was quite the opposite. As kings throughout Europe debased their currencies, through clipping, sweating or by decree, the Dutch provided a sound money policy which called for money to be backed one hundred per cent by specie. This policy, combined with the occasional

seizure of bullion and coin from Spanish ships on the high seas, served to attract coin and bullion from throughout the world.

The end result was a large increase in the supply of coin and bullion in 1630s Amsterdam. Free coinage laws then served to create more money from this increased supply of coin and bullion, than what the market demanded. This acute increase in the supply of money served to foster an atmosphere that was ripe for speculation and malinvestment, which manifested itself in the intense trading of tulips.

Figure 1
Spanish Imports of Fine Gold and Silver from America (in grams)

Period	Silver	Gold
1503–1510		4,965,180
1511–1520		9,153,220
1521–1530	148,739	4,889,050
1531–1540	86,193,876	14,466,360
1541–1550	177,573,164	24,957,130
1551–1560	303,121,174	42,620,080
1561–1570	942,858,792	11,530,940
1571–1580	1,118,591,954	9,429,140
1581–1590	2,103,027,689	12,101,650
1591–1600	2,707,626,528	19,541,420
1601–1610	2,213,631,245	11,764,090
1611–1620	2,192,255,993	8,855,940
1621–1630	2,145,339,043	3,889,760
1631–1640	1,396,759,594	1,240,400
1641–1650	1,056,430,966	1,549,390
1651–1660	443,256,546	469,430
Total	16,886,815,303	181,333,180

Source: Hamilton (1934; reprinted in Clough 1968, p. 150).

Figure 2
Total Mint Output of the South Netherlands, 1598–1789 (in guilders)

	Gold	Silver	Copper	Total
1628–29	153,010	2,643,732	4,109	2,800,851
1630–32	364,414	8,838,411	6,679	9,209,503
1633–35	476,996	16,554,079		17,031,075
1636–68	2,917,826	20,172,257		23,090,083
1639–41	2,950,150	8,102,988		11,053,138
1642–44	2,763,979	1,215,645	47,834	4,027,458

Source: Jan A Van Houtte and Leon Van Buyten (1977, p. 100).

Figure 3
Bank of Amsterdam (in florins)

Years (on the 31st of January)	Total balances	Metal Stock
1630	4,166,159	3,105,449
1631	3,784,047	2,976,742
1632	3,636,079	3,281,113
1633	4,272,224	3,866,890
1634	3,995,666	3,474,527
1635	3,860,342	3,416,112
1636	3,992,338	3,486,306
1637	5,680,522	5,315,576
1638	5,593,750	5,256,606
1639	5,802,729	5,446,002
1640	8,075,358	7,823,964
1641	8,056,232	8,356,437

Source: Van Dillen (1964, p. 117).

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