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### **Spending, saving, or investing? Risk management in sixteenth-century Dutch households**

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April 2011

**Working paper no. 8**

<http://www.cgeh.nl/working-paper-series/>

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### **Abstract**

*(This paper has been accepted (May 2011) for publication in the Economic History Review).*

In the past one of the main challenges to households was how to cope with adversity. War, plague, famine, and flood were a constant threat, and could reduce what little improvements families had made in productivity. Economic growth therefore required a means to absorb external adversities. To see how well late medieval households coped with adversity, this investigation focuses on the households of a small town and its surroundings in early modern Holland. Our findings reveal that several severe external events around 1500 had little effect on the general level or distribution of wealth, which suggests certain forms of insurance may have protected the population. The results show that households increasingly invested in capital markets rather than employ such techniques as scattered holdings and hoarding.. This fact indicates that such investment played a vital role in a household's risk aversion strategy. The change from unproductive to more productive risk-aversion strategies also provides some clues about progress with respect to insurance during Holland's financial revolution.

**Keywords:** Capital markets, Risk management, Holland, early modern period.

**JEL Codes:** N23, N33, G21.

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**Acknowledgements:** We would like to thank in particular Maarten Prak, Jan Luiten van Zanden and René van Weeren for their comments on earlier versions of this article. The research on which this article is part of the project "United we stand. The dynamics and consequences of institutions for collective action in pre-industrial Europe", funded by the European Research Council (under the European Community's Seventh Framework Programme (FP7/2007-2013) / ERC grant agreement n° 240928). See also [http://www.collective-action.info/projects\\_ERCGrant](http://www.collective-action.info/projects_ERCGrant)

# I

The development of financial institutions has historically been regarded as an important prerequisite for economic growth. Scholars have pointed to particular ‘financial revolutions’ that have brought about such growth. These include ‘sound public finances and public debt management; stable monetary and payments arrangements; sound banking systems (more generally, institutional lenders); an effective central bank; good securities markets for debt, equity and money-market instruments; and sound insurance companies (more generally, institutional investors)’.<sup>1</sup> Such financial revolutions have been linked to phases of marked economic growth in Renaissance Italy, the Low Countries, and England.<sup>2</sup> Historians have also pointed to innovations in government funding<sup>3</sup> and the development of the capital market.<sup>4</sup>

We know far less about developments in insurance during financial revolutions, however. Merchants would spread their risks as early as the middle ages in several ways: they entered into partnerships, divided cargo over several smaller ships, and allowed third parties to buy shares in their ships.<sup>5</sup> Yet the methods used by ordinary households to cope with risks have largely escaped the eye of the historian, particularly because the insurance industry emerged relatively late.<sup>6</sup> In England people could only ensure themselves against fire, one of the greatest dangers of the time, after the Great Fire of London in 1666.<sup>7</sup>

How did households cope with risks? In the past this question has been asked about the peasantry of medieval England, and scholars have debated how rural households countered risk since the 1970s.<sup>8</sup> One of the main issues was whether insurance required the ‘inefficient’ scattering of holdings, as has been suggested by McCloskey. Households did this ‘because villagers did not have cheap access to markets in risk, that is, insurance, as they did in land, labour and output’.<sup>9</sup> According to McCloskey, in the middle ages insurance was purchased at the expense of productivity. In 1972 Fenoaltea, however, suggested that medieval peasants could store grain, which served as a means to reduce risk.<sup>10</sup> Over the following two decades historians continued to debate grain storage and the development of grain prices<sup>11</sup> and interest rates.<sup>12</sup>

This article addresses the same basic question – how did households reduce risks – but for an entirely different area: the county of Holland in the fifteenth and sixteenth

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1. Sylla, ‘Financial systems’, p. 280.

2. Fratianni and Spinelli, ‘Italian city-states’; ‘t Hart, ‘The merits’; Tracy, *A financial revolution*; Dickson, *The financial revolution in England*.

3. North and Weingast, ‘Constitutions and commitment’.

4. Gelderblom and Jonker, ‘Completing a financial revolution’.

5. Kindleberger, *A financial history*, pp. 178-9; Howell, *Commerce before capitalism*, pp. 22-8. Cf. maritime insurance in the Netherlands in the late eighteenth century: F. Spooner, *Risk at sea*.

6. Cf. the late emergence of an insurance sector: Pearson, ‘Towards an historical model’.

7. Evans, ‘The early history of fire insurance’, p. 88. On the use of fire insurance policies by peasants: Stead, ‘Risk and risk management’, pp. 340-1.

8. Some recent contributions: Poynder, ‘Grain storage in theory and history’; Clark, ‘The interest rate’.

9. McCloskey, ‘The enclosure of open fields’, p. 19; McCloskey and Nash, ‘Corn at interest’. North and Thomas had a similar, if somewhat different suggestion, claiming that labour sharing may also have served to spread risks (North and Thomas, ‘The rise and fall’, p. 789).

10. Fenoaltea, ‘Risk, transaction costs, and the organization of medieval agriculture’. Storage of wealth, or hoarding, has often been a response to crises, such as the crash of 1929 (Whigmore, *The crash and its aftermath*, p. 535).

11. Nielsen, ‘Storage’, pp. 8-12; Persson, ‘The seven lean years’, pp. 698-702.

12. Clark, ‘The interest rate’.

centuries, which was by that time a highly commercial society in which people produced intensively for the market, as arable production had become impossible and grain had to be imported.<sup>13</sup> Also, since the fourteenth century emerging capital markets had allowed households to choose whether or not to save.<sup>14</sup> Did households use risk-spreading techniques (scattering holdings), store their wealth (hoarding), or create diversified portfolios in this setting, or did they use the capital markets to secure surplus income?

This question is not only important because it is closely associated with the literature about financial revolutions and the debate on grain storage, but also because risk is at the heart of some of the most important social and economic developments. In large areas of Europe households underwent major adjustments in the late middle ages, changing from risk-averse and self-sufficient patterns to using venture and more market-oriented strategies. Many families stopped producing their own food, relying on wage labour and commodity markets instead. Households thus had to anticipate economic cycles, monetary developments, and seasonal fluctuations. Advances in state formation meant that people had to deal with emerging states that engaged in warfare which necessitated increased taxation. This added to the more universal risk of natural disaster and 'the risks and uncertainties inherent in life and family cycles: disease, old age, widowhood, or having many young children'.<sup>15</sup>

At the same time the traditional unit of support – the extended family – lost much of its meaning. Individuals became more independent: they established their own households and many left the family farm to move to thriving towns. This loosening of family ties meant that households lost support at a time when they faced greater risks.<sup>16</sup> Understanding how households countered these risks is a key element in explaining the transformation of the family.

