

ECONOMIC GROWTH IN THE GOLDEN AGE  
THE DEVELOPMENT OF THE ECONOMY OF HOLLAND, 1500-1650\*

by  
*Jan Luiten van Zanden*

*1. Introduction*

There can be no doubt that the economy of Holland expanded rapidly between 1500 and 1650, and particularly after 1580. This expansion gave Holland a central, perhaps even dominant, position in the world economy during the mid seventeenth century. However, the extent to which the economy grew has not as yet been studied extensively. How rapid was economic growth? In what sectors was growth concentrated? What was the relationship between growth of output and population growth? Did per capita income also increase? What were the sources of economic growth; how important were technical developments, capital accumulation, and processes of specialization and structural change in the economy? Who benefited from growth ? labour, capital, or mainly the government?

Such questions have rarely been subject to systematic investigation by historians. One exception is Jan de Vries's study of the development of Dutch agriculture; De Vries is one of the few to analyse economic development during this period in terms of modern theories of economic growth.<sup>1</sup> In the present essay I provide an outline of the character of economic growth in Holland by first examining how output changed between 1500 and 1650. For practical reasons, and because of the nature of the sources available, changes in output and/or in real value added for the most important sectors of the economy can be reconstructed at only three points, c. 1500, c. 1580, and c. 1650. The estimates presented are preliminary, and much more work is required in order to arrive at more definitive and detailed figures. This study does not pretend to offer more than an outline of the available material and, where possible, initial conclusions based on this material. My intention is to identify the long-term changes that have occurred in the Dutch economy.

After presenting estimates of changes in gross output in section 2, I explore the relationship between the process of economic growth and two factors of production ? labour and capital. Wage levels between 1500 and 1650 are examined on the basis of existing studies, and then the pattern of capital accumulation is analysed. Sources enable rough estimates to be made of the capital wealth of individuals at three points in time (1500, 1650, and 1790), and these offer some insight into the process of growth in this period and to what extent economic growth benefited labour and capital. I conclude by summarizing some aspects of economic growth in Holland during the early modern period.

The importance of the period 1500-1650 in the subsequent economic development of the province of Holland can be gleaned from the fact that around 1800 per capita income in the Netherlands, and especially in Holland, was still significantly higher than in neighbouring countries ? even higher perhaps than in Great Britain.<sup>2</sup> This feature must have originated before 1650, because per capita output stagnated in Holland between 1650 and 1800.<sup>3</sup> Prior to 1650 therefore there must have been a period of intense growth which raised per capita income above those in the rest of western Europe; the literature suggests that the most likely period was 1580-1650.<sup>4</sup> The question is: when did the economic development of Holland begin to deviate so remarkably from that of the rest of western Europe?

*2. Growth in production*

Agriculture

The area of land under cultivation can be estimated by using the cadastral surveys of 1832 and deducting the area of land reclaimed in the years previously. The results are presented in Table 1 and broadly accord with contemporary estimates; the *verpondingskohier* of 1632, for instance, gives a figure of 386,000 *morgen* (about 325,000 ha), which is similar to the figures given in Table 1.<sup>5</sup> Estimates of the area of land under cultivation at the beginning of the sixteenth century are generally much lower. Using the *Informacie*,<sup>6</sup> for example, Naber arrives at a figure of about 275,000 *morgen* within the present borders of Holland; it is well known, however, that the *Informacie* understates the area of land under cultivation.<sup>7</sup>

Estimating the increase in agricultural productivity is much more difficult. Kuys and Schoenmakers' analysis of leases in Holland between 1500 and 1650 provides much valuable material, but there are a number of problems

associated with the data they present. Firstly, their data on the average cost of leaseholds suggest a rise much more rapid than the separate complete series of data they present for Rijnsburg, Leewenhorst, and Haarlem; this must have resulted from changes in the composition of the stock on which their averages are based.<sup>8</sup> In order to correct for this, we have used only the unweighted average of the three complete series (for Rijnsburg, Leewenhorst, and Haarlem). These series were then deflated by the unweighted average of wheat and butter prices in Utrecht and Leiden in the period 1490-1499 to 1640-1649 (1490/99 and 1500 = 100).<sup>9</sup> We have assumed here that rents were determined by agricultural prices in the previous decade; thus, rents in 1510 were deflated by agricultural prices in the period 1500-1509, and so on. The results are presented in Figure 1. It would appear that rents in 1580 were 20% higher in real terms than those in 1500; the corresponding figure for 1650 was about 50%. We have further assumed that real rents per *morgen* provide an indication of the growth in real value added per *morgen*.<sup>10</sup> Using the same method, Jan de Vries has similarly concluded that agricultural productivity during the Golden Age must have increased considerably.<sup>11</sup> Our estimates suggest that between 1500 and 1650 total output in agriculture increased by about 80% (Table 1), and it is likely that, because of an accelerated increase in the amount of land under cultivation and the rise in yields after 1580, the increase in agricultural output was also mainly concentrated in the second half of this period.

[hier Figure 1]

#### Herring fishing

The scale of herring fishing can be estimated from the number of herring busses in Holland. Kranenburg's data, relating to the years 1571 and 1586, suggest that there were between 400 and 450 in that period.<sup>12</sup> For the years 1630-1650 he estimates the corresponding figure to have been around 500. Willemsen's estimate, based on new data relating to the size of the Enkhuizen fleet, puts the number of busses at nearer 600.<sup>13</sup> The *Informacie* shows that the following number of busses put to sea in 1514: 63 from Rotterdam (50 of which came from elsewhere, especially Waterland), 40 from Delfshaven, 20 from Schiedam, and a number of others from the fishing ports along the North Sea coast (Katwijk, Egmond, Zandvoort).<sup>14</sup> It is remarkable that no mention is made of Enkhuizen here; the first occasion on which the town was referred to was in the 1550s, when 140 busses are said to have sailed from the port.<sup>15</sup> Allowing for certain inaccuracies and the lack of data for Brielle, the number of herring busses in 1514 can be estimated at around 200. In 1477 there were probably around 250 busses (with a total crew of 6,000) in Holland and Zeeland,<sup>16</sup> which is consistent with our estimate for 1514. The increase in the number of busses in the sixteenth century can be attributed almost entirely to the growth of Enkhuizen; by 1630 around 300 busses sailed from Enkhuizen every year.

