The Republic's Money: Money and the Economy

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The topic assigned to me in this Masterclass on 'The Republic's Money' is *Geld en bedrijf*, a formulation that most economic historians, I suspect, would prefer to see turned around. Rather than giving priority to money over economic activity, most economic historians would be more comfortable with the emphasis placed on the 'real economy' - production, technology, organization, labor - with the monetary phenomena that flow from these real factors, that emerge to accommodate them, placed second.

The formulation as presented to me implies an active rather than a passive role for money in economic history; it invites us to consider seriously the claims of monetarists and the autonomous role of financial institutions. This is not a perspective that comes naturally to someone trained as an agrarian historian. Indeed, in *The Dutch Rural Economy in the Golden Age*[1] I discussed price history only in one of the final chapters, and declared its value to be chiefly in its capacity to *reflect* changes in the real economy. However, my more recent book, co-authored with Ad van der Woude, the chapter on money comes much earlier, in our account of the structures that shape the economy.[2] To be sure, we continue to affirm the primacy of the real economy over monetary forces (p. 163), but we acknowledge the role of financial institutions in giving shape - and at times direction - to the Republic's economy.[3]

Regardless of one's theoretical posture regarding the active or passive role of money and about the institutions that govern its use, the fact remains that the base of knowledge about the Republic's money upon which any historical interpretations must rest is very small. Moreover, the generalizations that have come down to us from historians of an earlier era (most of the available literature dates from the interbellum) are often contradictory.

In many respects the money of the Republic was the money of Europe, and the Republic's financial institutions were part and parcel of a broad and complex international historical process. No one can tell the story of Dutch money without constantly looking across the borders to the rest of Europe. The very term *florijn* reminds us of that fact. Yet, the common ingredients of monetary history combined in the Republic to achieve something unusual. Somehow, people *used* money and *adapted* financial institutions in ways that distinguish the Republic from other societies of the time. But, whether we think in terms of Dutch exceptionality (*De Nederlandse geschiedenis als afwijking van het algemeen menselijk patroon*[4]) or of Dutch precociousness (*The First Modern Economy*[5]), the problem remains that we have at present only suggestive fragments of historical information, and no general framework in which to interpret the Republic's monetary experience. Therefore, this essay will more often pose questions than answer them.

The functions of money and its supply in the Republic

The functions of money are conventionally defined as 1. providing a unit of account, and 2. serving as a means of payment.[6]

To function as a unit of account - to be the numeraire for the valuation of all marketed goods and services - a monetary unit must be defined and defended, neither of which is as simple as it seems.[7] The monetary standard of the state and the monetary practice of the market have often been two quite different things. Indeed, the entire first century of the Republic's monetary history was spent bringing these two into conformity.[8]

To function as a means of payment a currency's usefulness depends on the answers to three questions: 1. is it recognized as a medium of exchange *now*? 2. will it be recognized *in the future* at its current purchasing power (i.e., does it serve as a store of value)? 3. are there facilities to use this currency *over space*, in fulfilling obligations internationally. In short, the usefulness of a currency as a means of payments depends on acceptance, stability, and transferability (today, convertibility). Not all currencies are equally strong in all three dimensions. (Today, the U.S. dollar continues to excel in 1 and 3, even though the *Deutschmark* has been superior in 2.) A feature of pre-modern coinages, also in the Republic, was the emergence of specialized coins for functions 1 and 3: the *standpenningen* for mainly domestic use and the *negotiepenningen* for particular foreign markets.

How much money circulated in the Republic, and how useful was it? Estimating the money supply would seem to be the obvious starting point in any study of a country's monetary and financial history, but in the case of the Republic there is virtually no literature on this subject. Only a couple of perhaps foolhardy foreigners have so much as touched on this subject.[9] The reason for this is not far to seek. Money flowed freely, and silver and gold bars (bullion) flowed with few effective restrictions, in and out of the Republic. In the absence of records of these large flows, the traditional method of estimating the money supply would seem to be powerless. That method is based on the measurement of mint output.

Numismatic studies provide reliable information about the production of coin in most periods (although the poorly regulated small mints in the Republic's eastern provinces form an exception to this rule).[10] Knowing the annual output of the mints, one can estimate the money stock once one settles on an average period of circulation for the produced coins (before they disappear, wear out, and are returned to the mints for reminting).

But, of course, much of the Republic's mint output was intended for export. The *negotiepenningen* were coins modeled after those already in use in international trade in the chief zones where the Republic always ran balance of trade deficits: the Baltic (which favored the *rijksdaalder*), the Levant (where the *leeuwendaalder* ruled), and Asia (which was partial to the *dukaat*). These and many other Dutch coins flowed out of the Republic in an unending stream.

It is equally obvious that foreign coin entered the Republic, where it circulated along with the domestically-minted supply. This was notoriously true between 1612 and 1659, when a slightly over-valued Southern Netherlands coinage - the *ducaton* and *patacon* - flooded the Republic.

While we know something about the nature of these in- and outflows, we know little about their quantitative volume. The volume of minting in the Southern Netherlands is known. Fueled by the massive silver shipments from Spain to support the Spanish military effort during the Eighty Years' War, southern mints produced more coin in the 1612-1659 period than did all the mints of the Republic. We also know that the large trade deficits incurred by the Spanish Netherlands with the Republic (a classic example of *handel op de vijand*) sent most of the massive southern coinage north, a movement strengthened by the workings of Gresham's Law (the southern coins had the same face value as similar Republican coins, but contained 4 percent less silver).

As for the export of coin, we can refer to the studies of international bullion flows by Artur Attman.[11] He estimates trade balances between the Netherlands and the major deficit regions and then proceeds to guess at the value of gold and silver that must have flowed from the Republic to cover those deficits. The estimated outflows are enormous, exceeding total Republican mint output at every date from 1600 to 1780. One might, as I do, question Attman's estimates, but the fact remains that bullion exports and the export of Dutch-minted coin are not the same thing. The latter was a subset - perhaps a small one - of the former, as Spanish and other foreign coin as well as bullion proper figured prominently in Dutch monetary exports.

These observations will suffice to indicate the considerable obstacles that stand in the way of estimating the size of the money supply that actually circulated within the Republic. In *Nederland 1500-1815* Van der Woude and I threw caution to the winds to propose rough estimates of the Republic's money supply at several benchmark dates.[12] These estimates are guided by evidence on mint production and in- and outflows of coin (with all the caveats alluded to above). They are reinforced by another source, one not used before to address this issue: the probate inventories.