This article draws on a large dataset to investigate whether households reduced risks by scattering holdings, hoarding, managing portfolios, or investing in capital markets. The dataset covers the small town of Edam and its surroundings from 1462-1563, which largely coincides with Holland's financial revolution. After an introduction to the circumstances (II), the article outlines the most important assets available to the population (III). Then the external shocks that should have caused poorly prepared households to lose property or change their risk-strategies are identified, particularly around 1500. Despite the adverse economic circumstances, the households of Edam managed to endure the external shocks without much trouble. (IV). To determine how most households could cope with the adversity, we examined how the portfolios of thousands of households actually changed over time. The evidence shows that the external shocks did not cause households to increase scattering. In fact, from 1462-1563, the people of Edam reduced the number of assets they had. The same was true of hoarding, which decreased over time (V). In this period households could do without scattering and hoarding because two other techniques were available to cope with risks: diversification of portfolios, for which there is no evidence, and investing in capital markets, which increased markedly. This suggests that the capital market was also used as a means of insurance (VI). Section VII contains conclusions that can be drawn from this information.

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<sup>13</sup>. Van Bavel, *Manors and markets*, p. 45.

<sup>14</sup>. Zijderduijn, *Medieval capital markets*.

<sup>15</sup>. Fontaine and Schlumbohm, 'Household strategies for survival', p. 1.

<sup>16</sup>. De Moor and Van Zanden, 'Girlpower', pp. 22-4; Laslett, 'Family, kinship and collectivity'.

## II

This article uses the small town of Edam, which lies about 20 kilometres northeast of Amsterdam, at the border of what was then known as the Zuiderzee, and its surroundings, De Zeevang. The entire region was highly urbanized (in 1462 more than 40 per cent of its population lived in Edam), and depended on a variety of activities: agriculture was still important, but a rapidly growing part of the work force was active in fisheries, industries, and trade.<sup>17</sup> The economy was characterized by smallholdings, another typical feature of the Dutch economy: most (rural) households owned small plots of land for herding cattle. They sold cows and dairy products on the market.<sup>18</sup>

How does Edam compare to other towns in Holland? To answer this question, a government inquiry from 1514 was used. This inquiry reviewed tax assessments by towns and villages in the county of Holland (table 1). Holland had six large towns and 22 small towns, and clearly, Edam was a typical small town, although it may have been relatively wealthy. The surrounding villages, an area called De Zeevang, are comparable to other rural settlements in this part of Holland, both with respect to population and wealth. Although the inhabitants were relatively wealthy, they were not far above average.

This study is representative for the province of Holland, and perhaps also for some other urbanized regions in the Low Countries, such as Brabant and Flanders, where households also had access to capital markets.<sup>19</sup> Since investments in capital markets are identified as an alternative to more traditional types of insurance, the situation elsewhere in Europe may well have been very different from Edam.

The analyses in this article are based on the tax assessments for households in Edam and its surroundings. These tax assessments, first recorded in 1462 by the government of Edam, are among the oldest of their kind and contain an unusual wealth of data.<sup>20</sup> Before, tax assessments had probably been based on landed property or rough estimates, but in the wake of specialization and commercialization, the town government felt the need to take other assets into consideration. To this end they recorded *verpachtingskohieren* (estimates of household wealth), which were compiled by a local official who went from door to door. These estimates were then used by the local government to assess a distribution key for taxation, which was drawn up in another source, the *schotkohieren* (every household was set at a share in taxation called *schot*).

In 1462 the Edam government decided to take a large number of assets into consideration when it assessed the *schot*:

. . . goeden, huijsen, erven, landen, ewelicke renten, losrenten, lijffrenten, gelt, schult, schepen, waeren, comanscappen, beesten, bedden, ende alle andere goeden . . . [goods, houses, premises, land, hereditary tenure, redeemable

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<sup>17</sup>.These population figures are based on Boschma-Aarnoudse, *Totverbeteringe*, pp. 421-6; cf. economic development pp. 367-75 and *passim*.

<sup>18</sup>.On the economic history of this region, see Van der Woude, *Het Noorderkwartier I*, pp. 362-3, 457-8, 511-3. On the development of the economy of Holland in this period, see Van Zanden, 'Taking the measure'; Hoppenbrouwers, 'Mapping an unexplored field', pp. 49-50; De Vries and Van der Woude, *Nederland 1500-1850*, pp. 236-8.

<sup>19</sup>. Cf. Hanus, *Tussenstad en eigengewin* and contributions in Boone et al, *Urban public debts*.

<sup>20</sup>.An older and more or less comparable source is the 1427 Catasto made for Florence (Herlihy and Klapish-Zuber, *Les Toscansetteursfamilles*).

annuities, life annuities, money, debts, ships, merchandise, sales, animals, beds, and all other goods].<sup>21</sup>

How land, houses, livestock and investments could contribute to portfolios will be discussed in section III. For the most part, the various types of investment assets available in this period included:

- 1) land and property
- 2) livestock
- 3) various types of credit
  - a. *custing* – middle term (3-4 years) for purchasing land, houses, or ships
  - b. *scheepsparten* – for purchasing shares in ships
- 5) cash or monetary assets
- 6) mercantile assets and working capital.

Inhabitants were supposed to have their assets registered when the *verpachtingskohieren* were drawn up, usually every seven or eight years. The earliest of these sources, from 1462, was probably drawn up to assess the taxes the Edam and De Zeevang inhabitants had to contribute to the ten-year subsidy (*bede*) that the Holland Estates (*Staten van Holland*) agreed to in 1462.<sup>22</sup>

Of course, it is important to be careful when using tax registers based on interviews. These are likely to yield a biased picture because the taxable community will have done everything possible to appear impoverished in order to escape high taxes. On the other hand, these were small communities, with strong social cohesion; citizenship was considered a virtue, which may have enhanced willingness to pay for the community services.<sup>23</sup>

There are two types of samples: one is a sample of all households in Edam and its surroundings for 1462, 1514, and 1563 (sample 1). The other is a sample of the households in one of the districts of Edam for all the years in the sixteenth century for which *verpachtingskohieren* are available: 1506, 1514, 1530, 1546, 1553, and 1563 (sample 2).<sup>24</sup> For practical purposes the district called 'Oorgat' was chosen, which consisted of a string of buildings on both sides of the canal connecting Edam with the Zuiderzee. The population figures for Oorgat are presented in table 2. The reason this district was chosen is that it is the only area that could be clearly identified in the sources: some of the *verpachtingskohierendo* not distinguish any other districts in Edam, and to sample the whole town would be too time-consuming. Oorgat was the least prosperous district of Edam.<sup>25</sup> Although this obviously has some drawbacks (to what extent did the poor have enough assets to spread risks?), it also yields an image that is not distorted by data from elite households.