#### The merchant fleet and international trade

Several estimates of the size of the merchant fleet are available from various sources. These suggest that the fleet grew tenfold between 1500 and 1650 (Table 2). The first period of growth occurred between 1530 and 1567 and was mainly the result of expanding trade with the Baltic. Imports of wheat from the Baltic increased from 10,000 lasts (20,000 tonnes) around 1500 to an annual average of 60,000 lasts (120,000 tonnes) in the period 1562-1565.<sup>17</sup> The second period of growth ? from about 1585 onwards ? led to the size of the merchant fleet more than doubling and to considerable diversification into other trading areas. Until about 1580 an estimated 50% of the fleet was involved in the *moedernegotie*, or mother trade, as the Dutch grain trade with the Baltic was termed; this proportion had fallen to below 25% by 1636 because of the rise of the VOC (Dutch East India Company) and the WIC (West India Company) and the growth of the Mediterranean trade.<sup>18</sup>

It is likely that the volume of international trade increased to a similar extent as the size of the merchant fleet.<sup>19</sup> This assumption may overstate the growth in international trade somewhat, however, because after 1580 trade with the Southern Netherlands, which was partly carried by river ships and barges, stagnated, and because trade with the German hinterland declined as a result of the Thirty Years War. On the other hand, according to Jonathan Israel, the main focus of Dutch international trade shifted from bulk trades to 'rich' (luxury) trades.<sup>20</sup> The increase in the value of trade may therefore have been much greater than the increase in the volume of trade. It seems reasonable then to maintain that the development of international trade and the growth of the merchant navy paralleled one another.

## Industry

The most difficult aspect of economic growth to assess is the pattern of industrial change. Extensive quantitative data are available only for the two most important export industries, brewing and textiles; for the years after 1590 soap production can be estimated, and data on growth in the size of the merchant fleet can be used indirectly to estimate growth in the shipbuilding industry. This is sufficient to enable us to draw conclusions about the long-term development of industry between 1500 and 1580, since industrial production in Holland was dominated by these industries. This was not the case after 1580: the period 1580 to 1650 was one of industrial diversification, with the rise of new (often harbour-related) industries (sugar refining, diamond cutting, paper making, printing, the silk industry, delftware).<sup>21</sup> Many of these new industries produced luxury products for the flourishing home market or were dependent on the expansion of international trade (mainly through the entrepôt of Amsterdam). In many cases the rise of a new industry was the direct consequence of the immigration of entrepreneurs and highly skilled craftsmen, particularly from Antwerp. Unfortunately, data on the growth of these new industries are lacking, and we are restricted to analysing the growth in the traditional export industries mentioned above (brewing and textiles). As a result, industrial growth in the period after 1580 has undoubtedly been significantly underestimated.

On the basis of the *Informacie*, Posthumus estimated total textile production in Holland to be 51,500 pieces in 1514; about half of this, 26,000 pieces, was produced in Leiden (and a further 9,000 pieces in Naarden, then the second most important textile centre in Holland).<sup>22</sup> His study of the Leiden textile industry shows that textile production in Leiden fell sharply between 1520 and 1570; in 1570 only 3,800 *lakens* were produced.<sup>23</sup> This decline was repeated in other cities too, and, as far as we can tell, to a similar extent.<sup>24</sup> In Amsterdam, however, textile production declined only after 1550, but here too it was rapid.<sup>25</sup> For this reason, it is probably realistic to suggest that total textile production in Holland around 1580 did not exceed 10,000 pieces.

There were two phases in the revival of the textile industry after 1580. Between 1580 and 1630 the woollen industry recovered in a number of cities (Haarlem, Gouda, Leiden, Delft, and Alkmaar) thanks to the migration of Flemish textile workers to Holland and the consequent introduction of the 'new draperies'. The second phase, between 1630 and 1670, was characterized by continuous growth in the Leiden textile industry and the sharp decline of the woollen industry outside Leiden. In Gouda, Haarlem, and Alkmaar hardly anything remained of the new draperies that had been introduced there around 1590.<sup>26</sup> As Posthumus has shown, by 1650 these developments led to the woollen industry being almost entirely concentrated in Leiden.<sup>27</sup> On the basis of his data, the proportion of woollen fabrics produced in Leiden can be estimated to have been at least 85 to 90% of total production, which was on the order of 100,000 to 110,000 pieces, 21,000 of which were high-quality *lakens*.<sup>28</sup> This is around twice the corresponding level of production at the beginning of the sixteenth century. A considerable proportion of these 100,000 pieces consisted of serges, bays, and the like, the price of which was much lower than that of *lakens*. But around 1500, a significant proportion of total production also consisted of cheap *lakens* produced in Naarden and Hoorn.<sup>29</sup> It is not clear then that the average value of woollen fabrics declined between 1500 and 1650.

How breweries fared can be reconstructed from a variety of sources on account of the numerous duties levied on beer. Most research has concentrated on production in the three large beer-exporting cities of Haarlem, Gouda and Delft. In the sixteenth century these cities accounted for most of the beer produced. Table 3 shows that total beer production fell prior to 1570, a consequence of a continuing fall in beer exports (though domestic consumption probably rose because of the increase in population). In the sixteenth century Dutch beer exporters faced a declining market on account of the expansion of brewing in the Southern Netherlands.<sup>30</sup> Only in Delft did brewers maintain their share of the market in the Southern Netherlands ? in Haarlem and Gouda their market share quickly declined (Table 3).

The 1570s and 1580s were also disastrous for brewers; Delft lost its foothold in the Southern Netherlands, and only in Haarlem was there evidence of recovery, because of the expansion of domestic demand. In the period after 1590 Amsterdam and Rotterdam became important brewing centres. By then beer was no longer an important export, and the northern part of Holland and Friesland became Haarlem's most important markets.<sup>31</sup>

Around 1500 total beer production amounted to between 1 and 1.1 million *vaten*; by 1590 this had fallen to 650,000.<sup>32</sup> An estimate for 1651 of about 950,000 *vaten* seems reasonable, and it is likely then that total beer production fell between 1500 and 1650.