Probate inventories usually record the cash on hand in the home of the deceased, and often specify precisely which coins - *ducaten*, *rijders*, *rijksdaalders*, *Spaanse stucken van acht*, etc. Of course, the cash on hand at the time of death may not be typical of the cash reserves of the living, but the evidence, which is abundant and awaits a fuller investigation, is intriguing. Hollanders held enormous cash reserves. Probate inventories do not usually illuminate the possessions of the poor, but where they do, as in Thera Wijssenbeek's study of eighteenth century Delft and Anne McCants current work on Amsterdam orphans, the surprising fact is uncovered that poor households - many with *negative* net assets - had 20 to 30 guilders of cash on hand, which was the equivalent to at least as many days pay for a manual worker.[13]

Among the better off households, cash reserves were usually in the hundreds, and among the rich often in the thousands of guilders. These findings, which deserve a more comprehensive study than has occurred thus far, seem to confirm what the minting records suggest: that the Republic's money supply, adjusted for population growth and price inflation - the real, per capita money stock - grew rapidly in the century after the Revolt, and continued to grow in the eighteenth century as well. A per capita money supply that may not have exceeded 5 guilders before the Revolt, stood near 60 guilders in 1690 and grew to approximately 100 guilders a century later.

When we compare these estimates with the most recent estimates of the French and English money supplies (Table 1), the Republic stands out in two ways: 1. the Republic had a much larger per capita stock, two to three times as large as England's, the nearest competitor; 2. the differentials between the Republic and these two countries grew larger, no only in the seventeenth century, but also in the eighteenth.

Table 1. Estimates of the money supply in England, France, and the Dutch Republic, 1540-1790

	England (£)	France (l.t.)	Republic (guilders)
1540	1.5 million	45 million	5 million
1690	12 million	500 million	120 million
1790	25 million*	2100 million	200 million
Per capita converted to guilders	England	France	Republic
1540	6.3	2.5	5
1690	29.4	18.5	60
1790	33.4*	35.4	100

*Coinage only; bank note issue, which played a major role in eighteenth century England, is not included in these estimates.

Sources: N.J. Mayhew, 'Population, Money Supply, and the Velocity of Circulation in England, 1300-1700', *Economic History Review* 48 (1995) 238-257; James C. Riley and John J. McCusker, 'Money Supply, Economic Growth, and the Quantity Theory of Money: France, 1650-1788', *Explorations in Economic History* 20 (1983) 274-293; Debra Glassman and Angela Redish, 'New Estimates of the Money Stock in France, 1493-1680', *Journal of Economic History* 45 (1985) 31-46; L.E. Challis, *The Tudor Coinage* (Manchester 1978); De Vries and Van der Woude, *Nederland 1500-1815*, Table 4.2.

Now, if these conclusions are not far from the mark, they raise a number of important questions for the Republic's monetary regime and about the way people used their money. Why was the demand for cash balances so large? Were these large balances a sign of prosperity or rather a symptom of a poorly functioning financial system? Why did the stock of money grow, relative to per capita income, in the eighteenth century? In the light of the quantity equation, MV = PT, the growth of M (the stock of money) in a period of minor rise of the price level (P) and of apparently little growth the the volume of transactions (T) leads us to the necessary conclusion that the velocity of circulation (V) must have declined. Did hoarding become more common in the eighteenth century than before? This counter-intuitive conclusion, to which we are led by the terms of the monetary identity, leads us directly to a second theme, the role of banking and credit creation in augmenting the basic money supply of the Republic.

Banking and credit creation

Modern measurements of the money supply make a distinction between 'high-powered money' - the cash in circulation - and broader indicators, which in the United States go by the names M1 (cash plus demand deposits - checking account balances) and M2 (M1 plus time deposits - savings account balances). As checks and credit operations supplement the basic money supply in satisfying the demand for means of payment they also speed the velocity of circulation, thereby increasing the effective supply. Each dollar, or guilder, works harder, as it were, in covering the transactions of the economy.

What was the experience of the Republic? Except in brief emergency situations, the Republic issued no paper money, and had no banking institutions that did so. In this respect, the late-eighteenth century Republic was very conservative, avoiding the pitfalls of French experience (with John Law's monetary scheme of 1720 and the revolutionary assignat), but also avoiding the advantages of English practice, where bank notes substantially supplemented the coinage measured in Table 1, above.

The Republic issued no bank notes, but this is not to say that there was no supplement to the money stock of *klinkende munt*. To begin with, there were the bills of exchange (*wisselbrieven*), the classic credit instrument of international trade. Their use spread from Italy to Flanders in the late middle ages, and on to the Northern Netherlands in the sixteenth century. I will not rehearse here the story of the spread and refinement of the bill of exchange,[14] except to note that its spread to the commercial centers of the north was not especially rapid. Baltic trade had never made much use of the bill of exchange, the merchants of the Hanseatic League preferring a simpler debt instrument known as the letter obligatory. After the Revolt, as commercial practices dependent upon the bill of exchange spread with the diaspora of Flemish traders, Amsterdam proved resistant to the spread of bills among parties who were not part of the underlying commodity trade from which a given bill had originated. Thus, the Bank of Amsterdam, or *Wisselbank*, was established in 1609 in part to stop what the *Keur van 1608* described as '*menichvuldich assigneren ende overwijsen van d'een op d'ander, bijnae sonder eynde*'. But soon the practices pioneered in Antwerp were also accepted in the north, and, indeed, extended and refined, as the bills trade of all Europe came to be concentrated in Amsterdam. The bill of exchange became more than simply 1. a short-term credit instrument between buyer and seller and 2. a means of clearing payments between distant places without the actual transport of coin. The bill became negotiable, a means of payment independent of the originating international transaction. This occurred as the *assignment* of bills became legal, as each person who accepts a bill takes responsibility for payment if the original drawee (*getrokkene*) defaults. It occurred also as bills became *discountable*, when the bearer surrenders a bill to a third party before the due date in consideration of a cash payment.

