The world's first stock exchange: how the Amsterdam market for Dutch East India Company shares became a modern securities market, 1602-1700

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2 LONG-TERM DEVELOPMENTS

Introduction

The discussion of the development of the market of the previous chapter will be complemented in this chapter using long-term data. Using transfer, price and dividend data, I will show that the Amsterdam market entered a second stage of development in the 1630s and 1640s. The data suggest that during these decades the market transformed from a place where traders occasionally transferred a share, into a full-fledged financial market, characterized by a high level of market activity and a growing share of speculative transactions with short-term investment horizons. The last section of this chapter will use price data from the shares in the smaller chambers of the VOC to show that by 1650, the transformation of the Amsterdam market had become indisputable.

Market activity

For a large part of the seventeenth century, the capital books of the Amsterdam chamber of the VOC have survived.¹ Despite their shortcomings, which I have discussed in the Introduction (see section Sources on page 9 ff.), this source can still be used for two purposes. Firstly, the data from the capital books allow for a – albeit incomplete – comparison of market activity in several years during the seventeenth century. If more shares were transferred in, say, 1667 than in 1639, this indicates that market activity had increased. The absolute growth cannot be determined, and the higher number of transfers could merely be a sign that share traders had shifted from spots to repos, leading to a higher number of share transfers – a single repo transaction required at least two transfers. Secondly, and more accurately, the capital books yield data on the dates when transfers were registered in the East India house. Peaks in the share transfer register are an important indication of the character of the share trade, because the primary motivations for transactions can be deduced from them. Several checks throughout the seventeenth century have shown that the entry dates in the company records never differed by more than three days from the dates in shareholders’ private records. And if the dates differed, the VOC register generally predated

¹ For the period 1602-12, only the transaction ledger has survived, listing all share transfers chronologically. From 1628 onwards, only capital books, containing the accounts of all shareholders, are available: NA, VOC, inv. nrs. 7066-72. The shareholder records of the years 1613-28 have not survived.
the merchants’ own accounts, suggesting that the company bookkeeper registered the correct date, whereas shareholders procrastinated over updating their records.\(^2\)

Figures 2.1-5 depict the share transfer patterns for 1609, 1639, 1667, 1672 and 1688, respectively.\(^3\) The columns (left-hand scale) show the number of transfers and the line (right-hand scale) the nominal value of these transfers. I have split up the years in five-day periods, because one of the purposes of these graphs was to trace when the rescontre meetings started to convene and what their impact on the share market was. For that reason, it is necessary to always discern the last and first days of a month in a separate column: all contracts entered into the rescontre were due on the first day of the next month, so it is to be expected that the effects of the rescontre are visible in the first few days of the month, but not necessarily on the first day. The disadvantage of five-day periods, on the other hand, is that some include a Sunday, when the East India house was closed, while others do not. This does not render the data useless, however, because the trade nevertheless continued on Sundays. The Sunday trades were probably entered into the capital ledger on the following Monday. So, only for the five-day periods including a Sunday, that did not also include a Monday (one out of five of the five-day periods), the number of transactions is probably too low. This issue notwithstanding, five-day periods are still preferable over seven-day ones, because they are more suitable to capture the first days of a month in a separate period. Choosing seven-day periods would imply a monthly residual category of either three or four days – except for February. I have therefore decided to split up the months in six five-day periods, or five five-day and one six-day, or, in the case of February, five five-day and one three- or four-day period.

Comparing Figures 2.1-5 yields a number of results. First of all, market activity increased considerably over the seventeenth century. More specifically, the number of share transfers doubled between 1609 and 1639 and again doubled between 1667 and 1672. In 1609, the bookkeeper registered on average five share transfers per five-day

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\(^2\) E.g. the share purchase by Jacques de Velaer, mentioned in a letter to his uncle on 13 January 1609, was registered in the VOC books on 12 January: BT, 215, A2/9 and NA, VOC, inv. nr. 7066, fo. 148. Louis Trip’s journal entry of 5 March 1664 lists a number of share transactions of the previous months. Trip registered his purchase of a f3,000 share from Arnout de Raet on 3 March, whereas it appears in the capital book on 29 February: SAA, Merchants’ accounts, inv. nr. 50, 5 March 1664 and NA, VOC, inv. nr. 7070. The dates of the share transactions of Joseph Deutz, finally, never differ by more than one day. His sale to Guilliam de Vicq and purchase from Jan Looten are listed on 12 February 1672 in the company register and on 13 February in his private records. On 16 February, he bought a share from Gerrit Bode and sold one to Balthasar da Cunha. Both are registered on the same date in both the company books and his ledger: SAA, Deutz, 293, fo. 31 and NA, VOC, inv. nr. 7070.

\(^3\) See the Introduction for a discussion on the choice of these sample years.
period. By 1639, this number had increased to almost ten per five-day period, while in the next thirty years, the average number of share transfers per five-day period saw only a small increase, to almost 13 in 1667. Only five years later, in 1672, this number had almost doubled to more than 22.25 transfers per five-day period. In 1688, on average 18.75 share transfers were registered per five-day period. Secondly, the pattern of share transfers over the year changed. This is related to the growing importance of the forward market and the monthly resontre. Finally, with the exception of 1672, in all these sample years the summer months saw less activity in the transfer registers. This is remarkable, as the VOC return fleets generally arrived in the Dutch Republic during the summer months. Possible explanations could be that commodity trade demanded more efforts from the merchants during these months, or that the wealthiest share traders spent the summer outside Amsterdam. War and political unrest in 1672 explain the remarkably high number of transfers in that year’s summer.