Growth in the shipbuilding industry cannot be calculated directly, but a rough idea is provided by the growth in the size of the merchant fleet. It is probably fair to assume that the shipbuilding industry expanded in parallel with the growth of the merchant fleet.<sup>33</sup>

Some data are available on the level of soap production. These suggest that the industry hardly grew at all between 1590 and 1650. Data on the yield of soap duties (12 *stuiver* per *ton* of soap) imply that annual output was

about 45,000 *ton* in 1590-1591, 42,000 *ton* in 1608, and that it rose to 48,000 *ton* by 1650-1659 ? hardly an example of dynamic growth.<sup>34</sup>

#### Total output

Although the statistical basis of the estimates presented above is narrow, it is nonetheless useful to try and summarize the apparent trends in order to give an indication of the change in per capita output in the periods 1500-1580 and 1580-1650. These figures are of course bound to have a wide margin of error given the nature of the data.

In the analysis I have tried to estimate the relative size of different sectors in the economy on the basis of the numbers employed in these sectors as a proportion of total employment. Two series of weights ? one for c. 1500 and one for c. 1650<sup>35</sup> ? have been calculated using what we know about employment patterns in different sectors in these two years. The results are given in Table 4. They show that it is unlikely that per capita output increased significantly between 1500 and 1580; the spectacular growth in international services and the expansion of herring fishing was largely offset by the marked decline in export industries. On balance, the economy probably grew, but only at the same rate as the population. In contrast, per capita output undoubtedly rose after 1580, despite more rapid population growth. The increase in agricultural output, in herring fishing, and in brewing was less than the rate of population growth, but expansion in other sectors ? textiles and international services ? was much greater. Furthermore, these data underestimate the level of industrial growth, for the reasons outlined above, so that real per capita output grew by more than 0.3% a year, and perhaps even by twice that figure.

When we consider the entire period 1500-1650, it is apparent ? and hardly surprising ? that the most dynamic sector was international services; this was paralleled by a similar expansion in the shipbuilding industry. Of the remaining sectors of the economy, only herring fishing grew as rapidly as the population.

The picture is diverse therefore. When we look at absolute growth figures, there appears to have been a process of continuous economic expansion remarkable for a pre-industrial economy; when we take into account the growth in population, however, then it is apparent that there was only a modest increase in per capita output. Clearly this provides no sufficient explanation for the high level of per capita GDP in Holland during the early modern period.

### 3. *Labour and capital*

#### Real wages

Who profited from economic growth in the period 1500-1650? The process of economic growth in western Europe during the nineteenth century gave rise to a sustained increase in real wages and in the standard of living of the population. Was this also true of the Golden Age? Or did growth benefit mainly capital rather than labour?

The study of changes in nominal and real wages carried out by Jan de Vries, Noordegraaf, and Nusteling enables us to provide a general answer to the first of these questions.<sup>36</sup> Noordegraaf concludes that economic growth between 1580 and 1650 led to a higher standard of living, particularly after the catastrophic fall in the standard of living between 1565 and 1580. This improvement was not so much the result of higher real wages as a consequence of the rapid expansion of employment and an increase in the number of working days in the year.<sup>37</sup> Nevertheless, the standard of living in the first half of the seventeenth century was only slightly above that in 1580. After a relatively prosperous period between 1600 and 1620, there were a number of years around 1630 when real wages were extremely low ? the consequence of marked price rises.

The series of data presented in Figure 2 confirm this conclusion. The wages of hodmen in Haarlem (1500-1580) and Amsterdam (1580-1800) calculated by Noordegraaf and Nusteling respectively have been compared with data on prices calculated by Nusteling (on the basis of estimates by Jan de Vries). The year 1580 has been taken as a base. Figure 2 shows that real wages of hodmen in Haarlem and Amsterdam were more or less constant in the long run. If we consider hodmen to have been more or less representative of labourers in general, then it is reasonable to conclude that long-term real wages were steady. The fall in real wages in the first quarter of the sixteenth century is somewhat suspect since the price data for the period 1500-1575 are not strictly comparable with those for after 1575. Further, the apparent decline in real wages after about 1760 was compensated to some extent by the introduction of the potato; this provided an alternative to bread in times of high bread prices, as a result of which the costs of subsistence did not increase to the extent implied by the decline in real wages.<sup>38</sup> We can conclude that real wages in Holland in the pre-industrial period were fairly stable in the long run.

[hier Figure 2]

## Capital holdings

Much less is known about capital during this period. Nevertheless, we can attempt to reconstruct quantitative changes in personal wealth. I have tried to estimate the value of capital holdings for a number of years (1500, 1650, 1790) and to establish broadly the composition of private wealth – to what extent it consisted of ‘productive’ capital (investment in agriculture, trade, and industry), and to what extent it consisted of lending to the government and capital invested abroad. It should be noted that these data give an impression of long-run changes during the period 1500-1800 in the value of capital holdings rather than of changes in the stock of capital goods. In the period 1650-1790, for example, the real value of capital invested in agricultural land rose considerably because of the increase in the (relative) price of land – the number of hectares of farmland remained practically the same however. The rise in the relative price of farmland partly resulted in turn from the decline in interest rates. Available sources also enable us to calculate the average rate of interest on the government debt for the same years as those for which data are available on the value of capital holdings. The combination of the two sets of data – on interest rates and the level of capital holdings (per capita) – gives a very rough indication of how capital incomes in Holland changed in the long term.