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<sup>21</sup>. Boschma-Aarnoudse, *Totverbeteringe*, p. 205.

<sup>22</sup>. Boschma-Aarnoudse, *Totverbeteringe*, p. 403.

<sup>23</sup>. Van Zanden and Prak, 'Towards an economic interpretation'. Cf. a more detailed critique of our sources: De Moor, Van Zanden, and Zijderduijn, 'Micro-credit'.

<sup>24</sup>. The 1563 *verpachtingskohier* seems to have been the final one that was recorded.

<sup>25</sup>. Boschma-Aarnoudse, *Tot verbeteringe*, 464-7.

Table 1. Relative position of Edam in Holland, 1514

	Inhabitants	Tax assesment	Taxation/capita
Holland	288760	60000	0,21
Edam and De Zeevang	3259	770	0,24
Edam	[1929]	[454]	[0,24]
Six large towns (average)	11550	4248	0,38
22 small towns (average)	2128	486	0,23
De Zeevang	[1330]	[315]	[0,24]
Warder	266		
Middelie	[333]		
Kwadijk	399		
Haekswijk	[333]		
Region (average)*	600	158	0,26

Estimates in brackets.

Since our sources recorded the number of people who received the Holy Communion, we have corrected our figures for the people that did not, i.e. infants younger than 13-14 years. We follow Ad van der Woude's approach, who calculated that c. 33 per cent of the population must have been younger than 13-14 years (Van der Woude, *Het Noorderkwartier*I, 77-85).

The differences between these estimates, a population of 3259 for Edam and De Zeevang in 1514, and the estimates Boschma-Aarnoudse based on the *verpachtingskohieren* (a population of 3655) seem reasonable – we have to accept a certain margin of error. Since Edam and De Zeevang were one jurisdiction and hence one taxation unit, we have had to estimate the tax assessment for the individual town and villages.

We also had to estimate the number of inhabitants for Edam (indicated in the source as between 1400 and 1500), as well as Middelie and Haekswijk (both villages were taken together in our source).

\*Region: 14 villages in the areas Amstelland, Gooiland, De Zeevang and Waterland of which we have data on population and taxation.

Sources: Fruin, *Informacie*, 185-189; Fruin, *Enqueste*, 271; Naber, *Een terugblik*.

Table 2: Overview of advantages and disadvantages of investment opportunities for profitability, risk, monitoring cost, and liquidity

Type	Profitability	Risk	Monitoring costs	Liquidity
Real estate	4%-5%	Low	Low	Low
Cattle	[5%]	Medium	High	Medium
Life annuities	10%	High	Low	Low
Redeemable annuities	6%	Medium	Low	Medium
Shares in ships	12%	High	Medium	Medium
Cash	[-2%]	Medium	Low	High

Sources: see text. Estimates are presented in brackets

### III

Before the emergence of insurance, one of the best ways to reduce risk was to invest in several factor markets, such as spreading investments among real estate, financial instruments, and cash savings, which can be considered the main investment categories. Choosing to invest in several different types of markets created a diversified portfolio. Here it is useful to outline the profitability and risks for the assets the people of Edam could invest in. In following a policy of spreading risks, it is to be expected that people would have invested in several assets, some risky, some with low monitoring costs, and some that were very liquid. First it is essential to identify the characteristics of the most popular assets and then to analyze the preferences of Edammers among these.

Table 3 provides a schematic depiction of the assets the local government recorded to assess the wealth of households. The figure provides a sense of some of the elements that affected the decision-making process of households; obviously there were others as well, such as personal preferences for luxury goods. Judging from the taxation records of Edam land, houses, cattle, annuities, shares in ships, and cash savings were the most important assets in sixteenth-century Holland. At least, these were what was assessed by the government of Edam, and it is safe to assume that they represented the investment opportunities available to the population.<sup>26</sup>

It is important to point out that markets had already emerged in the late middle ages for most of these assets, so people usually had ample experience in investing in any of these. Whatever their previous experience, however, it is necessary to estimate the extent investors in the period could actually reap the benefits of their investment of choice. Data from Edam from 1564 show that the volume of markets for real estate and capital was already quite sizeable, with ca. 175 transfers of real estate and ca. 120

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<sup>26</sup>Sparreboom, 'Twee fiscale bronnen' and Boschma-Aarnoudse, *Tot verbetering*, pp. 200-4). A somewhat odd asset recorded in our sources are beds. The value of a single bed could be considerable, as becomes clear from inventories: four guilders a piece (Schoorl, 1568), four or five guilders a piece (Haarlem, 1568) (Van Gelder, *Gegevensbetreffenderoerend en onroerendbezit I*, pp. 353, 582-3).



annuity sales per annum.<sup>27</sup> This means that there were ample possibilities for households who wanted to adjust their portfolio, and that households could adjust portfolios for assets they received or inherited.

In fact, there were few impediments to asset management. For example, some households only reported an annuity as taxable wealth, which suggests that they rented a house and either earned their livings as wage labourers or rentiers. Edam was a commercial society, so households did not have to own land or cows to survive, or own a house to live in. They could choose whether they wanted to be more or less market-oriented, and hence, they could create portfolios of their choice.

*Table 3: Rent/purchase price of land in Holland's Noorderkwartier in 1514*

<b>Village</b>	<b>ratio (%)</b>	<b>Village</b>	<b>ratio (%)</b>	<b>village</b>	<b>ratio (%)</b>
Heemskerk	5.0	Schermer	2.5 - 18.8	Zuiderwoude	4.0
Heiloo	5.0	Graft	7.5	Nek	5.0
Uitgeest	4.8	Assendelft	5.0	Oosthuizen	4.0
Akersloot	6.7	Wimmenum	5.0	Purmerend	3.3
Castricum	5.0	Bakkum	2.0-6.0	Purmerland	4.0
Katwoude	4.4	Westzaan-Krommenie	3.8	Oostzaan	3.3
Wijkaanduin	5.0	Alkmaar	3.0 - 4.0	Ransdorp	5.0
Limmen	5.0	Wormer-Jisp	5.0	Schellingwoude	5.0

Sources: Fruin (*Informacie*); Van der Woude (*Het Noorderkwartier*, p. 525).