The increase in number of share transfers in the periods 1609-39 and 1667-72 needs to be explained. Clearly, the 1609-39 increase is less sensational than the 1667-72 one: the period during which the number of share transfers doubled was six times longer. The 1609-39 increase followed from the regular dividend distributions that started in the 1620s. Around 1630, moreover, a clear legal framework took away any legal doubts that traders could have about the share trade, which encouraged new participants to enter the market. The 1667-72 increase, on the other hand, partly reflects the stock market boom of 1671 (the share price reached its highest point during the seventeenth century in early July 1671: 566%) and the subsequent shock that the year 1672 brought about. The wars and political unrest of 1672 influenced investors’ expectations regarding the price of VOC shares, which led to increased trading activity since not all investors interpreted the news in the same way.

However, there was yet another reason, directly linked to that year’s large price movement, why the number of share transfers increased so much in 1672. The high price volatility made forward traders aware of the counterparty risk of their transactions. They therefore shifted part of their activity to the repo trade. Each repo required two share transfers and hence the price fluctuations of 1672 led to a marked

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4 Gaastra, *De geschiedenis van de VOC*, 101.
5 See, for the legal framework, chapter 3, section The legal framework on page 97 ff.
6 SAA, Velters, inv. nr. 1, fo. 212. The share price reached this peak once more on 13 March 1688: SAA, Velters, inv. nr. 4, fo. 78.
7 See chapter 4, section Counterparty risk on page 120 ff.
increase in share transfers. In 1688, the share price made sharp movements only from late August until the end of October, which explains the slightly lower number of transfers in that year.

Focusing on the peaks in these graphs, it is clear that two five-day periods in 1609 (July 1–5 and August 11–15) were characterized by higher than average trade. These peaks were caused by the first news about the return fleet and its subsequent safe arrival in the Netherlands, respectively. Apparently, news about return fleets, the main indication of the company’s well-being, heavily influenced investment decisions. This indicates that the traders used the secondary market for long-term investments. 1639 saw increased activity in the transfer registers from January 21–25 and June 21–25. The high number of trades in January was probably due to the departure of ten ships destined for the East Indies a week earlier. The June peak may reflect the arrival of the first pieces of information about the return fleet that was expected to return to the Dutch Republic a month later. To be sure, I do not argue that information influencing the long-term outlook of the company was the only driving force behind transactions in VOC shares, but Figure 2.1 and Figure 2.2 clearly show that the arrival of news about the return fleet induced investors to trade more frequently than in other periods.

By 1667, however, this situation had changed, as can be seen from the rather different transfer pattern in Figure 2.3. This graph clearly shows that more shares than average were transferred in the first five-day period of each month. Especially the first days of March, May, September and November of this year witnessed a high number of share transfers. The peak in the number of share transfers in the first five days of November is particularly interesting. In the preceding month, ten ships from the East Indies had arrived safely in the Dutch Republic. However, the reaction of the share traders on the arrival of the return fleet is visible only in the first days of November. This means that the traders traded on the new information in the forward market. It also indicates that the rescontre, where transactions that were due on the first day of the next month were settled, was in full force by 1667 and that it had a considerable impact on the number of share transfers – even though the lion’s share of the deals the

9 DAS.
10 Exact arrival dates: October 9th (3), 10th (1), 21 (1), 22 (1), 25 (4): DAS.
traders made never ended up in the transfer registers. Put another way, the forward market had surpassed the spot market in importance.

The graphs depicting the share transfers in 1672 and 1688 (Figure 2.4 and Figure 2.5) must be interpreted differently. Both years witnessed major price falls, caused by war (in 1672) and rumors about an imminent invasion of England (in 1688). In these years, the peaks in the number of share transfers can be linked to political and military events. The peak in March was a reaction to the start of the war with England; in early April, France declared war on the Netherlands; on June 12, foreign armies entered the Dutch Republic near the village of Lobith; and finally, the peak that occurred in the five-day period of 16-20 August 1672 (49 share transfers) coincided with the murder of Johan and Cornelis de Witt. The share traders were fully focused on political events; the arrival of the return fleet on 3 August is not visible in the transfer data, even though this must have been a relief to everyone with an interest in the East India trade, for England had of course intended to attack the VOC return fleet.

The high number of share transfers between the end of August and mid-October 1688 reflects the turmoil on the secondary market for VOC shares caused by rumors about Stadholder William III’s plans to invade England. These were only rumors; the preparations for the invasion had started as a private undertaking of William; only a few insiders knew about it. Interestingly, the transfer register data also clearly show that the rumors became confirmed information directly after William had presented his plans to several political bodies for support. The States of Holland approved the recruitment of foreign troops on 22 September and the Amsterdam city magistrate gave its assent to William’s plans on the 26th. This immediately led to increased trading activity.

The analysis of the capital ledgers of the Amsterdam chamber of the VOC has thus yielded two results. Firstly, market activity increased markedly between 1610 and 1640, caused by regular dividend distributions and legal certainty, and again between 1667 and 1672, caused by a speculative boom and a growing preference for repo transactions. Secondly, the transfer data indicate that trading activity during rescontre

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11 See chapter 5, section Market reactions to information on page 156 ff.
13 14 ships arrived safely in Eems: DAS.
meetings had become very high by 1667. Clearly, the bulk of the share trade now took place on the more speculative and short-term horizon forward market. Investors no longer bought a share to hold on to it for a prolonged period of time, but actively traded short-term transactions on the financial market.