For the years around 1500 the yields of a good number of taxes levied by cities on personal wealth are known, and these give an indication of capital wealth (Table 5). Several studies using the sources from which these data are drawn have shown that at the beginning of the sixteenth century estimates of wealth were often made with considerable care. In Edam the register for 1462 contains specific information on the possession of *renten* (government bonds), houses, land, cows, beds, ships, shared ownership of any ships, merchandise, carpenter's workshops and ships-carpenter's yards, looms, nets, and gardens.<sup>39</sup> In general, however, we may assume that because they are based on taxes these estimates understate the real value of capital holdings. On the other hand, the mayors of Amsterdam declared that merchants overstated their wealth in order to improve their credit worthiness.<sup>40</sup>

Table 5 shows that around 1500 the average wealth of citizens was about 50 guilders (one guilder was equivalent to a Holland pound consisting of 40 *groten*) – only in Amsterdam and Haarlem in 1483 was the figure significantly higher, while in Gouda and Delft it was much lower. In the case of Gouda one explanation may be that the assessments were made at the end of a period of depression in the 1480s. In Haarlem, too, average wealth fell by a half during this depression. In the mid-1490s the economic situation improved and a period of relative prosperity began that continued until about 1520. If average wealth was indeed close to 50 guilders, then this implies that the total wealth of the 125,000 urban citizens was 6 to 7 million guilders. The average wealth of those living in rural areas would have been less of course; not only was trade and industry concentrated in the cities, but a great deal of agricultural land was owned by the urban élites.<sup>41</sup> As a rough estimate, we may presume that the average wealth of those living in the countryside was no more than half of the corresponding figure for urban dwellers. This suggests that total wealth was in the region of 10 to 12 million guilders, and since these estimates probably understate the actual level of wealth, 12 million guilders is a more likely figure than 10 million.

This wealth consisted almost entirely (85 to 90%) of investment in agriculture, trade, and industry. According to the *Informacie* of 1514, the level of debt owed by Dutch cities was at most 2 million guilders, but much of this was in the hands of investors in the Southern Netherlands (and Utrecht).<sup>42</sup> It is probable that most capital was tied up in agricultural land. The approximately 300,000 ha of land under cultivation yielded at least 400,000 to 500,000 guilders a year in gross rents;<sup>43</sup> assuming an interest rate of 6.25%; this implies that agricultural land had a capital value of at least 5 million guilders.

The level of capital wealth in the seventeenth and eighteenth centuries can be estimated in various ways. Data on the yield of taxes on capital wealth can be used to establish the probable minimum level of wealth (Table 6). On the basis of these figures, it would seem that the level of capital wealth increased from at least 160 million guilders in 1599 to at least 1,400 million in 1788. This last figure in particular is somewhat suspect because the 4% tax on wealth levied in 1788 was actually a sort of forced loan on which 2.5% interest was paid, as a result of which it is possible that a larger proportion of capital assets than the required 4% was ‘paid’. We shall therefore try to compare the figures given in Table 6 with independent estimates of the most important components of capital wealth for c. 1650 and c. 1790.

The following components of capital wealth can be distinguished:

1. Capital invested in property: (agricultural) land, houses, and other buildings; this also includes a proportion of capital invested in industry (mills, shipyards, breweries) and in trade (warehouses).

2. Capital invested in moveable property: these estimates include only the value of the merchant fleet (2a) and the stock of commercial goods (2b).
3. Capital invested in government debt.
4. Capital invested abroad.

No estimates have been made of the value of other types of property, including livestock, tools, and consumer durables (jewellery, carriages, paintings). The value of these was probably rather small.

On the basis of data from the *verpondingen* of 1632 and 1732 and the first cadastral estimates relating to 1808-1810, the level of income from rents and leases can be estimated; it grew from 13.5 million guilders in 1632 to about 30 million in 1810.<sup>44</sup> In 1650 income from rents and leases was probably higher than in 1632 – the series of land rents presented by Kuys and Schoenmakers and the series of house rents in Amsterdam calculated by Lesger show that there was a clear upward trend between 1630 and 1650 – and income from property can therefore be estimated to have been about 15 million in 1650.<sup>45</sup> Income from property is unlikely to have risen between 1790 and 1808-1810 – countering the decline in rents that Lesger observed for Amsterdam was the rise in the value of leases, the result of high agricultural prices. In order to determine the value of property, it is necessary to multiply this income by a factor that reflects the decline in interest rates between 1650 and 1790. On the basis of Prak and De Jong's research into the estates of Leiden and Gouda's élites, it would appear that this factor was about 12 in 1650 and about 16 in 1790.<sup>46</sup> This implies that the value of property rose from about 180 million guilders in 1650 to about 480 million in 1790 (Table 6).

The value of the merchant fleet was modest: in 1510 estimates of 7 guilders per *ton* suggest a total of 270,000 guilders;<sup>47</sup> around 1780, on the basis of data relating to the price of ships from several Frisian shipyards, the corresponding figure is c. 55 guilders per *ton*, implying a total of 22 million guilders.<sup>48</sup> In comparison, the much more extensive series of data used by Horlings suggests the value of the merchant fleet in 1850, then about as large as in 1780, was 25 million guilders.<sup>49</sup> Given, among other things, the increase in construction costs in the second half of the eighteenth century, it is not unreasonable to estimate the value of the merchant fleet in 1650 to have been at most 20 million guilders.<sup>50</sup>

More important, but also much more difficult to estimate, is the value of the stock of commercial goods. It is likely that the size of the stock was related to the level of Holland's trade abroad. A few very rough estimates of this are given in Table 8. P.L. van de Kastele estimated that the level of total capital invested in trade in 1797 was around 200 million guilders.<sup>51</sup> This estimate implies that the level of investment in stock was less than the value of international trade. There are reasons to presume that in the mid seventeenth century the relationship between these two factors was different and that the value of stocks held was relatively high. The struggle for a monopoly position, which P.W. Klein has argued was characteristic of Holland's merchants in this period, implied the need to hold large stocks in order to control the market.<sup>52</sup> In the eighteenth century attempts to monopolize the market were less intense, partly as a result of the sharp increase in international competition, and the value of stocks held by merchants was probably lower. Only in the case of the VOC can this change be analysed: around 1650 the value of the stock of commercial goods (at cost price) was, roughly speaking, equivalent to the level of annual sales – both fluctuated around 8 million guilders. In the period 1771 to 1780 sales had increased to about 20 million guilders a year, but the value of the stock of commercial goods had declined to about 6 million guilders.<sup>53</sup> On the basis of these considerations and the experience of the VOC, the stock of commercial goods in 1650 can be estimated to have been at most twice the value of total foreign trade – say around 200 million guilders; for 1790 we have used Van de Kastele's estimate of 200 million guilders (see Table 9).