The most obvious types of investments were land and houses. In general the rental value of land in the north of Holland was a little less than five per cent.<sup>28</sup> This is a comparatively low rate of return for a large expenditure: owners were required to make investments (for example, in maintenance), they had to pay taxes, and they often had trouble evicting tenants after termination of the lease.<sup>29</sup> As a result the net profits were likely to have been closer to four per cent. On the other hand, real estate, particularly land, was a safe investment. With respect to liquidity, in this part of Holland owners of real estate usually had full ownership titles, which was not necessarily the case elsewhere. But liquidity was probably not very high because landowners requiring immediate cash were unlikely to be able to sell on short notice. It was not easy to find a

<sup>27</sup>. Van Zanden, Zijderduijn and De Moor, 'Small is beautiful'. Cf. the emergence of markets in late-medieval Holland: Van Bavel, *Manors and markets*; Dijkman, *Medieval commodity markets*; Zijderduijn, *Medieval capital markets*; Cornelisse, *Energie en energiehandel*; Gijsbers, *Kapitale ossen*.

<sup>28</sup>. Calculations based on Fruin, *Informacie* and Van der Woude, *Het Noorderkwartier*, 525. The average rent/purchase price ratio is 4.8 per cent if the somewhat unclear figures of Schermer, Bakkum, and Alkmaar are excluded, and 5.0 per cent if these are included.

<sup>29</sup>. Van Bavel, *Manors and markets*, 176.

buyer for a particular plot of land at a specific location, or a house on a particular street in Edam.

Another type of investment was movable property. The region of Edam was an important centre for dairy production and many households owned one or more cows.<sup>30</sup> Even in the town of Edam, more than half the population owned land and cattle. In the surrounding villages four out of five households owned land, and 70 to 75 per cent had livestock. Even those involved in shipping owned a number of cows.<sup>31</sup> Considering the widespread cattle breeding, investment in cattle was a reasonable, straightforward option. Determining profitability for such investments is more difficult, however, because the data are absent.<sup>32</sup> In table 3 profits for this type of investment have been estimated at five per cent: considering the small scale of dairy production, individual yields cannot have been very high. With respect to liquidity, there were few obstructions to trade in cattle, so it was relatively easy to sell cows.<sup>33</sup> Nevertheless, there were risks: a cow could die, or a plague could kill the whole herd.

Another option was to invest in life annuities or redeemable annuities. Life annuities yielded the investor a life-long annual pension of around 10 per cent of the principal sum. With respect to liquidity, even though selling life annuities was not completely unheard of,<sup>34</sup> demand for such assets was very low. Redeemable annuities yielded about six per cent, but had the advantage of being transferable through gift or resale. These investments were secured with special mortgages on real estate. Investors relied on an extensive institutional framework that protected them against fraud, theft, and loss.<sup>35</sup> One of the main drawbacks was the possibility that pensions would suffer from inflation. Moreover, since 1542 annuities were taxed by the provincial government.<sup>36</sup>

Edammers could also use of other types of credit. The *custing* was a debt that had to be repaid over several years, usually three to four. It was mostly contracted as consumer credit for purchases of land, houses, or ships.<sup>37</sup> The government of Edam apparently regarded these mid-term debts as investments to be taken into account for tax purposes. And indeed, sellers could decide to invest assets in a *custing* by extending credit to purchasers. What did they gain by this? Although a *custing* contained some hidden interest, it is not at all clear what the returns were, presumably because these were simply added to the principal and thus are not detailed in our sources. With respect to security, the good that was transferred served as collateral for the *custing*.<sup>38</sup> Furthermore, a *custing* could be alienated at will, so liquidity was reasonable.<sup>39</sup>

Shares in ships (*scheepsparten*), were used to spread risks: investors could buy shares up to 1/256 in a ship, and by dividing their capital among several ships (and/or

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<sup>30</sup>.According to the sources used for this article, the number of people owning a horse was very small.

<sup>31</sup>.Boschma-Aarnoudse, *Tot verbeteringe*, p. 13.

<sup>32</sup>.We have explored virtually all archival documents that could have included cattle prices for the region studied here, but could not find any data. Other literature also does not provide ample information about this.

<sup>33</sup>.We are only aware of a few market prices for cows: they were valued at 12 guilders each in the village of Schoorl (1568) and 28.8 guilders (1563) and 31.2 guilders (1568) (Van Gelder, *Gegevens I*, pp. 351 and 353; Posthumus, *Nederlandseprijsgeschiedenis*, II, p. 805).

<sup>34</sup>. Howell, *Commerce*, p. 78 note 69.

<sup>35</sup>.Zuijderduijn, *Medieval capital markets*, pp. 183-226.

<sup>36</sup>. Zuijderduijn, *Medieval capital markets*, p. 67.

<sup>37</sup>.Zuijderduijn, 'Assessing a late-medieval capital market'.

<sup>38</sup>.Unger, *Dutch shipbuilding*, pp. 158-9.

<sup>39</sup>.Cf. examples, WaterlandsArchief, Oudrechterlijk Archief Edam, inv. no. 3813, f. 1, 1v, 2, etc.

other investment opportunities), they did not run the risk of losing their entire investment when one ship was lost at sea.<sup>40</sup> With respect to profitability, Gelderblom estimated that shares in ships yielded a profit of 12.8 per cent at the end of the sixteenth century.<sup>41</sup> Although there is evidence of shares being resold, the general view in the literature is that these investments were not very liquid.<sup>42</sup>

As a last option, it was possible to keep savings in cash. Cash savings were not profitable, however: in times of inflation, keeping (or hoarding) money over a long period resulted in losses.<sup>43</sup> It was also risky: money could be stolen or misplaced. In sum (see overview in table 3): assets with a distinct profitability, risk, and liquidity were widely available, which means there were ample possibilities for investment strategies and diversified portfolios. Individuals could have chosen some profitable but risky investments in maritime trade, some less profitable and less risky investments in real estate, and may have kept some money for immediate availability (liquidity).<sup>44</sup> Those involved in agriculture or trade might have chosen to invest part of their liquid assets in livestock. Although the assets mentioned in table 3 do not cover the complete spectrum of potential assets in a portfolio, they are relatively comprehensive. Not included in the sample, for example, are mercantile goods or investments in working capital, e.g. a craftsman's workshop. To a certain extent such assets were mentioned in the sources but these data are too unreliable to use in the analysis.<sup>45</sup>

#### IV

Deciding to spend income surplus on one or several of the above assets was probably influenced by external influences such as political factors (wars in which the country of residence may or may not have been directly involved), bad harvests, and economic cycles. Each type of investment would have been especially vulnerable to particular events. What main developments would households in sixteenth-century Edam have reacted to? Several variables are particularly relevant: warfare and piracy, epidemics (those affecting both humans and animals), bad harvests, extreme weather conditions, and economic cycles (these are indicated on the timeline in figure 1 when they may have been important for the Edammers).