**Number of traders**

The capital books can also be used to estimate the number of active traders in a certain year. Again, the actual number of traders who participated in the secondary market for VOC shares was probably much higher than the number of traders who were involved in one or several share transfers – traders who managed to settle all their derivatives contracts through money settlement do not appear in the transfer registers – but the transfer data allow for the best possible estimation.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of accounts</th>
<th>Number of active accounts</th>
<th>Number of share transfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1602</td>
<td>1143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1609</td>
<td></td>
<td>276</td>
<td>368</td>
</tr>
<tr>
<td>1639</td>
<td></td>
<td>264</td>
<td>713</td>
</tr>
<tr>
<td>1667</td>
<td></td>
<td>347</td>
<td>934</td>
</tr>
<tr>
<td>1672</td>
<td></td>
<td>521</td>
<td>1604</td>
</tr>
<tr>
<td>1688</td>
<td></td>
<td>436</td>
<td>1350</td>
</tr>
<tr>
<td>1679-1695</td>
<td></td>
<td>1770</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2.1** Total number of shareholders’ accounts, Amsterdam chamber VOC, 1602 and 1679-1695; number of active accounts and share transfers, 1609, 1639, 1667, 1672 and 1688


Table 2.1 lists the data I have collected about the total number of shareholders’ accounts and the number of active accounts for several years throughout the seventeenth century. In 1602, 1143 investors subscribed to the capital stock of the Amsterdam chamber. The number of shareholders increased over the seventeenth century to 1770 in the period 1679-95. Each year, only part of the shareholders transferred a share in the capital books. In 1609, 276 shareholders transferred at least one share. This number decreased to 264 in 1639, went up to 347 and 521 in 1667 and 1672, respectively, and fell back to 436 in 1688.
The increase between 1639 and 1667 equals the increase in the number of share transfers. The increase in the number of active accounts between 1667 and 1672 was relatively smaller than the growth in the number of share transfers, which can be explained by the fact that traders shifted to repo transactions, requiring relatively more share transfers. The difference between 1672 and 1688 can again be explained by a decreasing number of share transfers. The number of transfers per shareholder thus stayed more or less the same over this period.

So, what really needs to be explained is the difference between 1609 and 1639. In 1609, 276 shareholders transferred 368 shares, whereas 264 shareholders transferred 713 shares in 1639; fewer shareholders transferred almost twice as many shares. From the 1630s onwards, a small number of shareholders accounted for a large proportion of the total number of share transfers. In 1641, for example, the thirteen most active shareholders (with at least ten sales and ten purchases registered on their accounts) were involved in almost a third of all share transfers. In 1664, the fourteen most active shareholders (with at least fifteen sales and fifteen purchases) were involved in almost 40% of all share transfers. In 1609, however, the distinction between active shareholders and less active shareholders was almost non-existent; there are a few accounts with frequent purchases and others listing frequent sales, but nobody both purchased and sold more than five shares.

These findings corroborate my view on the changing character of the share trade starting around 1630. In the earliest years of the secondary market for VOC shares, shareholders occasionally transferred their shares. Some shareholders either purchased or sold a higher number of shares, indicating that they expected the share price to rise in the future or that liquidity constraints or negative trading sentiment prompted them to liquidate large part of their share capital. From the 1630s onwards, however, certain shareholders started to both buy and sell large amounts of shares in the same year. Investors with short-term investment horizons had begun to dominate the market.

Share price and dividends
Figure 2.6 and Figure 2.7 depict the monthly price of VOC shares in the Amsterdam chamber throughout the seventeenth century, which are also listed in Appendix A.

\[13\] NA, VOC, inv. nr. 7068, 7070. In an earlier stage of my research, I made these laborious calculations using 1641 and 1664 data. 1639 and 1667 are likely to yield similar results.
For months with multiple observations, I have calculated the average share price.\textsuperscript{16} In Figure 2.6, missing values have been derived from linear interpolation; Figure 2.7 does not use interpolation, it shows how my observations are spread over the century. The dataset consists of 851 observations of spot prices. Figure 2.8 gives an impression of the variation in the share price. This graph shows the yearly high, low and average price.

The prices used to draw these graphs and listed in Appendix A are \textit{ex}-dividend prices. So, for example in February 1688, the market price for shares on which 1449 1/6\% of the nominal value of the shares had been collected as dividend since the first distribution in 1610 was 563.5\%. On 15 April 1688, the company distributed another 33 1/3\%. It took a while, of course, before all shareholders had collected their dividend, so for a period of two or three months, there were two kinds of shares in circulation: those on which 1449 1/6\% dividend had been collected and shares on which 1482.5\% had been received. Obviously, the price difference between these two kinds of shares amounted to 33 1/3\%, which explains why share traders always mentioned the amount of dividend received on a certain share. The \textit{ex}-dividend price did not always fall by exactly the size of the dividend, however. Dividend distributions also had an informational value – they informed investors for instance about the profitability of the company\textsuperscript{17} – to which the market reacted.

The share price equals the present value\textsuperscript{*} of all future dividends. Put another way, the share price reflects the market’s expectations of dividends. Hence, Figure 2.6, showing the VOC share price 1602-98, reflects how the shareholders valued remaining dividends at any point in time during the seventeenth century. It cannot exactly be reconstructed how shareholders formed their expectations on remaining dividends, but previous dividends were undoubtedly a major factor in determining the expected size of dividends. These previous dividends (1620-99) are depicted in Figure 2.9. In this graph, dividends are expressed as a percentage of the nominal value of the capital stock. In 1625, for example, the VOC announced a dividend of 20\% of the nominal value of the company stock. A shareholder who owned a share with a nominal value of f3,000 could thus collect a dividend of f600.