The size of Holland's debt increased from 130 million guilders in 1650 to 360 million guilders;<sup>54</sup> these figures do not include the (much smaller) debts of the Generaliteit (the Admiralty), cities, and district water authorities held by citizens of Holland.

The most recent estimates of the change in the level of investment abroad, made by Dormans, indicate an increase from 300 million guilders in 1770 to 765 million guilders in 1792 (Table 8);<sup>55</sup> it is assumed that a small proportion of this, i.e. 15%, was not held by citizens of Holland.

The estimates are set out in Table 9. They imply a very rapid increase in wealth in the period 1650-1790, not what one would have expected during a period of economic stagnation. For reasons of completeness, supplementary data that indicate the same phenomenon are presented below:

– In Leiden and Gouda the average value of the assets of regents (and in Gouda of the merchants too) increased significantly during the course of the eighteenth century; it doubled in Leiden and increased by 250 to 300% in Gouda.<sup>56</sup>

– In Amsterdam and in Delft data on the value of dowries and of inheritances indicate that the proportion of the

population that was wealthy increased significantly and the number of poor declined relatively; this too suggests there was an increase in the level of capital assets, an increase not restricted to the élite.<sup>57</sup>

According to data on death duties presented by A.C. Carter, the proportion of individuals with capital assets exceeding 90,000 guilders increased from 1.7% in 1739/40 to 4.4% in 1799/1800; the proportion of those with assets of between 20,000 and 90,000 guilders increased from 7.9% to 15.7% during the same period. A rough estimate assuming the average value of assets under 20,000 guilders was 5,000 suggests that the average value of inheritances subject to death duties doubled between 1740 and 1800, which is again consistent with our other data.<sup>58</sup>

Van der Spiegel estimated in 1782 that the wealth of the Dutch Republic had increased since 1648 by at least 1,000 million guilders, which is consistent with the estimates of Table 9.<sup>59</sup>

In short, all the figures point to significant growth in the level of capital assets in Holland in the course of the eighteenth century.

#### Labour and capital compared

The estimates presented above are summarized in Table 10, which shows that the level of capital accumulation was enormous. In both the periods 1500-1650 and 1650-1800 real per capita wealth tripled. The most important factor in this was no doubt domestic savings; only for the period 1580-1620 is there any evidence of significant capital flows to Holland from abroad. While this accumulation of capital resulted in interest rates falling by about a half, from 6.25% (a fairly standard rate at the beginning of the sixteenth century) to about 3% around 1790, on the basis of the data in Table 10 it can be estimated that per capita income from capital increased from 2.5 guilders in 1500 (equivalent to 12.5 guilders in 1650 prices) to more than 60 guilders in 1790.

If these estimates are correct, then it would appear that economic growth in early modern Holland was accompanied by a change in the distribution of income. Real wages remained at best constant in the long run the growth in per capita income probably benefited only capital. In this respect, pre-modern growth differs fundamentally from the 'modern economic growth' that characterized the period after 1850 and that benefited labour, too.

The estimates presented in Table 10 also cast new light on the debate concerning the development of the Dutch economy in the eighteenth century. Riley takes a somewhat revisionist view in arguing that there is evidence that there was an increase in nominal and real incomes in Holland in this period.<sup>60</sup> He points particularly to the growth of the financial sector during these years. On the other hand, research by Johan de Vries, Jan de Vries, Van der Woude, and Van Zanden has shown that per capita output declined somewhat, or at best stagnated.<sup>61</sup> To some extent, these apparently conflicting claims can be reconciled. Despite stagnating production, Holland became richer during the eighteenth century because of the continuing growth of private wealth. Net investment in trade, industry, property, and land was low perhaps even negative but the level of capital invested in government loans as well as abroad mostly also in loans to governments increased rapidly (Table 8). The savings surplus in the private sector increased consistently and significantly (Table 8). Up until 1720 the government more or less absorbed this savings surplus. After 1720 an increasing amount went abroad and was invested in foreign government bonds and, between c. 1760 and 1775, plantations in Surinam. So the period 1650-1800 can be characterized as a phase of 'accumulation without growth', an event undoubtedly unique in economic history.

#### 4. Conclusion

This essay presents estimates concerning the 'stylized facts' of the long-term development of the economy of Holland in the early modern period. Central to our analysis is the question of whether the economy grew, and to what extent this growth benefited labour and capital. Much work remains to be done to produce more robust and more detailed estimates than those provided here. Nevertheless, the general outline of the development of the Dutch economy up to 1650 seems fairly clear. It is evident from our findings that per capita output probably did not significantly increase between 1500 and 1580, while between 1580 and 1650 it clearly did increase. Per capita output rose by an average of at least 0.3% per year between 1580 and 1650, while the population increased by about 0.9% per year. The resulting growth in income per capita did not benefit labour; in the long run, real wages remained at best constant. Per capita wealth increased considerably throughout the period 1500-1790 by tenfold in real terms and this increase was not offset by a similar fall in interest rate levels (they were more or less halved). As a result, per capita income from capital increased significantly; a not insignificant proportion of this increase consisted of income from foreign investments however.

NOTES

Table 1. Area of land under cultivation, level of real rents and value added in agriculture (1500=100), 1500-1832

1500	1580	1650	1832	
Cultivated area (1000s ha)	300	314	360	376
Real rents (1500=100)	100	120	150	180
Estimated value added (at constant prices, 1500=100)	100	125	180	225

Sources: J. Lucassen, 'Beschouwingen over seizoengebonden trekarbeid', *Tijdschrift voor Sociale Geschiedenis* 8 (1982) 334, 336, 350-351; A.M. van der Woude, *Het Noorderkwartier; Een regionaal historisch onderzoek in de demografische en economische geschiedenis van westelijk Nederland van de late middeleeuwen tot het begin van de negentiende eeuw* (AGG Bijdragen 16 (1972)/Utrecht 1972) 46-53 and the sources cited in notes 8 and 9.