When all this was achieved, bills became a flexible supplement to the money supply and extended the currency's reach to distant places (fulfilling the third criterion for a useful means of payment). The Bank of Amsterdam was founded as a deposit bank to provide for the orderly payment of bills of exchange; in fact its charter obligated merchants to present all bills valued at 600 guilders at the bank for payment. The fast and safe transfer of funds from account to account was undoubtedly a convenience for merchants, and it must have speeded the velocity of circulation of the money held in deposit. Account holders at the Amsterdam *Wisselbank* numbered some 2,000 by the 1650s, and over 1,500 by 1700. Moreover, Middelburg, Delft, and Rotterdam also established banks that provided these same services, although on a much smaller scale. Middelburg's bank had over 400 depositors by 1700 and deposits of about two million guilders, about one-tenth of the size of Amsterdam's deposits.

The *Wisselbank* archive includes account books recording transfers to and from each account holder. These would seem to be an under exploited resource. I am personally aware of only a single student research paper that examined the records for a single year, 1707, of the 26 largest depositors in the Bank of Amsterdam. These 26 depositors, one percent of all account holders, were responsible for 33 percent of the Bank's total turnover for this year. The largest of them, the banker George Clifford, generated 1524 transactions involving nearly 11 million guilders. Yet his average deposit in the Bank was only a small fraction of this amount, about one-twentieth. Clifford was no typical depositor, but his ratio of deposits to transactions *was* typical, it seems, for all 26 large depositors examined in this study generated over 25,000 transactions with an average value of over 3,000 guilder each, for a total turnover of 79 million guilders.

To be frank, I am not certain what to make of these findings. They seem to reveal a frantic velocity of circulation that directly contradicts the claim made by the great historian of the *Wisselbank*, J. G. van Dillen, that after 1683, when specie deposits came to be accepted, the Bank's assets tended to sit in the vaults for long periods of time.[15] The reason for this was the Bank's innovation of issuing receipts (*recepissen*) to the depositors of specie. These receipts could circulate as a means of payment for the duration of the deposit. We see here a limited form of note issue. Of course, these receipts did not much augment the money supply, since a guilder (technically, a guilder worth of foreign coin or bullion) sat in the vaults of the *Stadhuis* for every guilder in receipts that circulated on the streets.

The *Wisselbank* did not issue notes, nor did it (legally) make loans. It was not a modern fractional reserve bank, and it is, according to Herman van der Wee, a puzzle why it did not evolve in this direction. He sees the Bank of Amsterdam as a continuation of Italian banking practices, while the more expansive practices pioneered at Antwerp were neglected, only to be taken up by the English when the Bank of England was established in 1693. There is much merit in Van der Wee's formulation of the basic historical pattern of banking development. But it may be that the puzzling conservatism of the *Wisselbank* can be explained if we come to know more about the role of the *kassiers*, the private bankers who functioned in the Republic.

They remain shadowy figures. It was the intention of the city fathers to outlaw the *kassiers* when they established the *Wisselbank*. But by 1621 they operated openly again, and after 1659, when the distinction between bank money (*bankgeld*) and circulating money (*courantgeld*) was formalized by a bank money premium, the *agio*, it became common for merchants to deal with both the Bank and a *kassier*.

Unlike the Bank, the *kassiers* offered credit - short-term credit in the form of advances on deposited security, and account overdrafts. Unlike the Bank, they discounted bills of exchange and, after the 1680s, they handled *promessen*, the promissory notes that served domestic trade as bills of exchange served international trade. These *promessen* were credit instruments with a duration of ten days. Thereafter they had no legal standing. But, it appears that among traders and *kassiers* they circulated much longer.[16]

The *kassiers* themselves held accounts in the *Wisselbank*, and provided those commercial services the *Wisselbank* did not. But were these *kassiers* important enough to alter the characterization of Dutch banking made by Professor van der Wee? We do not know. Since the *kassiers* do not appear to have lain the foundations of later commercial banks, it is tempting to dismiss them as a marginal phenomenon. But they were numerous - the *Personele Quotisatie* of 1742 identified 84 of them with a taxable annual income above 600 guilders - and they were not small fry - their average income stood at 2,000 guilders each. But the question remains, did bills of exchange, specie receipts, and *kassiers promessen* circulate on a scale that measurably augmented the basic money supply? We do not know.

Saving and investing

The augmentations of the money supply discussed above all involve some form of credit creation. An influential definition of capitalism, that of Joseph Schumpeter, claims that credit creation stands at its core; it is credit that diverts resources from their customary uses, that introduces innovation to the circular flow of economic life.

Individuals can, of course, extend credit without the assistance of formal institutions, except for the legal institutions that enforce such private contracts. But the mark of a modern capitalist economy is the presence of formal institutions of financial intermediation, standing between the mass of savers and the mass of borrowers. The task of these institutions is to direct the savings to the most creditworthy of the borrowers, to select the most promising new ventures, and to mobilize the idle balances of savers.

One thing we believe we know about the Republic's money habits is that these folks were great savers! In an unintentionally amusing section of Simon Schama's *Embarrassment of Riches* he describes the profligate spending that came inevitably with growing wealth, or, in other words, the erosion of Calvinist probity by that treacherous temptress Dame Money. Schama used the example of Cornelis de Jonge van Ellemeet, one of the Republic's richest men. As his income grew - he became *Ontvanger Generaal van de Generaliteit*, a lucrative office - he spent more and more. He indulged himself in luxuries that would presumably have shocked his austere, sober-sided ancestors. But what Schama could not deny was that this increased spending formed a *diminishing percentage* of De Jonge van Ellemeet's income. His propensity to save did not decline, it rose - from an already impressive 50 percent of income in 1685-1689 to an extraordinary 67 percent by 1704 (when 35 percent of his 'profligate' spending was actually tax payments!).[17] Schama sought to deflect our attention from this inconvenient fact by accusing De Jonge van Ellemeet of war profiteering; the fact remains that his propensity to consume would not have impressed the genuine rakes so numerous among the contemporary British or French aristocracies.

De Jonge van Ellemeet, it is safe to say, was representative of nothing, but there were tens of thousands of Netherlanders in the Golden Age who were impressive savers. They included the 1,500-odd VOC shareholders who usually shared over one million guilders in dividends every year, and the tens of thousands - Sir William Temple, the English ambassador, claimed in 1672 that they numbered over 60,000 - who owned a share of the public debt, which paid out over 10 million guilders per year in the 1670s and over 20 million annually throughout the eighteenth century.