\textsuperscript{16} For high-volatility periods (1664-5, 1672 and 1688), minimum and maximum instead of average monthly prices have been used to make the size of the price fluctuation visible in the graph. In August 1688, for example, the price dropped from 546.66\% to 460\%. The average price of my observations in this month is 493.73\%, but I have used the 460\% observation to make this month’s price drop visible.

\textsuperscript{17} See chapter 5, section Market reactions to information on page 156 ff.
At first sight, the dividends distributed by the VOC are impressive: a 60% dividend in 1671, for example, seems enormous. However, dividends expressed as a percentage of the nominal value of the shares do not reveal much about the actual impact of the dividend distribution. Dividend as a percentage of the market price is a better measure, because it allows for a comparison of the company’s dividend distributions over time. Figure 2.10 depicts the dividends of the VOC as a percentage of the market price of the Amsterdam shares (1620-97). This graph clearly shows that the 37.5% dividend of 1620 was the largest in relative terms. The sequential dividend distributions of 1633, 1635, 1636 and 1637, moreover, are striking in size. These distributions coincided with the remarkable share price increase of the 1630s (see Figure 2.6); they clearly induced shareholders to update their expectations regarding dividends and hence about the share price.

Figure 2.11 takes the analysis one step further. It shows to what extent historical dividends determined the value of the VOC shares. The two lines of the graph are a ten-year moving average of the real dividend (dividend as a percentage of the market value of the shares) on the left-hand scale and the average yearly share price of the Amsterdam chamber VOC shares on the right-hand scale. The ten-year moving average real dividend is calculated by dividing the average nominal dividend over the previous ten years by the market price of the VOC shares in a given year. The value for 1670, for example, is calculated by dividing the average nominal dividend over the period 1661-70 by the market price of the VOC shares in 1670.

If shareholders indeed based their expectations of dividends in future years on the dividend they received in previous years, the share price and ten-year average of real dividends should move in tandem. Figure 2.11 shows that this was only partially the case for the seventeenth-century market for VOC shares. In the second half of the 1660s and the first years of the 1670s, for example, the average real dividend over the preceding ten years was very low (around 3% annually), but the share price did not make a downward correction until 1672 – a year in which the Dutch Republic was at war. The shareholders were apparently optimistic that the shares would yield a good return even if high dividend payments failed to occur. The data are inadequate to make firm statements, but it does seem that the VOC shares were overvalued shortly before the 1672 price crash.

On the whole, however, the share price adjusted with a short lag to fluctuations in the average real dividend over the preceding ten years. The share price rose
upwards around 1637, when the ten-year real dividend reached 6.6%. When the ten-year real dividend dropped back to around 5% from 1646 onwards, the share price followed with a similar movement in the next few years. Finally, focusing on the periods 1630-35, 1648-63 and 1689-98 reveals that the shareholders of the VOC made a downward adjustment of the discount rate during the seventeenth century. During these three periods, the average dividend over the preceding ten years fluctuated around 5% annually, whilst the share price fluctuated around 200%, 400% and 500% in 1630-35, 1648-63 and 1689-98, respectively. Assuming that shareholders expected the real dividend to stay constant, these share price differences can only be explained by a change in the discount rate. The development of interest rates charged on the Amsterdam capital market provides an explanation for the downward adjustment of the discount rate: the interest rate on private obligations declined from around 8% in the early seventeenth century to as low as 2.5-3% in the 1680s. As money became cheaper, shareholders also required a lower return on their investment. The price pattern of VOC shares over the seventeenth century can thus partly be explained by the declining interest rate.

**Divergent developments: Amsterdam and peripheral markets**

The previous sections have shown that the periods before and after 1640 are separate stages in the development of the secondary market for VOC shares. This section will show that the development of the peripheral markets for shares in the five smaller chambers of the VOC kept up with Amsterdam until about the same time – 1640. Thereafter, however, the development of the Amsterdam market entered a second stage, whereas the smaller markets stayed behind.

The markets developed in tandem in the first years of the seventeenth century. In the period 1604-8, for example, about 30% of the capital stock of the Enkhuizen chamber was transferred. These figures are comparable to those of Amsterdam.

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18 See, for the relation between dividends, the discount rate and the share price, the formula in footnote 31 on page 71.
Soon thereafter, however, the Amsterdam market started to develop relatively faster.\textsuperscript{21} The Amsterdam stock was of course by far the largest, which naturally resulted in a larger market, but Amsterdam merchants also seem to have been more inclined to trade on the secondary market; Amsterdam merchants had initiated more than half of the transfers in the Enkhuizen chamber stock between 1604 and 1608.\textsuperscript{22}

The higher trading activity in Amsterdam led to price differences between the shares in the Amsterdam chamber and shares of the smaller chambers. The share traders who petitioned against the proposed ban on short selling in January 1610 mentioned that the price of shares in the Amsterdam and Zeeland chambers was on average between 3 and 5 percentage points higher than the price of the shares in the other chambers.\textsuperscript{23} A year and a half later, in September 1611, shares in Middelburg and Enkhuizen traded at 220%; about 4 percentage points lower than in Amsterdam. From that time onwards, Amsterdam shares would remain the most expensive.\textsuperscript{24}