Table 2. Estimates of the size of the Dutch merchant fleet of the Netherlands, 1500-1850 (in tonnes)

1500	38,000
1532	38,000a
1567	160,000
1636	310,000b
1670	400,000
1750	365,000b
1780	400,000
1824	131,000
1850	390,000

a Holland only

b excluding ships belonging to the VOC and the WIC

Sources: Van Zanden, 'De economie', 587; H.P.H. Jansen, 'Handelsvaart van de Noordnederlanders', *Maritieme geschiedenis der Nederlanden* (Bussum 1976) I: 272.

Table 3. Estimates of beer production in the most important brewing centres and in Holland as a whole, 1510/14-1651 (in thousands of *vaten*)

	1510/14	1554/5	1569/70	1590/91	1651
Gouda	432	122	87	23	26
Haarlem	151	102	80	95	215
Delft	290	511	630	202	82
Total	873	735	797	320	323
Total					
Holland	1000-1100	-	598	907	

Sources: Haarlem: Van Loenen, *De Haarlemse brouwindustrie*, 47; Gouda: yield of *accijns* on *hoppebier* collected by A. van der Poest Clement and available in Gemeente-Archief [GA; = Municipal Archive] Gouda see also V.C.C.J. Pinkse, 'Het Goudse kuitbier', *Gouda zeven eeuwen stad* (Gouda 1972) 128; Delft: J.J. Woltjer, 'Een Hollands stadsbestuur in het midden van de 16e eeuw; Brouwers en bestuurders te Delft', D.E.H. de Boer & J.W. Marsilje (eds), *De Nederlanden in de late Middeleeuwen* (Utrecht 1987) 261, 268, 278; 1510/14: *Informacie*, various pages (data on yield of *accijns* on beer and the tax per *vat*); 1590: ARA, Huis Adrichem, no. 229; 1651: ARA, Financie van Holland, no. 826.

Table 4. Estimates of the growth of production in the most important sectors of the economy and in the economy of Holland as a whole, 1500-1650 (annual average growth rates)

1500-1580	1580-1650	1500-1650	
Agriculture	0.3	0.5	0.4
Herring fisheries	1.0	0.4	0.7
International services	1.8	1.3	1.5
Textiles (woollen)	-2.0	3.3	0.5
Brewing	-0.6	0.6	-0.1
Shipbuilding	1.8	1.3	1.5
Gross output			
weights 1500	0.7	1.2a	0.95
weights 1650	0.3	1.2a	0.7
Population	0.5	0.9	0.7

a ?minimum estimate

Sources: see text.

Table 5. Estimates of per capita wealth c. 1500 (in guilders/Holland pounds of 40 *groten*)

year	total capital (1000 guilders)	capital per capita(guild.)	
Amsterdam	1505/7	1018	
			73
Delft	1508	536	
			36
Haarlem	1495-1500a	444-553	32-40
Leiden	1498	919	55
Leiden	1502	805	49
Gouda	1492	216	23
Enkhuizen	1514	200	51
Hoorn	1514	332	54
Edam	1514	147	54
Total		3810	46
Haarlem	1483	973	70
Alkmaar	1532	547	78-99
Edam	1462	317	60-80

a ? seven different estimates ranging from 444 to 553

Sources: *Informacie*, various pages; Tracy, *Holland*, 30; Sparreboom, 'Twee fiscale bronnen', 160; H.E. van Gelder, 'Een Noord-Hollandse stad 1500-1540', H.E. van Gelder, *Alkmaarse opstellen* (Alkmaar 1960) 34; H. Kokken, *Steden en staten* (Den Haag 1991) 166-167.

Table 6. The taxable value of capital assets according to taxes levied in 1599, 1650, 1672 and 1788 (in millions of guilders).

1599	160
1650	400
1672	626
1788	1400

Sources: Dormans, *Het tekort*, 52, 69; J.M.F. Fritschy, *De patriotten en de financiën van de Bataafse Republiek* ('s-Gravenhage 1988; Hollandse historisch reeks X) 36, 47-48; ARA, *Financie van Holland*, no. 451.

Table 7 Estimates of the value of Dutch international trade 1560-1780 (in millions of guilders)

1560	40a
1650	100
1750	125
1780	250-300

a ? including the Southern Netherlands

Sources: J. de Vries, *De economische achteruitgang der Republiek in de achttiende eeuw* (Leiden 1959) 27-28; Bruijn, 'Scheepvaart 1580-1650', 139 (Bruijn estimated that the value of European imports in 1636 was 30.4 million and in 1650 around 40 to 50 million; imports from outside Europe amounted to at least 10 million guilders; the value of exports was certainly less than that of imports; a figure of 100 million guilders for the total value of international trade is thus somewhat conservative); 1560: W. Brulez, 'De handelsbalans der Nederlanden in het midden van de 16de eeuw', *Bijdragen voor de Geschiedenis der Nederlanden* 121 (1966/67) 278-310; Brulez estimated total imports to be 20-22 million guilders.

Table 8. Estimates of capital invested abroad and in loans to the States of Holland, 1650-1790 (in millions of guilders)

Public debt (Holland)	Foreign investments	Average	increase
1650	130	0	-
1720	310	0	2.6
1770	335	250	6.0
1790	360	650	21.3

Sources: J.C. Riley, *International government* (Cambridge 1980) 221, 243; Dormans, *Het tekort*.

Tabel 9. Estimates of the value of capital assets in 1650 and in 1790 (in millions of guilders)

	1650	1790	
Property		180	480
Merchant fleet		20	22
Stocks		200	200
Government debt		130	360
Abroad		-	650
Total		530	1712

Sources: see tables 6, 7 and the text.

Table 10. Estimates of private wealth and interest rates, 1500-1790.

Private capital		Intrest		
			%	
total (million)	per capita	at 1650 prices		
1500	10-12	ca 40	ca 200	6.25
1650	500-50	ca 650	ca 650	5
1790	1700-50	ca 2150	ca 2150	3

Sources: see text; interest rates from: *Informacie* (interest on *losrenten*) and Dormans, *Het tekort*; index of cost of living from H.P.H. Nusteling, *Welvaart en werkgelegenheid* (Amsterdam 1985) 280-1.

### Notes

\*..Translation: Chris Gordon (The English Word).