These are only conspicuous and quantifiable examples of income streams that are likely to have generated large savings. The Republic's fiscal system was, by the last quarter of the seventeenth century, a great money pump, sucking tax revenues from hundreds of thousands of tax payers and funneling it to a much smaller number of bondholders. If the latter group saved 25 percent of bond interest income, they had five million guilders per year to invest, which represented all by itself nearly 2 percent of national income.[18]

We have, of course, little direct information about the national savings rate, although the abundant supply of investable funds in the Republic has always, and not unreasonably, been thought confirmed by the low interest rates that prevailed from the mid-seventeenth century on. The question of how savers could find profitable destinations for this great stream of investable funds was often pressing. In wartime, the state sold bonds at a furious pace, absorbing the loose change of any- and everyone. But in peacetime, the public bond market dried up. Suddenly, enormous sums of money sought new destinations.

So, what *did* savers do with their savings? Or, to put it a bit differently, how did investors come into contact with attractive opportunities for the placement of their funds? Here, again, we know very little. In the second half of the eighteenth century, the merchant banking houses specialized in the floating of loans for foreign governments (the *emissiebedrijf*), relied on networks of *makelaars*, brokers who cultivated circles of wealthy clients and peddled new issues.[19] But by all accounts this was a narrowly based and highly specialized intermediation. No such intermediaries functioned in the sale of domestic government bonds. These appear always to have been sold directly, without intermediation, by the local tax offices, the *gemenelandscomptoren*, located in every city of consequence. These offices possessed the authority to adapt to their local markets, offering bonds in smaller units in the lesser cities, and larger units in the large centers, but this seems to have been the limit of their salesmanship.[20]

Our question remains: how did private borrowers find funds, and how did savers come to know of investment opportunities? It is possible that the *kassiers* played a role as intermediaries, and it is certain that notaries did so. Some of them had printed loan forms ready, suggesting a considerable volume of business in which the notary stood, literally, between the borrower and the lender. The notarial archives - a literal embarrassment of riches for the historian - should be able to shed light on this scope of this intermediation. What will be more difficult to determine is how active notaries were in bringing lenders and borrowers together. Did two men find each other and proceed to the office of the notary, or, as seems probable, did the notaries actively seek financial partners for their clients, who were eager to borrow or to lend?[21] It is likely that a study of this subject will lead the historian to taverns and coffeehouses, where information circulated and clients came into contact with notaries, *kassiers*, and private merchants.

It is, perhaps, also in such venues that the participants of *partenrederijen* found each other. Thousands of maritime ventures, but also industrial investments, took this form, where investors purchased anywhere from 1/2 to 1/64th of an enterprise. Once again, we stand before the question of how the passive and active partners in these ventures found each other. Did the notary play a role in bringing them together? Were they typically bound together by blood and marriage ties? Were they neighbors or co-religionists?

In the literature on the British Industrial Revolution much has been written about the irrelevance, or only the indirect relevance, of formal financial intermediation in the financing of the new industrial ventures.[22] From this perspective, the weak development of investment banking in the Republic can hardly come as a surprise. Still, this economy had a special need for intermediation because of the large supply of savings. The relatively narrow range of investments that characterized the late-eighteenth century and the large size of idle cash balances referred to earlier suggest that this is an area in which institutions failed to keep pace with the developing needs of the economy. The unusual term structure of interest rates that long prevailed on the Amsterdam capital market also hints at a failure to effectively mobilize short-term lending. P. Dehing's research reveals interest rates that fall with lengthening maturities (rather than the more usual opposite pattern), and this inverted pattern prevailed throughout the period 1620-1730. The famous low interest rates of the Republic's capital markets seem only to have been available for long-term borrowers.[23]

Income security in a volatile world

One category of investment deserves separate discussion: investment designed to achieve a steady income stream and to secure the financial well-being of the family over time. In a world of enormous uncertainty - both about the economy and mortality - this investment motive was always strong. Indeed, it remains important today, even though many risks faced by our ancestors are now buffered by the state.

Thus, it should not surprise us to find that one of the earliest forms of public debt was the life annuity (*lijfrente*). Beginning as a feature of municipal finance in the middle ages, it became a staple of public finance everywhere. The buyer of a *lijfrente* was assured of annual payments to the assigned party - often a spouse or child - so long as that person - that *lijf* - lived. The death of the beneficiary extinguished the debt contracted by the issuer of the annuity. It was long the custom for *lijfrenten* to pay twice the annual interest of redeemable bonds (*losrenten*), which were extinguished only by the repayment of the principal. Thus, around 1600, *lijfrenten* paid the 6th penny (16.67 percent) when redeemable bonds paid the 12th penny (8.33 percent).

It is a sign of the advanced state of Dutch capital markets that a series of thinkers made important breakthroughs in probability theory, demographic analysis, and the combination of the two, actuarial science, to replace the old rule of thumb with a more accurate method for determining the appropriate interest rate on *lijfrenten*.[24] Christiaan Huygens, Johan de Witt, and Johannes Hudde all contributed to this project, which led to the discovery that current practice provided overly generous returns to all *lijfrenten* settled on beneficiaries under the age of 40! In response Holland adjusted the interest rates on *lijfrenten* to the age of the nominee, the beneficiary of the annuity. As real returns fell to the level of redemable bonds, buyers lost interest, and as demand fell, the sale of this venerable debt instrument was brought to an end.

With Holland no longer active in the issuance of *lijfrenten*, notaries began to provide private alternatives by organizing investment pools. Groups of some 30 or more persons invested in bonds, and concentrated the income generated by the bonds on the surviving members of the pool. Over 100 such 'tontine' associations have been identified from the notarial archives of the 1670s and 1680s. There may have been many more, but they disappear in the 1690s, when Holland, hard-pressed to raise money during the wars against France, resumed the issue of high-interest *lijfrenten*. The peace of 1714 brought a definitive end to the public issue of annuities, and once again the formation of private income pools resumed. They reach a peak of popularity in the 1770s, by which time research has uncovered some 250 of these schemes to secure income for survivors. These eighteenth century associations were larger than their seventeenth century predecessors. Organized by specialized brokers, they included not only general survivors' funds, but also special widows' funds, burial societies, and orphans' funds.[25]

Once again, this incipient life insurance industry was cut at the knees by government competition, this time by the French state, which issued annuities on the old basis - as if De Witt and Hudde had never existed - in the dying days of the *ancien régime*. The foolishly generous terms of the French annuities left no room for the private income maintenance associations.

Income smoothing in a volatile world

Up to this point we have focused primarily on the problems that faced the well-to-do in their use of money. Here we shall consider the use of money by ordinary folks. For people who do not engage in large scale borrowing or investing for productive purposes, the most important role played by money in daily life is to *smooth* one's income over time.