The price differences became remarkably big in the second half of the seventeenth century, as can be seen from Table 2.2 (on page 75), which lists the available price data for the Middelburg, Enkhuizen and Hoorn chambers, to which Amsterdam prices for the same months are added. The last column lists the relative difference between the price quoted in Amsterdam and the other chambers. I have not found any price data for the Rotterdam and Delft chambers. Figure 2.12 gives a graphic representation of these data. It clearly shows how the share prices started diverging after about 1650. Before that year, the relative price difference fluctuated between 1 and 3.5%. After 1650, however, the Enkhuizen and Hoorn shares were on average around 17% cheaper. The price difference with shares of the Middelburg chamber was even larger: 21% in 1660 and increasing to 33% after 1672.

The price gap between Amsterdam and Middelburg is especially remarkable. The Zeeland chamber had the second largest capital stock and its share price had kept up with Amsterdam in the first decade of the seventeenth century. The anonymous author of the 1688 pamphlet \textit{De actionisten voor en tegengesproken} gave an explanation for the diverging prices. According to him, a tax on share capital, levied in Zeeland from

\textsuperscript{22} Gelderblom and Jonker, ‘Completing’, 658.
\textsuperscript{24} BT, inv. nr. 112 C2, fo. 7; inv. nr. 113, fo. 1.
1672 onwards, had caused the relative price fall of the Zeeland shares. The Zeeland tax was a capital levy of 0.5%. The company bookkeeper was responsible for the tax recovery; shareholders were taxed for the amount of shares registered under their name in the company’s capital books. VOC shares were taxed at 400% of their nominal value, so the tax burden was 2% on the nominal value of the share capital.

The other five chambers were located in the province of Holland, where a similar tax was not levied, but share capital in Holland was not exempt from capital levies either. For certain years, the tax burden was even higher in Holland than in Zeeland, but what set the Zeeland tax apart was its structural character. This induced shareholders to adjust their expectations on future returns and hence it brought the share price down. The authorities of Holland, on the other hand, announced the provincial capital levies irregularly—they levied a tax when they needed the money.

25 De actionisten voor en tegengesproken. Consideratien tot wederlegging van de voorstellingen door de Heer Mr. Nicolaas Muyt van Holy, opgestelt in zyne Memorie, om de Negatie van Oost en West-Indische Actien te bezwaren met een Impost, ende in zyn nader geschrift van oplossinge van de difficutatien, die hy sagt by eenige gemaakt te zyn, tegens de selve Memorie (Amsterdam 1688) 7.

26 A so-called tweehonderdste penning: out of every two hundred pennies, one had to be paid as a tax to the provincial government (0.5%).

27 This means that the tax applied to the total capital stock of the Middelburg chamber, hence shareholders from outside the province of Zeeland were also liable to pay the tax.

28 In Holland, the following taxes were levied on share capital in the period 1672-88:

<table>
<thead>
<tr>
<th>Announcement date</th>
<th>Tax rate</th>
<th>Tax burden on nominal value</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 VI 73</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>8 X 73</td>
<td>0.5%</td>
<td>2%</td>
</tr>
<tr>
<td>22 XII 73</td>
<td>0.5%</td>
<td>2%</td>
</tr>
<tr>
<td>20 XII 75</td>
<td>1%</td>
<td>&gt; 4% - this tax was levied on the pre-1672 share price (i.e. &gt; 400%)</td>
</tr>
<tr>
<td>19 III 1677</td>
<td>1%</td>
<td>&gt; 4% - idem</td>
</tr>
<tr>
<td>30 VII 1677</td>
<td>0.5%</td>
<td>&gt; 2% - idem</td>
</tr>
<tr>
<td>22 XII 1677</td>
<td>0.5%</td>
<td>&gt; 2% - idem</td>
</tr>
<tr>
<td>20 VIII 1678</td>
<td>0.5%</td>
<td>&gt; 2% - idem</td>
</tr>
<tr>
<td>29 III 1679</td>
<td>0.5%</td>
<td>&gt; 2% - idem</td>
</tr>
<tr>
<td>31 V 1680</td>
<td>0.5%</td>
<td>2%</td>
</tr>
<tr>
<td>11 XII 1681</td>
<td>0.25%</td>
<td>1%</td>
</tr>
<tr>
<td>21 VI 1687</td>
<td>0.5%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: Cornelis Cau (et al.), Groot placaet-boeck, vervattende de placaten, ordonnantien ende edicten van de... Staten Generael der Vereenigde Nederlanden, ende van de... Staten van Hollandt en West-Vrieslandt III (The Hague 1683) 1034-85; Cornelis Cau (et al.), Groot placaet-boeck, vervattende de placaten, ordonnantien ende edicten van de... Staten Generael der Vereenigde Nederlanden, ende van de... Staten van Hollandt en West-Vrieslandt IV (The Hague 1705) 921-2.

Until 1680, the tax was assessed on the basis of so-called personele kohieren, registers that listed the assessed wealth of taxable citizens. Hence, taxes were paid on the basis of the estimated value of shares and other property owned. In May 1680, the States General ruled that the real share capital should be taxed, so from now on shareholders were liable to pay tax on the basis of the amount of shares registered on their account in the capital books of the VOC. This instantly led to protests by moneylenders on whose accounts shares pledged as collateral were registered, but the States General did not make an exception for these shares. R. Liesker and W. Fritschy, Gewestelijke financiën ten tijde van de Republiek der Verenigde Nederlanden IV Holland (1572-1795) (The Hague 2004) 224, 367. Van Dam, Beschryvingen 1A, 145. Cau, Groot placaet-boeck III, 1081-2.