- 1.. J. de Vries, *The Dutch rural economy in the Golden Age, 1500-1700* (New Haven/London 1974); see also J. de Vries, *Barges and capitalism; Passenger transportation in the Dutch economy* (AGG Bijdragen 21 (1978); Utrecht 1981).
- 2.. A. Maddison, *Dynamic forces in capitalist development* (Oxford 1991) 30-35; J.L. van Zanden, 'Economische groei in Nederland in de negentiende eeuw', *Economisch- en Sociaal-Historisch Jaarboek* 50 (1987) 68.
- 3.. J.L. van Zanden, 'De economie van Holland in de periode 1650-1805: groei of achteruitgang?', *Bijdragen en Mededelingen betreffende de Geschiedenis der Nederlanden* 102 (1987) 562-609.
- 4.. Cf. J.G. van Dillen, *Van rijkdom en regenten; Handboek tot de economische geschiedenis van Nederland tijdens de Republiek* ('s-Gravenhage 1970); J.I. Israel, *Dutch primacy in world trade, 1585-1740* (Oxford 1989).
- 5.. Calculated from Rijksarchief Haarlem [RAH; = ###], Gecommitteerde Raden Noorderkwartier, no. 130.
- 6.. The *Informacie*, or ? in full ? the *Informacie up den staet Faculteyt ende Gelengentheyit van de Steden ende Dorpen van Hollant ende Vrieslant om daerna te reguleren de nyeuwe Schiltaele, gedaen in den jaere 1514* (ed. R. Fruin, Leiden 1866), was a village-by-village survey ordered by the future Hapsburg emperor, Charles V.
- 7.. J.C. Naber, *Een terugblik* (Haarlem 1970) 18; see for instance K.P.J. Janse, 'Gooise landbouw en koptienden', *Economisch- en Sociaal-Historisch Jaarboek* 54 (1991).
- 8.. J. Kuys & J.T. Schoenmakers, *Landpachten in Holland, 1500-1650* (Amsterdam 1981; Amsterdamse Historische Reeks 1).
- 9.. N.W. Posthumus, *Nederlandsche prijsgeschiedenis* (Leiden 1964) II: series nos 28a, 104, 160 and 180.
- 10.. This assumption is generally justified if the elasticity of substitution between land and labour is approximately -1, a not unreasonable premise.
- 11.. De Vries, *The Dutch rural economy*, 188-90; J. de Vries, 'Landbouw in de Noordelijke Nederlanden', *Algemene geschiedenis der Nederlanden* (Bussum 1980) V: 42, concludes on the basis of similar sources that productivity must have increased by as much as 50% between 1570 and 1650.
- 12.. H.A.H. Kranenburg, *De zeevisserij van Holland in den tijd der Republiek* (Amsterdam 1946) 29-32; see also R.W. Unger, 'Dutch herring, technology and international trade in the seventeenth century', *Journal of Economic History* 40 (1980) 253-279.
- 13.. R.T.H. Willemsen, *Enkhuizen tijdens de Republiek; Een economisch-historisch onderzoek naar stad en samenleving van de 16e tot de 19e eeuw* (Hilversum 1988) 55-6.
- 14.. R. Fruin (ed.), *Informacie*.
- 15.. Willemsen, *Enkhuizen*, 56.
- 16.. G. Asaert, 'Scheepvaart en visserij', *Algemene geschiedenis der Nederlanden* (Bussum 1980) IV: 134.
- 17.. W.J. Alberts & H.P.H. Jansen, *Welvaart in wording* (Den Haag 1977) 300.
- 18.. J.R. Bruijn, 'Scheepvaart in de Noordelijke Nederlanden 1580-1650', *Algemene geschiedenis der Nederlanden* (Bussum 1980) VII: 138.
- 19.. In the period 1650-1805, too, the pattern of change in international trade mirrored that in the size of the merchant fleet; see Van Zanden, 'De economie', 582-588.
- 20.. Israel, *Dutch primacy*.
- 21.. Van Dillen, *Van rijkdom en regenten*, 197-217.
- 22.. N.W. Posthumus, *De uitvoer van Amsterdam, 1543-1545* (Leiden 1971) 25; see also N.W. Posthumus, *De geschiedenis van de Leidsche lakenindustrie* (Den Haag 1908) I: 368.
- 23.. Posthumus, *Lakenindustrie*, I: 371.
- 24.. C.M. Lesger, *Hoorn als stedelijk knooppunt; Stedensystemen tijdens de late middeleeuwen en vroegmoderne tijd* (Hilversum 1990; Hollandse Studiën 26) 76, shows that the production of *lakens* decreased from 4500 in 1514 to 566 in 1559 and 105 in 1562; T. Wijsenbeek, *Achter de gevels van Delft; Bezit en bestaan van rijk en arm in een periode van achteruitgang (1700-1800)* (Hilversum 1987) 57; J.E.J. Geselschap, 'De lakennijverheid', *Gouda zeven eeuwen stad* (Gouda 1972) 134-135; L. Noordegraaf, 'Nijverheid in de Noordelijke Nederlanden 1480-1580', *Algemene geschiedenis der Nederlanden* (Bussum 1979) VI: 18, 26.
- 25.. J.G. van Dillen (ed.), *Bronnen tot de geschiedenis van het bedrijfsleven en het gildewezen van Amsterdam 1512-1632* (Den Haag 1929) I: XIV.