Some of these variables occurred so frequently, or were always in the background, so they did not present true external shocks. Epidemics were recorded every couple of years, and even though there is no direct evidence of the plague affecting Edam,<sup>46</sup> it is likely some may have fallen victim to disease. Since there is no evidence that a plague did wipe out a large part of the population, epidemics are not included as external shocks. While livestock are also subject to epidemics, there is no clear evidence for large-scale outbreaks of cattle plague. The number of livestock in Edam and the

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<sup>40</sup>. Van Gelder, *Gegevens*I, pp. 426, 444, 455, etc.

<sup>41</sup>. Gelderblom, 'The governance of early modern trade'.

<sup>42</sup>. Kole, *Ondernemen en beleggen*, p. 25; Van Gelder, *Gegevens betreffende roerend en onroerend bezit* I, pp. 415, 440, 450-1, etc.

<sup>43</sup>. Inflation in the 'long sixteenth century' was on average 1.4 % (De Vries and Van der Woude, *Nederland 1500-1850*, p. 42).

<sup>44</sup>. Mathias, 'Strategies', p. 8.

<sup>45</sup>. Sources such as probate inventories would be helpful to provide this information, but unfortunately these are not available for this period in this area.

<sup>46</sup>. Population figures in fact increased in the sixteenth century, both in the town and villages. Recent calculations of population figures (see also table 2) show in a population rise for the whole area by a factor of 1.6 in a century. See Boschma-Aarnoudse, *Tot verbeteringe*, pp. 421-6.

surrounding villages remained at ca. 2,000 from 1462-1554, which rules out major outbreaks like those of the eighteenth century that decimated more than half the herd.<sup>47</sup> Bad weather can be considered a structural threat: the people of Edam had to prepare for snow, hail, and storms, but these came almost every year. Harsh winters, such as those from 1511-1514 may have destroyed crops and may also have killed livestock.<sup>48</sup> In general, however, it is difficult to imagine that the few cold winters Edam experienced would have caused households to change their asset management. While such events may have induced households to adopt risk-reducing strategies, they would not have been perceived as incidental external events that caused people to change investment strategies.

There were some factors that gradually changed and caused conditions in Edam to alter, however. Warfare, rebellion, and piracy were omnipresent around 1500, but the area was not usually subject to direct attacks.<sup>49</sup> The people of Edam did occasionally feel threatened by the presence of hostile troops in the area: according to Boschma-Aarnoudse, many inhabitants fled to safer places, which led to de-population of some areas around 1512, such as the district of Oorgat.<sup>50</sup> More peaceful conditions from the 1530s on were likely to have favourably affected asset management, inducing people to take more risks.

With few possibilities for self-sufficiency (the wet soil did not allow for growing bread grains), the county's inhabitants had to produce for the market, and as a consequence they were closely dependent on economic cycles. The Edam economy has been characterized as one of economic recovery in the period 1495-1521, 1521-1540 has been considered a period of depression, and 1540-1565 was again one of recovery.<sup>51</sup> This accords with the data on Haarlem, a town ca. 30 kilometres southwest of Edam, for which more detailed estimates of the economic cycles in Holland exist.<sup>52</sup> On the whole, inflation was also relatively mild, about 1.4 per cent. But there were periods of greater fluctuation. While before 1540 fluctuations were moderate, after 1540 prices increased faster and trends were more volatile.<sup>53</sup> How would price movements have

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<sup>47</sup>.However, from 1554-1563 the number of cattle in Edam declined by ca. 250, and the same is apparent in the villages of De Zeevang. This may suggest an outbreak of cattle plague – although the very cold winter of 1563 may also have been partly responsible for this. See for cattle plagues in the eighteenth century: Faber, 'Cattle-plague in The Netherlands' and Van der Woude, *Het Noorderkwartier*, II, pp. 587-8.

<sup>48</sup>.In 1494 the government of Edam stated that during 'wet years' – i.e. years with much rain – part of the livestock had been killed (Fruin, *Enqueste*, p. 101).

<sup>49</sup>.The first half of the sixteenth century was characterized by hostilities between Holland and other provinces under Charles V and the duchy of Guelders, to the east of Holland. Edam would not have been under immediate threat of invasion because the fighting mainly occurred in the southeast of Holland (Burgers, 'De steden van Holland in oorlog'). The main effect warfare with Guelders had on the people of Edam was probably piracy on the Zuiderzee, where a pirate by the name of Grote Pier ransacked ships from 1515 onward. Attacks from Guelders were only resolved by a peace treaty in 1536 (Boschma-Aarnoudse, *Tot verbetering*, pp. 203-4; Koster, *Hoorn in de Middeleeuwen*, pp. 120-2).

<sup>50</sup>.Boschma-Aarnoudse, *Tot verbetering*, p. 204.

<sup>51</sup>.Boschma-Aarnoudse, *Tot verbetering*, p. 212.

<sup>52</sup>.For Haarlem the volume of the capital market has been used to estimate economic cycles. Since the 1970s the number of long-term loans contracted has been used as an indicator of economic growth, for example, in Antwerp and Ghent (Soly, 'De schepenregisters'; Dambruyne, *Mensen*). The method used in Haarlem is explained in Zijderduijn, 'Conjunctuur'.

<sup>53</sup>.De Vries and Van der Woude, *Nederland 1500-1850*, p. 41. This is also apparent in the price trend for butter, one of most important commodities the people of Edam brought to the market. With the exception of a temporary rise in butter prices in the 1480s, which was probably caused by the depreciation of coinage, prices were stable until 1500, when they gradually began to rise, a process that speeded up after the 1540s. See: Posthumus, *Nederlandse prijsgeschiedenis*, II.

affected the people of Edam? Noordegraaf characterized the period 1465-95 as one of 'a decrease in purchasing power'.<sup>54</sup> Purchasing power increased in many areas of Holland from 1535-1565, and in this respect the households of Edam may have been able to improve their position, also profiting from rising butter prices.<sup>55</sup>

Finally, there were some real, serious, and unexpected threats: major floods, such as those of 1507 and 1508, ruined harvests, and killed livestock, which may have induced households to pull out of agriculture.<sup>56</sup> Expensive years were particularly difficult for households that depended on monetary revenues – wage labour, rents, and pensions. They may have induced people to add some assets to their portfolios that would allow for self-sufficiency. Warfare was also a threat to crops and livestock, while piracy hindered fisheries and trade.