When we consider the inherent uncertainty and volatility of economic life, our first thought is to the incidence of poverty, and to the poor relief and charity which transfers income *at a point in time* from those who have to those who have not. There is, of course, a second way to deal with the problem of insufficient income that is available to many (but not all) people: transferring income *over time*, so that consumption can be spread more smoothly than a volatile and unpredictable steam of income.

It is useful to keep in mind that redistribution at a point in time does not require money. We have all heard of peoples who, when a large beast is killed, feast and extend hospitality until the beast has been eaten. It takes money to slaughter and sell the beast, and live from the income for an extended period. The former is more dramatic and more colorful; the latter is, for better or worse, modern.

Consider the following example, drawn not from a remote hunting and gathering people, but from the Hollanders of the Republic. The *trekschuit* skippers who carried passengers from Leiden to Haarlem for nearly two centuries beginning in 1658 were organized in a guild. This organization received passenger fares and paid for the expenses of operating the barges, including a basic salary for the skippers. The salary paid to the skippers was modest, barely higher than the earnings of the assistants they employed.

The guild records show that in many years the skippers earned nothing more than this modest salary. Indeed, in especially bad years the guild took out loans in order to be able to pay all its expenses - including these salaries. But in other years the guild made large profits. It paid off its debts and distributed the profits to the skippers. Suddenly, men who had been earning little more than 300 guilders per year began taking in twice and three-times this amount.[26]

How did these skippers adjust to the sudden and substantial changes in their income? Did they adjust their standard of living to the new circumstances, or had they internalized a notion of a 'permanent income', whereby they treated deviations as windfalls (or temporary shortfalls)? And were windfalls spent in extravagant living, after the manner of the sailor returned from months at sea, or were they invested, as earnings in excess of one's permanent income?[27]

If the skippers sought to smooth out their income over time, they would have invested in years of high earnings, but what were the investment opportunities open to ordinary people in the Republican era? We know that the skippers' guild sometimes bought government bonds when it accumulated surpluses, but did ordinary individuals also do this? Redeemable bonds (*losrenten*) do appear in the seventeenth-century probate inventories of farmers and other persons of middling circumstances, but a comprehensive study of the bond market remains to be made.

Our curiosity about this market is peeked by the knowledge that the social composition of government bond ownership shifted over time. In the first decades after the Revolt, when interest rates stood at 8 percent and more, merchants had to be dragooned into purchasing Holland's bonds, the ownership of which seems to have been concentrated in the names of women. A century later, with post-fisc interest rates below 3 percent, bond ownership seems to have been much more concentrated in the hands of the very wealthy.

Another investment possibility was real property, although its ability to serve an income smoothing function would depend on the liquidity of such investments, which, in turn, would hinge on the character of the mortgage market. Here, too, our knowledge is very limited. The English publicist Andrew Yarranton held the fluid Dutch property market before his jealous countrymen as a signal source of Dutch commercial strength: 'Every acre of land in the Seven Provinces trades all the world over, and is as good as ready money'. But it would be foolish to rely on the opinions of this rather feverish mercantilist.[28]

Investment in a stock of goods for trade, often to be conducted by one's wife, must have been a use to which windfalls were put, for petty trading and peddling was ubiquitous in the towns, and shopkeeping was the secondary activity of many households where the chief employment was likely to be characterized by irregular earnings, such as seafaring and inland transportation.[29]

The attention given by social historians to the phenomenon of poverty in pre-industrial society has conditioned us to suppose that most families lived at the margin of subsistence, so that any interruption in their income forced them into dependency on poor relief and charity. But, if the irregularity of the income flow had its occasional upside as well as the better know downside, the management of assets must have played some role in the smoothing of income over time. The ubiquitous presence of pawn shops suggests that many people had assets which they attempted to sell or pawn in time of need.

The lombard, or *bank van lening*, came to be a municipally-sanctioned institution for consumer credit, and small traders' credit, in cities throughout the Republic. A long debate about the morality of lending at interest *for consumption purposes* led communities throughout the Republic to outlaw private pawnbroking and money lending and to establish public pawn banks whose profits would support the poor relief efforts of the diaconates. By the late-eighteenth century some 85 such pawn banks were in operation. The Rotterdam *Bank van Lening*, for example, had 71,563 loans outstanding in 1794, or perhaps these should be understood as so many items in pawn. When the 100 largest of these loans, averaging a thousand guilders each, are set aside, the average loan was for 5.5 guilders.

Pawn banks also served small producers and traders. Consider the case of the Gouda pipemakers, most of whom were poor as church mice. If their daily production could not be sold, they were unlikely to have the means to finance the next day's production costs. To prevent their ruin, or their falling under the control of large merchants, the city established a *bank van lening* which bought up any unsold pipes at the prevailing price, thereby financing the pipemakers and providing for an orderly marketing of output.

The Amsterdam *Bank van Lening* lent extensively to small merchants and traders in the decades after its founding in 1614, although by the eighteenth century its clientele appears to have become almost exclusively persons pawning possessions for consumption purposes.[30] An example of such petty pawning is provided by an inventory drawn up in 1761 for the benefit of Amsterdam's *Burgerweeshuis* when Marretje Venloo, a poor widow, died leaving three children, the youngest of whom entered the orphanage. The widow owned a bare minimum of possessions, valued altogether at only 22 guilders. Her estate also included five *lombart briefjes*, evidence that she had pawned, over the previous year, various articles of clothing (*een rok, twee hemden, een boeselaar, een half hemt*) for a total of 7 guilders 15 stuivers.[31]

What became of such a poor person once the pawnable goods were at the lombard? Was there any alternative to a dependence on poor relief? Could a poor person in the Republic still command credit? Here the probate inventories give an unequivocal answer: ordinary people with few assets received credit on a large scale. In fact, it does not appear that cash transactions on a day-by-day basis were customary, even among people who had large amounts of cash lying idle at home.

People of every income level were enmeshed in intricate networks of lending and borrowing. Few persons, it seems, were only lenders or only borrowers. Thus, of 282 inventories drawn up by Amsterdam's *Burgerweeshuis* in the 1740s - all for poor persons - 241 of them had left debts for goods and services averaging over 300 guilders. In addition, 102 had borrowed money, in loans averaging nearly 200 guilders. Moreover, 40 of these modest folk had collectable loans outstanding; their estates were owed an average of 150 guilders.[32]

A more broad-ranging study of Amsterdam probate inventories conducted by J.A. Faber (478 inventories in every income category, all drawn up in 1701-1710), found that financial claims and debts were both a large part of the total wealth in every income bracket. The rich no less than the poor were both borrowers and lenders. In general, the size of a person's debts rose with his or her assets, which suggests that debt was an inevitable part of daily life in the Republic. From rich to poor, everyone owed money; at all income levels, a very large number of people were owed money (Table 2).