These unexpected capital levies decreased the value of an individual’s current stock holdings, but they did not directly influence all future cash flows. So, in hindsight, although the tax burden on shareholders in Zeeland and Holland did not differ much, diverging expectations caused the price difference between Holland and Zeeland.

The following calculation, using 1681 data, will show the effect of a yearly recurring 2% capital tax can on the share price. 1681 is a good year to check for the price impact of the tax, because by that time, the Franco-Dutch war had ended and political unrest no longer caused sudden price changes. Furthermore, I have a relatively large number of price observations for both the Amsterdam and Middelburg chambers in these years (see Table 2.2), which makes a comparison of the prices more convincing.

In the decade preceding 1681, VOC shares had earned on average a yearly 15% dividend on nominal value. It could be assumed that shareholders expected to earn this rate in the future as well. Using a discount rate of 4.5% leads to a share price of 348%. A yearly tax of 2% on share capital meant that the yearly return on the share decreased by about 2%, hence this tax can be considered as a 2-percentage-point dividend cut. Shareholders would now adjust their expectations on dividends from 15% to 13% per year. Consequently, the share price would fall to just over 300%. Hence, in this example, a 2% capital tax would have resulted in a relative price fall of 13 1/3%. VOC shares in the Amsterdam chamber quoted on average 438.5% in January and February 1681. Extrapolation the data from Table 2.2 would yield a pre-tax Middelburg price of 345% (the Middelburg chamber shares quoted on average 21% lower), which almost equals the price for a share that earns 15% dividend per year. On the Middelburg market, however, shareholders paid 290.5-292%. This is slightly more than 2.5% less than predicted by my calculation, but the tax still provides a plausible explanation for the increased price difference after 1672.

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30 A discount rate of 4.5% may seem low, but this was about the same rate merchants charged each other on loans where no collateral was pledged – an investment that could be considered equally risky as VOC shares. See for interest rates: SAA, Deutz, inv. nrs. 291-5.
31 The price of a share today equals the sum of the present value of all future dividends. This is written as

\[ P_0 = \sum_{t=0}^{\infty} \frac{D_{t+1}}{(1+r)^t} \]

where \( P_0 \) is the share price today, \( r \) is the discount rate (the expected return on securities in the same risk class), \( D_{t+1} \) is the dividend, \( t \) the year and \( \infty \) infinity. For an explanation on how this formula is derived, see e.g. Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance (6th ed., Boston 2000), 64-6.
32 Cf. Table 2.2.
33 SAA, PIG, inv. nr. 858, fo. 174.
The pamphlet’s anonymous author also gave an explanation for the high share price in Amsterdam relative to the other four Holland chambers. According to him, the different levels of trading activity on the markets caused this. He wrote this pamphlet in 1688, shortly after the publication of a proposal to levy a tax on derivative transactions on the Amsterdam market that did not ultimately result in a share transfer. The author of this proposal, Nicolaas Muys van Holy, argued that the tax would limit speculative trades and hence protect less wily participants of the market.34 De actionisten voor en tegengesproken, on the other hand, reasoned that a thriving secondary market for shares did not harm anybody and that a comparison between the six share markets in the Netherlands immediately revealed that more active trade led to higher prices. Hence, widows and orphans were not victims of the flourishing derivatives trade; on the contrary, they profited from the higher price resulting from the trading activity.35

The anonymous author did not elaborate on his explanations, but it is very well possible that these two factors accounted for the price differences within the province of Holland. Seventeenth-century investors, just like their present-day counterparts, preferred to invest in liquid assets, for this allowed them to quickly sell off the share if they needed cash. Additionally, they did not want their trades to have too much price impact; a sale on an illiquid market, for instance, could very well lead to a significant price decrease. Hence, shareholders were willing to pay a liquidity premium. I have no data on the liquidity of the markets for shares in the smaller chamber of the VOC, but Catharina Pieterson’s efforts to sell her ƒ3,000 share in the Delft chamber reveal quite a bit of information about trading activity on the smallest markets. In March 1689, she asked Harmen van den Honert to sell her share. Van den Honert passed the order on to Johan de Hertoghe, a lawyer of the States of Holland. The reason why he did this becomes clear from the action taken by De Hertoghe: he ordered the Amsterdam broker Gerrit Loot, specialized in the share trade, to sell the share.36 There were probably no buyers at all on the Delft market, so Van den Honert

34 Muys van Holy, Middelen en motiven, 1. Muys van Holy proposed a ƒ6 tax on forwards. Option buyers should pay 10% of the premium, with a minimum of ƒ6. The tax would be refunded if the derivative transaction led to a share transfer. Ibidem, 3-5.
35 De actionisten voor en tegengesproken, 7.
36 Manuel Mendes Flores vs. Johan de Hertoghe, NA, Court of Holland, inv. nr. 857, nr. 1695-58. This case came up before the Court of Holland in first instance. Broker Loot managed to sell the share in Amsterdam to Manuel Mendes Flores, but the share was never transferred to him, because De Hertoghe had inadvertently also sold the share in The Hague – probably to an acquaintance of his, for there was no sizable share market in The Hague.
needed someone with good connections in Amsterdam to sell the share there. Shares in the smaller chambers thus gained liquidity by using the size of the Amsterdam market. It could be possible – but this single example cannot prove it convincingly – that the secondary markets for shares in the smallest chambers of the VOC gradually dissolved in the Amsterdam market, rendering the smaller markets redundant.