It is clear that especially the period from 1506-1530 must have been difficult for the inhabitants of Edam and surroundings: wars, piracy, pestilence, and floods threatened everyday life to a greater extent than before or after. It is interesting to note that this did not cause significant social polarization: the sources indicate that most households managed to pull through. There is no reason to believe people were really impoverished by these events, as the number of households paying no *schot* taxes remained very low for the entire period.<sup>57</sup> The persistence of households, even when they faced external shocks, does not explain how they managed to survive.

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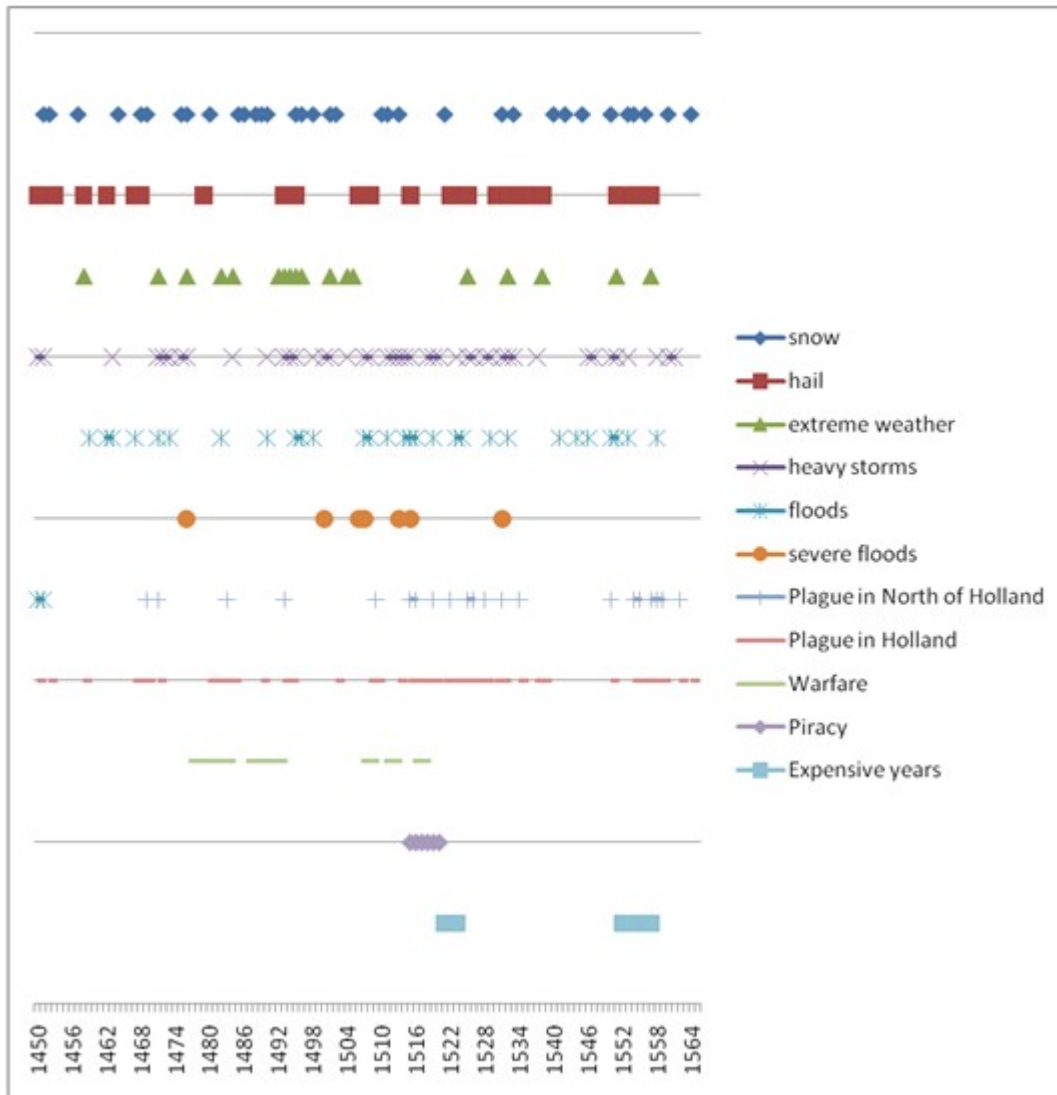
<sup>54</sup>.Noordegraaf, *Hollands welvaren?*, pp. 186-7.

<sup>55</sup>.Recovery or at least stabilization in real wages is also apparent in the data Jan de Vries and Ad van der Woude collected (De Vries and Van der Woude, *Nederland 1500-1850*, pp. 719-21, especially figures 12.7.1 and 12.7.2).

<sup>56</sup>. In the period 1507-1509 several floods also overwhelmed Edam (Fruin, *Informacie*, p. 186). On 16 October 1507 the St. Gallusvloed caused the main dike protecting the north of Holland, the Westfriese Omringdijk, to collapse, causing much damage in Edam and surroundings. The inhabitants had hardly fixed the dikes, when in 1509 the flood referred to as the *Cosmas- en Damianusvloed* caused the dikes of Spaarndatum and Diemen to collapse; to the south of Edam large parts of Holland were inundated. See Buisman, *Duizend jaar weer, wind en water*, pp. 283 and 290; Gottschalk, *Stormvloed en rivieroverstromingen*.

<sup>57</sup>. For example, the number of people in Edam paying no *schot* tax remained below 4 per cent for the entire period, while the number of people paying a *schot* of 0.5-1.5 gradually rose from 40% to 60 in the course of a hundred years. The number of wealthy people, paying a *schot* of more than 12, gradually declined from 7% in 1462 to 3% in 1546, and then rose again to 6% in 1569 (Boschma-Aarnoudse, *Tot verbeteringe*, pp. 464-7). Indeed, Jan Luiten van Zanden also suggested that inequality in the Netherlands only began to increase after ca. 1560 (Van Zanden, 'Tracing').

Figure 1: External shocks in Edam, 1450-1565



Sources for data on weather conditions: Buisman (*Duizend jaar weer, wind en water*, pp. 743-7). Only included are Buisman's observations for the Low Countries; observations for more remote areas are omitted.

Source for plague years: Noordegraaf and Valk (*De gave Gods*). Sources for prices: Noordegraaf (*Hollands welvaren?*, pp.28-41). Other sources: see text.

On the basis of the above it is evident that economic conditions in Edam were favourable in the fifteenth century; they deteriorated around 1500 and improved again after 1530. If households responded to external shocks by changing their portfolio and spreading risks, it would be clear that in the first decades of the sixteenth century the number of households involved in various types of assets would be greater than in subsequent decades. An analysis of the popularity of specific assets for the samples as a whole reveals that holding cash and cattle became less popular among households in the area (on the basis of sample 1, while the typical capital investments (redeemable and life annuities) were clearly gaining popularity.