One might suppose that such a pattern of debt and credit bespeaks a cash-short society, where money was scarce except perhaps once a year when crops were sold after the harvests. But we are obviously not dealing with an agrarian economy, and we have already established that the Republic was relatively abundantly supplied with money, indeed, that the very people enmeshed in this web of credit often held significant cash balances.

Table 2. Incidence of cash holdings, debts, and financial claims by wealth category in Amsterdam, 1701-1710

Wealth category	I	II	III	IV	V
Total inventories	56	18	53	148	203
Cash, bullion, and bank deposits (% of inventories)	9414 84	6525 94	1732 92	973 94	473 97
Claims (% of inventories)	9923 95	10300 100	5227 91	1419 97	1092 99
Debts (% of inventories)	12083 86	8555 83	5348 89	1757 97	800 97

Source: J.A. Faber, 'Inhabitants of Amsterdam and their Possessions, 1701-1710', *A.A.G. Bijdragen* 23 (1980) 149-155. The Wealth categories are based on the assessment of burial taxes (the middel op begraven). I, the highest category, included only 2 percent of all burials (but a larger percentage of adult burials); V, the lowest category, paid no tax, and embraced fully 86 percent of all burials (but a smaller percentage of adults).

A full explanation of this phenomenon will require further research, but it does appear that a pronounced seasonal pattern of payments characterized the urban as well as the rural economy. Rental contracts for housing and contracts regulating the hiring of domestic servants were typically for six-month periods, usually expiring on 1 May and 1 November.[33] At the higher level of *Wisselbank* transactions we see a similar pattern. When Amsterdam suppressed the activities of the *kassiers* in 1608, a large number of merchants protested, saying they would miss the *kassiers'* services,

> doch principalijck ultimo juni ende ultimo november, alsser veel hondert duysent florenen tegelijk moeten betaelt, getrocken ende gedisponeert worden.

Much later, after 1700, the Bank van Middelburg was in the habit of closing its doors to business twice a year to balance the accounts - from Pentecost for eight days, and from mid-December until 2 January.[34]

We stand here before a puzzle. A society awash in cash lived by credit. An urban society with no highly pronounced seasonal rhythm, none the less concentrated many ordinary payments into six-monthly cycles. Some of these patterns of financial behavior lived on into this century, and perhaps for this reason we are inclined to view these credit practices as those of a poor society. This seems almost certainly to be misleading, but a satisfactory explanation remains to be supplied.

Conclusions

The Dutch Republic is part of the history of early modern Europe, and that history is often presented as proceeding through a kind of transition, where old and new rubbed against each other, giving rise to cultural tension and often surprising, mixed forms of life that combined the traditional and the modern, feudalism and capitalism, religious and secular thought. With respect to the role of money, it is easy to suppose that all sorts of mental taboos had to be overcome in this period; that a money-based economy had to burst out of all the restricting ties of law, religion, and custom that had long confined it to narrow channels.

This is almost certainly a misleading way of thinking about the society of the Dutch Republic. To be sure, objections were voiced to various forms of speculation, especially to futures trading, known by the evocative term *windhandel*. But with every lurch of the financial system of the late twentieth century - whether it calls attention to derivatives trading in Chicago, currency futures in Singapore, or program trading on the New York Stock Exchange - moral arguments continue to be advanced in justification of restricting financial transactions. If the seventeenth century was transitional in this respect, so is our society today.

Indeed, our seventeenth century ancestors may have been rather more conscious of money and its role in society than we. When a Golden Age Hollander walked down the street, he was very likely to pass several people to whom he owed money, and who owned him money. Their mutual knowledge of these direct, personal financial ties could not fail to affect their conduct. Today our financial dealings are lodged firmly in the 'private' sphere, a word that did not have its current meaning in early modern times.

Moreover, money itself was heavy, tangible, and difficult to hide. Investors were not on the telephone or behind computer screens, but visibly present at the tax office, buying bonds, at the notary and the tavern, buying real estate and selling the spices they received as dividends from the VOC. The refreshing 'matter-of-factness' of Dutch society was not limited to an unvarnished understanding of human sexual foibles and recognition of man's tendency toward gluttonous excess. It certainly extended to the 'fact of money'.

In this context, the Republic's speculative excesses should be reconsidered. They are commonly presented as the product of an immature, reckless, youthful capitalism. The most celebrated of these volatile events, the tulipmania of 1636-1637, has repeatedly been represented as a bizarre trade, in which unknowledgeable traders ruined themselves and others in foolish, greed-driven speculations.[35] The speculators, it is claimed, were naively unaware of the power of money while the public authorities were still capable of being scandalized by the worship of Fortuna and set about 'returning the genie speculation to the bottle from which it had escaped, and corking it tightly to ensure against any recurrence'.[36]

In fact, futures trading was quite common. It was subject to restriction, to be sure: a stream of edicts from 1610 to 1677 forbade trade in shares not currently possessed by the seller (*blanco verkoop*, the true *windhandel*). On the other hand, future sale of shares in the seller's possession (hedging) was always permitted. In practice, the chief limitation to futures trading - which was conducted in VOC shares and many commodities - was the lack of legal recourse to disputed contracts or non payment.[37] Speculators were not prosecuted, but their contracts could not be enforced in the law courts.

The financial dealings of the painter Jan van Goyen can serve to illustrate how deeply financial transactions penetrated seventeenth century life.[38] He was one of the speculators in tulip futures in 1636-1637. At that point he was certainly no stranger to risky financial transactions, since he had speculated in real property continuously since moving to The Hague in 1631. In 1636 a rising market for, among other commodities, whale oil and bone and tulips encouraged futures trading. Van Goyen took out a contract for future delivery of some 50 tulips at the height of the speculative fever, in January, 1637. At the settlement date, that summer, he would pay 900 guilders while, to secure the contract, he agreed to deposit two paintings, one of his own and one by Salomon Ruysdael.