Apart from a liquidity premium, short-selling restrictions would also have had an effect on the price. On markets with short-sale constraints, pessimistic investors can sell the shares they currently own, but they cannot get a short position\(^*\). Optimistic investors, on the other hand, have no limitations of the amount of shares they can buy. Hence, their beliefs have a disproportionate influence on the share price.\(^{37}\) Short-sale constraints were in force on the market for VOC shares, but they were generally ignored. However, these constraints could still have had an effect on the share price, for there was a bias in the courts’ behavior in favor of buyers. As I will show in chapter 3, buyers of forward short sales could always ask the court to declare their transaction null and void. The seller would then not only forgo the profit from the transaction, but he would also incur a fine. Buyers of forward short sales seldom went to court, but sellers nonetheless knew that they ran a risk that the contract would be declared null and void. Put another way, the \textit{a priori} risk of a forward seller was higher than that of the buyer. This could have resulted in more buyers than sellers among the traders willing to participate in the forward market, leading to a higher price, and it could also have induced forward sellers to demand slightly higher prices as a compensation for the extra risk they ran. Although short-sale constraints were in force in all the cities with VOC chambers, I contend that the restrictions had a greater influence on the price in Amsterdam than in any of the other cities, because of the simple fact that the Amsterdam forward market was much larger.

The increasing price difference after 1650 was thus a direct result of the fact that the development of the Amsterdam market outpaced that of the peripheral markets. Participants of the Amsterdam market were willing to pay a liquidity premium and the increase in speculative trading activity led to higher prices for shares in the Amsterdam chamber.

\(^{37}\) Several economists have tried to model the effects of short-sale constraints on share prices. E.g. Hong Scheinkman and Xiong, ‘Asset float’.
Conclusions

The data presented in this chapter corroborate the findings of chapter 1. During the 1630s and 1640s, the secondary market for VOC shares transformed into a modern financial market. Market activity, both on the spot and forward markets, increased sharply during these decades. The growing price difference between shares in the Amsterdam chamber and shares in the peripheral chambers from 1650 onwards shows that the development of the smaller markets could not keep pace with Amsterdam. The data also provide evidence for my hypothesis that the trading clubs began to play a significant part only from the 1660s onwards. The explanation for the fact that the emergence of the trading clubs lagged behind the other developments on the market must be that by 1660, the market had grown too large for its original structure; trading clubs were needed to handle the complexity of the market.
Table 2.2 Share price data of the Middelburg, Enkhuizen, and Hoorn chambers of the VOC

<table>
<thead>
<tr>
<th>Date (month-year)</th>
<th>Middelburg</th>
<th>Enkhuizen</th>
<th>Hoorn</th>
<th>Amsterdam</th>
<th>Relative difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX-1611</td>
<td>220</td>
<td>220</td>
<td>225</td>
<td>2.2%</td>
<td></td>
</tr>
<tr>
<td>XI-1611</td>
<td>216</td>
<td>218</td>
<td>218</td>
<td>0.9%</td>
<td></td>
</tr>
<tr>
<td>VII-1616</td>
<td>254.5</td>
<td>262</td>
<td>262</td>
<td>2.9%</td>
<td></td>
</tr>
<tr>
<td>III-1617</td>
<td>260</td>
<td>265</td>
<td>265</td>
<td>1.9%</td>
<td></td>
</tr>
<tr>
<td>VI-1617</td>
<td>264</td>
<td>267</td>
<td>267</td>
<td>1.1%</td>
<td></td>
</tr>
<tr>
<td>XII-1618</td>
<td>310.5</td>
<td>314.5</td>
<td>314.5</td>
<td>1.3%</td>
<td></td>
</tr>
<tr>
<td>IX-1649</td>
<td>520</td>
<td>539</td>
<td>539</td>
<td>3.5%</td>
<td></td>
</tr>
<tr>
<td>XII-1650</td>
<td>490</td>
<td>527.5</td>
<td>527.5</td>
<td>7.1%</td>
<td></td>
</tr>
<tr>
<td>XI-1652</td>
<td>363-6</td>
<td>438</td>
<td>438</td>
<td>16.4%</td>
<td></td>
</tr>
<tr>
<td>VIII-1659</td>
<td>280-90</td>
<td>340</td>
<td>340</td>
<td>17.6%</td>
<td></td>
</tr>
<tr>
<td>IV-1660</td>
<td>350-2</td>
<td>412</td>
<td>412</td>
<td>15.0%</td>
<td></td>
</tr>
<tr>
<td>VI-1660</td>
<td>350</td>
<td>443</td>
<td>443</td>
<td>21.0%</td>
<td></td>
</tr>
<tr>
<td>VII-1667</td>
<td>350</td>
<td>422.5</td>
<td>422.5</td>
<td>17.2%</td>
<td></td>
</tr>
<tr>
<td>VIII-1671</td>
<td>460</td>
<td>535</td>
<td>535</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>X-1671</td>
<td>470</td>
<td>517</td>
<td>517</td>
<td>9.1%</td>
<td></td>
</tr>
<tr>
<td>II-1672</td>
<td>330-40</td>
<td>406-13</td>
<td>406-13</td>
<td>17.7-18.7%</td>
<td></td>
</tr>
<tr>
<td>IV-1672</td>
<td>255</td>
<td>311</td>
<td>311</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>XI-1672</td>
<td>280-290</td>
<td>378</td>
<td>378</td>
<td>23.3-25.9%</td>
<td></td>
</tr>
<tr>
<td>XI-1680</td>
<td>300</td>
<td>447.5</td>
<td>447.5</td>
<td>33.0%</td>
<td></td>
</tr>
<tr>
<td>I-1681</td>
<td>290.5-292</td>
<td>438.5</td>
<td>438.5</td>
<td>33.4-33.8%</td>
<td></td>
</tr>
<tr>
<td>II-1681</td>
<td>292</td>
<td>438.5</td>
<td>438.5</td>
<td>33.4%</td>
<td></td>
</tr>
<tr>
<td>XI-1681</td>
<td></td>
<td>357</td>
<td>439</td>
<td>18.7%</td>
<td></td>
</tr>
<tr>
<td>VI-1685</td>
<td>382.5</td>
<td>464.5</td>
<td>464.5</td>
<td>17.7%</td>
<td></td>
</tr>
</tbody>
</table>