The data on household portfolios show a significant differentiation in household assets in 1462: they had invested in land, houses, cattle, and a number of other assets, and many also possessed ready cash. General conditions in 1462 were good, but the situation was quite different in the next benchmark year, 1514, when Holland experienced several fundamental crises. Contrary to what would have been expected from sample 1, the crises did not cause households to spread risks by diversifying portfolios. In fact, households reduced the number of different assets they held. This was also apparent in 1563, when Edam had experienced several decades of recovery.

By and large, there is a continuous decline in the variety of assets in the portfolios of Edam households; the scattering strategy suggested in the introduction was clearly not followed by the Edam households. Among the relatively poor households of Oorgat, the number of different assets also declined, as it did elsewhere in Edam. Yet, an in-depth analysis for 1462-1563 reveals one remarkable shift: in Oorgat the percentage of households that invested in land rose until 1514, and then declined greatly, only to increase again after 1553. It seems that one of the responses of the people of Oorgat to difficult times was to include land in their portfolios – hence the rise from 10 per cent in 1462 to 33 per cent in 1514 (table 4). The data do not show the size of the plots they acquired, but they were probably small. This behaviour differs markedly from that of the households elsewhere in Edam, where portfolios were not adjusted to include land. This suggests that poverty was associated with more conservative investment strategies.

Table 4: Number of households with a particular type of asset and their percentage of the total population with assets (excl. beds) for the whole of Edam and the Zeevang, except for Oorgat (sample 1); below, Oorgat (sample 2).

Year	Number of households	Cash	Land and lease	Houses	Cattle	Life annuities	Redeemable annuities	Ships' parts	Debts	Fishing equipment
<b>THE WHOLE OF EDAM AND THE ZEEVANG, EXCEPT FOR THE OORGAT (Sample 1)</b>										
1462	752	51% (381)	24% (183)	40% (299)	74% (554)	6% (47)	21% (158)	23% (175)	20% (149)	3% (19)
1514	867	28% (245)	24% (204)	35% (301)	73% (629)	4% (33)	27% (233)	20% (174)	23% (201)	2% (18)
1563	1248	14% (171)	19% (232)	18% (230)	51% (641)	7% (86)	49% (607)	23% (290)	29% (368)	2% (30)
<b>OORGAT (Sample 2)</b>										
1462	60	48% (29)	10% (6)	38% (23)	83% (50)	7% (4)	13% (8)	5% (3)	18% (11)	5% (3)
1506	41	7% (3)	29% (12)	34% (14)	78% (32)	15% (6)	12% (5)	10% (4)	7% (3)	0% (0)
1514	129	6% (8)	33% (42)	29% (38)	75% (97)	11% (14)	13% (17)	7% (9)	14% (18)	0% (0)
1530	32	13% (4)	0% (0)	19% (6)	91% (29)	6% (2)	25% (8)	0% (0)	6% (2)	0% (0)
1546	27	4% (1)	0% (0)	26% (7)	74% (20)	4% (1)	15% (4)	7% (2)	0% (0)	0% (0)
1553	38	8% (3)	0% (0)	11% (4)	76% (29)	5% (2)	16% (6)	5% (2)	3% (1)	3% (1)
1563	44	2% (1)	23% (0)	23% (10)	57% (25)	2% (1)	23% (10)	9% (4)	14% (6)	0% (0)



Another conservative strategy, hoarding of cash, was used less frequently. In Oorgat many households stopped keeping ready cash around the house (from 29 per cent of households hoarding cash in 1462 it declined to 8 per cent in 1514); outstanding debts declined as well (from 19 per cent in 1462 to 8 per cent in 1514). Yet households did not simply exchange cash and outstanding debts for land or reverse that after 1514. Such assets remained at low percentages even after 1514. Therefore, the decline of cash and outstanding debts should be considered an element of the general specialization in Edam.

As for specialization in the types of assets households invested in, the average number of assets per household clearly diminishes over time. Again, this trend is already apparent from 1462-1514, when reduced specialization due to deteriorating circumstances was expected. Comparing Edam to Oorgat, the percentage of households with only one type of asset is clearly much smaller and shows less of an increase in Edam than in Oorgat (tables 5 and 6). The majority of households outside Oorgat owns two or three different types of assets.

Social polarization in Edam was quite modest, so it is unlikely that this was the driving force behind the trend to asset specialization, observable in both the poorer and richer parts of Edam and De Zeevang. Only a few households grew wealthier and could afford to follow other strategies. An equally low number of households would have been impoverished to the extent that they lost assets. This is also true for Oorgat: examining the distribution of the *schot* tax, it becomes clear that this district did not experience social polarization, but rather the opposite: in the course of the sixteenth century an increasing number of households ended up paying a *schot* of 0.5–1.5 pounds, which was the lowest category of taxes, except for the households with no taxable wealth at all, which were set at zero *schot*.<sup>58</sup> There is no reason to believe that this was a result of the rich taking their assets and moving to other parts of town, as the development of the average value of *schot* in Oorgat follows the same trend as Edam, which seems to exclude any major movements of assets (see also table 4). Moreover, the decline in the number of assets did not cause the amassed wealth to decline. The most likely explanation for the greater specialization in Oorgat than elsewhere in Edam and surroundings must therefore be the simple fact that this poorer area simply did not have the assets to engage in diversification.

*Table 5: Evolution of the average number of different types of assets households had per year*

<b>Year</b>	<b>Edam and De Zeevang without Oorgat (Sample 1)</b>	<b>The Oorgat (Sample 2)</b>
1462	3.613032	2.28
1506		1.93
1514	3.350634	1.81
1530		1.59
1546		1.30
1553		1.26
1563	3.127404	1.52

<sup>58</sup>. In the entire area of Edam and the Zeevang, about 63.5% of the population paid up to 1 pound of *schot* annually in 1462. By 1563 this had gone up to more than 73%. See Van Zanden, Zuijderduijn and De Moor, 'Micro-credit', p. 655).

Table 6: Percentage of households with a specific number of investments in types assets (disregarding the number of investment in one particular type of investment), in the whole of Edam and the Zeevang, except for the Oorgat (sample 1); and below, the Oorgat (sample2).