If Van Goyen was like the other traders, he had no intention of taking delivery of tulips; he hoped to find a buyer for his contract at a higher price than he had promised to pay. With his paintings as margin money (apparently, he only handed over his own painting), he hoped to pocket a tidy profit. Instead, the rising market crashed within days of Van Goyen's fateful entry. There would be no buyers for his contract. Van Goyen never paid his 900 guilder debt, which is not surprising since the futures contract could not be enforced in court. Van Goyen died, insolvent, in 1656, with the estate of the seller still trying to collect its 900 guilders. Whether this financial setback was the cause of his later insolvency is not obvious.

The tulipmania has gone down in history as a classic capitalist folly, perhaps the first great financial bubble. Guided by the moralizing pamphlets that appeared after the bubble burst (and which remain almost the only source of information about the event), nearly all writers have emphasized the irrationality of the financial transaction, a 'madness' fed by the amateurish naiveté of greedy small-fry with no understanding of the markets.[39] There can be little doubt that human folly was plentiful at the peak of the speculation (although neither Van Goyen, a seasoned speculator, nor his seller, a Hague burgomeester, were exactly small fry), but the futures market in tulips was also part of a process of financial innovation that was by no means foolish; rather, it was an expression of the Republic's financial sophistication.[40]

Notes:

1. Jan de Vries, *The Dutch Rural Economy in the Golden Age*, 1500-1700 (New Haven 1974) Chapter 5.
2. Jan de Vries and Ad van der Woude, *Nederland 1500-1815. De eerste ronde van moderne economische groei* (Amsterdam 1995) Chapter 4.
3. Monetary flows are given a more active role in Pit Dehing, 'Geld als water? Amsterdam en de internationale kapitaalstroom (1600-1730)', in: Karel Davids e.a., eds., *De Republiek tussen zee en vasteland* (Leuven/Apeldoorn 1995) 229-248.
4. Karel Davids, Jan Lucassen, and Jan Luiten van Zanden, *De Nederlandse geschiedenis als afwijking van het algemeen menselijk patroon* (Amsterdam 1988).
5. English version of *Nederland 1500-1815*: Jan de Vries and Ad van der Woude, *The First Modern Economy. The Rise, Decline, and Perseverance of the Dutch Economy, 1500-1815* (Cambridge 1996).
6. For a fuller account of this issue consult any text in macroeconomics, such as Rudiger Dornbusch and Stanley Fischer, *Macroeconomics* 5th ed. (New York

1990) Chapter 10, 345-81. For a classic account of the function of money, see W.J. Jevons, *Money and the Mechanism of Exchange* (London 1910).

7. It was characteristic of all European countries until well into the nineteenth century that the circulating currency consisted of coins from many countries, of varying weights and degrees of purity. This promiscuous coinage served as a means of payment, while the unit of account - in the Netherlands the *karolusgulden* of 20 stuivers - was the unit of account. However, in the case of the *karolusgulden*, no such coin actually circulated from shortly after 1544 until 1694. It was a notional unit of account. (It was, however, not the *only* unit of account in the Republic! Zeeland held fast to the *schelling* of 6 stuivers, which is often encountered in price notations for wheat and for the foreign exchange value of the English pound sterling. Grain prices at the Amsterdam *korenbeurs*, on the other hand, were always quoted in *goudguldens* of 28 stuivers.)
   Today the *Ecu*, the unit of account of the European Union's financial affairs, is such a notional unit of account. In 1999 Europeans may once again be able to experience directly what had been typical of pre-industrial society, a world of numerous circulating currencies of frequently changing value and a unit of account, the *Euro*, that struggles to place a common valuation on all transactions. See, for example, Richard Portes, 'Implementing EMU', *American Economics Review*, 86 (1996) 139-142.

8. H. Enno van Gelder, *De Nederlandse munten* (Utrecht 1965); *Munthervorming tijdens de Republiek, 1659-1694* (Amsterdam 1949).

9. Michel Morineau, 'Quelques remarques sur l'abondance monétaire aux Provinces-Unies', *Annales E.S.C.* 29 (1974), 767-776; De Vries and Van der Woude, *Nederland 1500-1815*, 107-117.

10. Monetary studies based on numismatic evidence are most numerous for the medieval period. The 'monetary famine' of the fifteenth century has attracted a great deal of attention. See: N.J. Mayhew, ed., *Coinage in the Low Countries (800-1500)*. Third Oxford symposium on coinage and monetary history. B.A.R. International series 54 (Oxford 1979); John Day, *The Medieval Market Economy* (Oxford 1987); Peter Spufford, *Money and its Uses in Medieval Europe* (Cambridge 1988); John H. Munro, 'The Central European Mining Boom, Mint Outputs, and Prices in the Low Countries and England, 1450-1550', in: Eddy van Cauwenberghe, ed., *Money, Coins, and Commerce: Essays in the Monetary History of Asia and Europe from Antiquity to Modern Times* (Leuven 1991) 119-183.

11. Artur Attman, *Dutch Enterprise in the World Bullion Trade* (Göteborg 1983); 'The Bullion Flow from the Netherlands to the Baltic and the Arctic, 1500-1800', in: W.J. Wieringa e.a., eds., *The Interaction of Amsterdam and Antwerp with the Baltic Region, 1400-1800* (Leiden 1983) 19-22.
12. De Vries and Van der Woude, *Nederland 1500-1815*, 110-117.
13. Thera Wijssenbeek-Olthuis, *Achter de gevels van Delft* (Hilversum 1987); Anne McCants, 'The Debts and Possessions of Amsterdamers: Evidence from the mid-eighteenth century', Unpublished paper presented at the 1995 Annual Meetings of the Social Science History Association, November, 1995. In 282 inventories, all dating from the 1740s, the average net value was negative: *f* -128.67. This was caused by debts of the deceased that averaged *f* -271.22. Nonetheless, these same housholds possessed average cash holdings of *f* 17.17.
14. For this see Herman van der Wee, 'Monetary, Credit and Banking Systems', in: E.E. Rich and C.H. Wilson, eds., *Cambridge Economic History of Europe, Vol. V. The Economic Organization of Early Modern Europe* (Cambridge 1977) 290-392.
15. J.G. van Dillen, *Van rijkdom en regenten* (The Hague 1970) 446.
16. Joost Jonker, 'Kassierspapier', in: Jan Lucassen, ed., *Gids van de papiergeld-verzameling van het Nederlands Economicsch Historisch Archief* (Amsterdam 1992) 103-132; J.M.F. Fritschy, *De patriotten en de financiën van de Bataafse Republiek* (The Hague 1988) 189, 282, n.2.
17. Simon Schama, *The Embarrassment of Riches* (New York 1987) 320-321. Schama's source is B.E. de Muinck, *Een regentenhuishouding omstreeks 1700. Gegevens uit de privé-boekhouding van Mr. Cornelis de Jonge van Ellemeet, Ontvanger-Generaal der Verenigde Nederlanden (1646-1721)* (The Hague 1965).
18. For a justification of these estimates, see De Vries and Van der Woude, *Nederland 1500-1815*, 148-159.
19. The great strength of the pre-eminent banking house, Hope en Co., is said to have resided in its network of well-connected retail brokers. See M.G. Buist, *At spes non fracta: Hope & Co., 1770-1815. Merchant Bankers and Diplomats at Work* (The Hague 1974).
20. The public bond market, so important to the history of the Republic, has yet to find its historian. However, a good beginning, for the early days of the Republic, is provided in Marjolein 't Hart, *The Making of a Bourgeois State. War, politics and finance during the Dutch Revolt* (Manchester 1993) and James C. Tracy, 'Redeemable Bonds (Losrenten) in the Early Dutch Republic', Unpublished paper, University of Minnesota 1988.