- 26.. L. Noordegraaf, 'Textielnijverheid in Alkmaar 1500-1850', *Alkmaarse historische reeks* 5 (1982) 42-44; Geselschap, 'De Lakennijverheid', 137-42; J.A.F. de Jongste, *Onrust aan het Spaarne* (Den Haag 1982) 16; for the decline in Delft after 1630 see Wijsenbeek, *Achter de gevels*, 58.
- 27.. Posthumus, *Lakenindustrie*, II: 946.
- 28.. Posthumus, *Lakenindustrie*, II: 883-886.
- 29.. Posthumus, *De uitvoer*, 242.
- 30.. H. Soly, 'De economische betekenis van de Zuidnederlandse brouwindustrie in de 16e eeuw', *Economische geschiedenis van België* (Brussel 1972) 101-105.
- 31.. L. Noordegraaf, 'Nijverheid in de Noordelijke Nederlanden 1580-1650', *Algemene geschiedenis der Nederlanden* (Bussum 1980) VII: 77; J.C. van Loenen, *De Haarlemse brouwindustrie voor 1600* (Amsterdam 1950).
- 32.. The tax data for 1590 are perhaps on the low side; Delft in particular protested at the way in which the duties were levied, believing that duties in other cities were being systematically evaded (see K. van Berkel, 'Delft als industriestad in de zestiende eeuw', *De stad Delft* (Delft n.d.) 81). These data are consistent with what is known from other sources, however, about the amount of beer brewed in Haarlem and Gouda (see sources Table 6).
- 33.. See R.W. Unger, *Dutch shipbuilding before 1800; Ships and guilds* (Assen 1978) 11; Unger estimated that in the seventeenth century perhaps half the output of shipbuilding was exported, which means that the output must have expanded even more rapidly.
- 34.. Sources: Algemeen Rijksarchief [ARA; = National Archives], The Hague: Huis Adrichem no. 229 (1590/91); Joh. van Oldenbarnevelt, no. 110 (1608); Financier van Holland, no. 826 (1651); Amsterdam's share of total soap production increased ? see Van Dillen (ed.), *Bronnen*, I: XXI, II: XXVIII.
- 35.. See Van Zanden, 'De economie', 603-606, and the sources cited in notes 12, 16, 22, 31 and Table 3.
- 36.. J. de Vries, 'An Inquiry into the behaviour of wages in the Dutch Republic and the Southern Netherlands, 1580-1800', *Acta Historiae Neerlandicae* 10 (1978) 79-97; L. Noordegraaf, *Hollands welvaren?; Levensstandaard in Holland 1450-1650* (Bergen 1985); H.P.H. Nusteling, *Welvaart en werkgelegenheid in Amsterdam, 1540-1860; Een relaas over demografie, economie en sociale politiek van een wereldstad* (Amsterdam 1985).
- 37.. Noordegraaf, *Hollands welvaren?*, 170-171.
- 38.. L. Noordegraaf, 'Levensstandaard en levensmiddelenpolitiek in Alkmaar vanaf het eind van de 16e tot het begin van de 19e eeuw', *Alkmaarse Historische Reeks* 4 (1980) 55-100.
- 39.. J. Sparreboom, 'Twee fiscale bronnen uit het stadsarchief van Edam, circa 1462', *Holland* 13 (1981) 150.
- 40.. J.D. Tracy, *Holland under Habsburg rule 1506-1566* (Oxford 1990) 28.
- 41.. De Vries, *The Dutch rural economy*, 43-49.
- 42.. Calculated from data on the payment of *renten* interest by the fourteen largest cities in Holland in the *Informacie*, assuming an average interest rate of 6.25% (the average interest rate of the *losrenten* in this source).
- 43.. Kuys & Schoenmakers, *Landpachten*, 58 (they give an average rent of 1.57 guilders per *morgen* for 1510).
- 44.. Van Zanden, 'De economie', 576; 1810: ARA, Collectie C. van de Breugel, no. 48; J.L. van Zanden, *De economische ontwikkeling van de Nederlandse landbouw in de negentiende eeuw 1800-1914* (Wageningen 1985) 125.
- 45.. Kuys & Schoenmakers, *Landpachten*; C.M. Lesger, *Huur en conjunctuur; De woningmarkt in Amsterdam, 1550-1850* (Amsterdam 1986) 181.
- 46.. M. Prak, *Gezeten burgers; De elite in een Hollandse stad. Leiden 1700-1780* ('s-Gravenhage 1985, Hollandsche Historische Reeks VI) 283; J.J. de Jong, *Met goed fatsoen* ('s-Gravenhage 1985, Hollandsche historische reeks V) 260.
- 47.. Based on Posthumus, *De uitvoer*, 88-89 (data on value and *lastage* of 12 ships in 1510/11) and table 2.
- 48.. J.L. van Zanden, 'De Friese economie in de 19e eeuw', *It Beaken* (1992) table 2 (data on the cost price of ships build in Frisia); and table 2.
- 49.. E. Horlings, 'De waarde van de Nederlandse koopvaardijvloot in 1850', (Amsterdam 1992; unpublished manuscript).
- 50.. For the rise in construction costs see Van Zanden, 'De Friese economie'.
- 51.. 'Begroting der inkomsten van de ingezeetenen der gehele Republicq', unpublished manuscript in ARA, Coll. Canneman, no. 4.
- 52.. P.W. Klein, *De Trippen in de 17e eeuw; Een studie over het ondernemersgedrag op de Hollandse stapelmarkt* (Assen 1965).
- 53.. J.P. de Korte, *De jaarlijkse financiële verantwoording in de Verenigde Oostindische Compagnie* (Leiden 1984) appendices 1 and 9.
- 54.. E.H.M. Dormans, *Het tekort; Staatsschuld in de tijd der Republiek* (Amsterdam 1991).
- 55.. Dormans, *Het tekort*; J.C. Riley, *International government finance and the Amsterdam capital market 1740-1815* (Cambridge 1980) 221, 243.
- 56.. Prak, *Gezeten burgers*, 276, 279; De Jong, *Met goed fatsoen*, 125.
- 57.. S. Hart, 'Een sociale structuur van de Amsterdamse bevolking in de 18e eeuw', *Geschrift en getal* (Dordrecht 1976) 188-191; Th. Wijsenbeek, *Achter de gevels*.
- 58.. A.C. Carter, *Getting, spending and investing in early modern times* (Assen 1975) 40-52.
- 59.. 'Van der Spiegel's "Schets tot een vertoog over de intrinsieke en relative magt van de Republyk" (1782)', *Economisch-Historisch Jaarboek* 27 (1958) 81-100.
- 60.. J.C. Riley, 'The Dutch economy after 1650: decline or growth?', *Journal of European Economic History* 13 (1984) 149-189.
- 61.. See Van Zanden, 'De economie', 562-564, 608-609, for a summary of the debate.