Year	1	2	3	4	5	6	7	Total
<b>EDAM AND THE ZEEVANG, WITHOUT THE OORGAT</b>								
<b>1462</b>	8%	22%	30%	25%	10%	5%	0%	100%
<b>1514</b>	11%	31%	27%	18%	10%	2%	1%	100%
<b>1563</b>	17%	29%	27%	15%	8%	2%	1%	100%
<b>OORGAT</b>								
<b>1462</b>	41%	44%	9%	3%	2%	0%	0%	100%
<b>1506</b>	44%	29%	17%	10%	0%	0%	0%	100%
<b>1514</b>	57%	30%	10%	3%	0%	0%	0%	100%
<b>1530</b>	59%	25%	13%	3%	0%	0%	0%	100%
<b>1546</b>	74%	22%	4%	0%	0%	0%	0%	100%
<b>1553</b>	79%	16%	5%	0%	0%	0%	0%	100%
<b>1563</b>	80%	14%	5%	0%	1%	0%	0%	100%

## VI

In the above sections it was explained that households did not choose to scatter their assets, nor did they hoard cash to face hard times. Instead, households chose to invest in a limited number of assets. But how did they manage to build their portfolio so that it was stress-resistant? There are in fact two other ways households could deal with risks: by taking into account the positive and negative correlations between investments, as advocated in Modern Portfolio Theory, or by simply investing in capital markets.

According to Modern Portfolio Theory, careful asset management allows people to maximize return and minimize risk. In fact, asset management should allow for the creation of a portfolio that collectively has a lower risk than any individual asset. The way to realize this is by choosing assets that change in value in opposite ways: for example, if stocks decrease in value, bonds often increase, so investing in a combination of both reduces risks. The trick is to invest in assets where the values show a negative correlation to specific risks.

To be sure, it is unlikely that households in the 1500s had as much understanding of asset management as twenty-first-century economists. Modern Portfolio management is simply used as an illustration to trace rudimentary means to reduce risks in addition

to scattering and hoarding. The households of Edam may have had some basic understanding of how to create a portfolio that reduced vulnerability to severe external events. They probably acquired such an understanding through 'learning by doing' and techniques that had been traditionally used.

Which assets show a negative correlation to risk? First, there is an obvious negative correlation between real estate and cattle on the one hand, and life and redeemable annuities and cash savings on the other (table 7). When prices for agricultural products dropped, and returns for real estate and cattle followed, fixed incomes from life annuities and redeemable annuities remained stable – and in fact could buy a relatively large quantity of agricultural products. The same was true for cash savings. Conversely, in the event prices for agricultural products rose, returns on real estate and cattle would rise, while returns on annuities would drop. It would therefore be expected that households would combine real estate and cash with annuities in an attempt to reduce risk from price fluctuations.<sup>59</sup>

A positive correlation between assets was also possible (see table 7). There was probably a strong positive correlation between real estate and cattle, since both such investments suffered equally from warfare, piracy, floods, storms, inflation, and price movements. The same was true for real estate, cattle, and shares in ships: these assets were similarly affected by warfare, piracy, and storms. Life annuities, redeemable annuities, and cash also show a positive correlation, responding the same way to inflation and price movements.

Based on these assumptions, an ideal portfolio would contain a combination of real estate, cattle, and life annuities, redeemable annuities, and cash. By diversifying a portfolio in this way, households would have reduced risk from price fluctuations. Portfolios would respond to such a composition, rather than being comprised of 'risky combinations of assets': real estate + cattle; real estate, cattle + shares in ships; life annuities, redeemable annuities + cash.

Table 7: Correlation of (returns to) assets

	<b>Real estate</b>	<b>Cattle</b>	<b>Life annuities</b>	<b>Redeemable annuities</b>	<b>Ships' parts</b>	<b>Cash</b>
<b>Real estate</b>	X	+++	---	---	+++	---
<b>Cattle</b>		X	---	---	+++	---
<b>Life annuities</b>			X	+++	0	+++
<b>Redeemable annuities</b>				X	0	+++
<b>Ships' parts</b>					X	0
<b>Cash</b>						X

<sup>59</sup>.We assume that the return to shares in ships depends on the profits skippers made: general price movements would not have had much of an effect on the profitability of trade.

Do the sources support the above hypothesis? For now, this has only been tested for 1462, but there is no reason to believe that the results would not apply to other benchmark years as well. In 1462 only 36 per cent of the households with two assets shows a preference for a combination of variable returns and fixed returns. Among households with more assets this preference increases, up to 62 per cent among households with three assets. Yet even for households with as many as six assets, only 71 per cent had invested in land and cattle and life annuities or redeemable annuities and cash. Thus, there is little evidence to support a negative correlation hypothesis.

If households employed an asset management strategy aimed at reducing vulnerability to external shocks, it would not have entailed more than simply spreading investments (which was applied less and less frequently). There is no evidence that households extensively weighed the consequences of investment behaviour for risk by using clever combinations of assets.

The main explanation of how households managed risk appears to have been the capital market. Elsewhere it has already been demonstrated that capital market institutions in fifteenth-century Holland had already reached a high level of efficiency, with (very) low interest rates (in fact, no higher than they are today), and they afforded access to various forms of micro credit at low cost to men and women.<sup>60</sup> The tendency to invest savings in an annuity instead of keeping them in cash can be considered a form of insurance against theft and fire, as even the loss of the annuity document would not mean loss of the investment.<sup>61</sup> The clear growth in the number of households that chose such options, whether redeemable annuities or life annuities, indicates that the capital market was a popular means to secure surplus income, although redeemable annuities were less popular in the poorer section of the area under consideration than elsewhere, as can be seen in table 4.

## VII

The question of how households, the smallest units of economic behaviour in society, managed to counter risks, and whether they were successful in this is central to the thesis of this paper. This is important because investigating the possibilities households had to defend themselves against risk may help us understand the process of economic growth in history. While growth was often uncertain, at least some regions managed to prosper for a relatively long time in spite of wars, plagues, famine, and floods.

The data analysis shows that Edam passed the 'historical stress test', for a number of important crises did not alter socio-economic conditions. In explaining such stability, this paper identified a few traditional types of insurance (scattering and hoarding) which lost ground in the course of the fifteenth and sixteenth centuries. The possibility that households could do this because they began combining specific assets that may have guarded them from the effects of price fluctuations was discarded. Most portfolios continued the trend to specialization, which started in the fifteenth century, and which was not affected by severe external events around 1500. Most striking however is that during this process many households adjusted their portfolios to include more profitable investments in capital markets.

These findings thus suggest that the emergence of capital markets before and during Holland's financial revolution allowed households to switch from rudimentary types of risk-averse techniques (scattering and hoarding) to more profitable means to

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<sup>60</sup>. Van Zanden, Zijlenderdijn and De Moor, 'Micro-credit', pp. 658-9.

<sup>61</sup>. Zijlenderdijn, *Medievalcapital markets*, p. 208.

spread risks. This process must be regarded as an important step in the history of insurance, during which households managed to acquire stability without reducing profitability.

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