21. The role of Parisian notaries as financial intermediaries is revealed in Philio T. Hoffman, Gilles Postel-Vinay, and Jean-Laurent Rosenthal, 'Private Credit Markets in Paris, 1690-1840', *Journal of Economic History* 52 (1992), 293-306; and their 'Redistribution and Long-term Private Debt in Paris, 1660-1726', *Journal of Economic History* 55 (1995) 256-284.
22. See: Rondo Cameron, *Banking in the Early Stages of Industrialization* (Oxford 1967); François Crouzet, ed., *Capital Formation in the Industrial Revolution* (London 1967).
23. Dehing, 'Geld als water?', 234-236.
24. Calculating the interest rate on an annuity that would equal the return on redemable bonds required the solution to two problems: 1. determining the discounted present value of a stream of future payments, and 2. weighting this income stream by the probability of survival at every age, which required the construction of a life table. Christiaan Huygens, *De Ratiociniis in Ludo Aleae* (1657), explored issues in probability that his brother, Lodewijk, extended to questions of life expectancy. Johannes Hudde marshalled data on Amsterdam *lijfrenten* to construct a primitive life table, and Johan de Witt, *Waerdye van lijfrenten. Naer proportie van losrenten* (The Hague 1671), extended this research to focus on the question of how annuity returns should be calculated to make them equivalent to redemable bond interest.
25. James C. Riley, *Population Thought in the Age of the Demographic Revolution* (Durham, N.C., 1985) 107-111.
26. Jan de Vries, *Barges and Capitalism. Passenger transportation in the Dutch Economy (1632-1839)* (Utrecht 1981) 147-150.
27. The 'permanent income hypothesis' states that people gear their consumption behavior to their permanent or long-term consumption opportunities, not to their current level of income. See a macroeconomics text, such as Dornbusch and Fischer, *Macroeconomics* 278-83. See also, Milton Friedman, *A Theory of the Consumption Function* (Princeton 1957).
28. The title of Andrew Yarranton's book alone must give one pause: *England's Improvement by Sea and Land, to Out-do the Dutch without Fighting, to Pay Debts without Moneys, to Set at Work all the Poor of England with the Growth of our own lands* (London 1677). The quote is from p. 11.
29. For an overview of available evidence, see De Vries and Van der Woude, *Nederland 1500-1815*, 693-696.
30. L. Jansen, *Geschiedenis van de Stads Bank van Lening te Amsterdam, 1614-1964* (Amsterdam 1964) 53-54.

31. Kindly supplied by Prof. Anne McCants; see her paper, cited above, for references.
32. McCants, 'Debts and Possessions of Amsterdamers', Table 2.
33. On house rentals see Clé Lesger, *Huur en conjunctuur* (Amsterdam 1986) 23-31.
34. J.G. van Dillen, ed., *Bronnen tot de geschiedenis der wisselbanken (Amsterdam, Delft, Middelburg, Rotterdam)* Rijks Geschiedkundige Publicatiën 59-60 (The Hague 1925)
35. The classic account remains Charles Mackay, *Popular Delusions and the Maddness of Crowds* (London 1841). See also, N.W. Posthumus, 'The Tulip Mania in Holland in the Years 1636-37', *Journal of Economic and Business History* 1 (1929) 434-466; E.H. Krelage, *Bloemenspeculatie in Nederland. De tulpomanie van 1636-37 en de hyacintenhandel 1720-36* (Amsterdam 1942). Since then the *tulipmania* is often invoked but little studied. In the *New Palgrave: A Dictionary of Economics* (London 1987), 4 vols., ed. by John Eatwell e.a., the entry *Tulipmania* makes no reference to historical events, but defines it as asset pricing not based on economic fundamentals.
36. Schama, *Embarrassment*, 361. Schama's interpretive narrative of the tulip mania stresses its 'transitional' character, and the strong moral reaction it provoked.
37. J.G. van Dillen, 'De termijnhandel te Amsterdam in de 16de en 17de eeuw', *De Economist* 76 (1927) 503-523; M.F.J. Smith, *Tijd-affaires in effected aan de Amsterdamse beurs* (The Hague 1919); Joseph Penso de la Vega, *Confusión de confusiones* (Amsterdam, 1688). Futures contracts became legal in 1689.
38. The account that follows is based on information provided in Krelage, *Bloemenspeculatie in Nederland*, 66. Schama, *Embarrassment*, 358, retells the story as well, but with several inaccuracies.
39. Posthumus explains the mania as follows: 'The real speculation came when outsiders joined in. People with no connection with bulb growing began to trade, among them weavers, spinners, cobblers, bakers and other small tradespeople, who had no knowledge whatsoever of the subject.', 'The Tulip Mania in Holland' 440. Certainly 90 percent of our knowledge of the tulip speculation is derived from a series of three pamphlets, 'T'samenspraeck tusschen Waermondt ende Gaergoedt', (Haarlem 1637) reprinted in N.W. Posthumus, 'De speculatie in tulpen in de jaren 1636-1637', *Economisch-Historisch Jaarboek* 12 (1927) 3-99, 13 (1929) 1-85, 18 (1934) 229-240.
40. For a defense of this position, see: Peter M. Garber, 'Tulipmania', *Journal of Political Economy* 97 (1989) 535-560.