No data available for the Rotterdam and Delft chambers. Sources: SAA, Velters, inv. nr. 1; SAA, Deutz, inv. nrs. 276, 294-5; SAA, PIG, inv. nr. 858; SAA, Merchants’ accounts, inv. nr. 39; SAA, Notaries, inv. nr. 1133, fo. 18, inv. nr. 2207, fo. 255, 739; BT, inv. nr. 112 C2, fo. 7; inv. nr. 112 C2, fo. 7; inv. nr. 113, fo. 1, 38, 40, 42, 49.

Please note that for the period 1611-1617, the prices in this table do not correspond to those depicted in Figure 2.6. The account books of Anthoni Thijs yielded the observations (for both the Amsterdam and Enkhuizen chambers) for these years. Thijs quoted the prices cum-dividend (57.5%). I do not know the ex-dividend values – part of this dividend had been distributed in kind and the shareholders did not value it at exactly 57.5%. Therefore, I have chosen to omit them in the dataset containing the prices of the Amsterdam chamber for the entire seventeenth century. However, these price observations are useable for a comparison between the Amsterdam and Enkhuizen chamber prices, for Thijs had collected the same amount of dividend in both chambers.
Figure 2.1 5-day period share transfers, VOC Amsterdam chamber, 1609
Total number of share transfers: 368. Total nominal value of share transfers: f785,690. Source: NA, VOC, inv. nr. 7066.
Figure 2.2 5-day period share transfers, VOC Amsterdam chamber, 1639
Total number of share transfers: 713. Total nominal value of share transfers: ƒ2,205,330. Source: NA, VOC, inv. nr. 7068.
Figure 2.3 5-day period share transfers, VOC Amsterdam chamber, 1667
Total number of share transfers: 934. Total nominal value of share transfers: \( \mathcal{E}2,960,910 \). Source: NA, VOC, inv. nr. 7070.
Figure 2.4 5-day period share transfers, VOC Amsterdam chamber, 1672
Total number of share transfers: 1604. Total nominal value of share transfers: f5,200,497. Source: NA, VOC, inv. nr. 7070-1.
Figure 2.5 5-day period share transfers, VOC Amsterdam chamber, 1688
Total number of share transfers: 1350. Total nominal value of share transfers: f4,456,446. Source: NA, VOC, inv. nr. 7072.
Figure 2.6 Monthly VOC share price, Amsterdam chamber, September 1602 – February 1698. Missing values derived from linear interpolation.

Number of observations: 851. Sources: SAA, Velters, inv. nrs. 1-4; SAA, Deutz, inv. nrs. 275-6, 291-5, 301; SAA, Merchants’ accounts, inv. nrs. 39-40; SAA, PIG, inv. nr. 858; SAA, Notaries, Card index; SAA, Notaries, inv. nrs. 2238-40, 4131-6; BT, inv. nrs. 112-3, 119K, 119N, 215; PA, Microfilms SP 119/36, SP 119/38.
Figure 2.7 Monthly VOC share price, Amsterdam chamber, September 1602 – February 1698
Figure 2.8 Yearly high-low-average VOC share price, Amsterdam chamber, 1602-1698

The markers show the average share price in a given year; the vertical lines connect the highest and lowest shares prices in a given year.
Figure 2.9 Yearly dividends as a percentage of the nominal value of VOC shares, 1620-1699
Sources: Klerk de Reus, Geschichtlicher Überblick, Appendix VI. Van Dam, Beschryvinge 1A, 433-436. De Korte, De jaarlijke financiële.
Dividend as a percentage of market value, 1620-1697

Dividend as a percentage of market value is calculated by dividing the dividend per share by the market price per share. Please note that for the periods 1624-31, 1645-6 and 1654-7, the market prices are based on interpolated data.
Figure 2.11 Real dividend and VOC share price, 1630-98
The dark grey line depicts a ten-year backward moving average of real dividend on Amsterdam chamber VOC shares (left-hand scale). The value for 1630, for example, is calculated by dividing the average yearly nominal dividend over the period 1621-30 by the average share price of 1630. The light grey line depicts the average yearly share price of Amsterdam chamber VOC shares (right-hand scale). Missing values in the share price series have been derived from linear interpolation.
Figure 2.12 Share price data of the Amsterdam, Middelburg, Enkhuizen and Hoorn chambers of the VOC, 1611-1685
Source: Table 2.2.