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The ages of women and men

Life cycles, family and investment in the fifteenth-century Low Countries

Jaco Zuijderduijn[*]

Abstract

Recent literature has suggested how late-medieval families may have used financial markets to navigate the life cycle. Precious little is known about the precise connections between the life cycle and family on the one hand and investments in financial instruments on the other, though. We analyse late-medieval investment behaviour using a new dataset of hundreds of life annuities. Our data give ages at purchase of annuitants as well as the pairings of investors in joint and survivor annuities and thus they allow us to link life-cycle events and family relationships to participation in financial markets. We demonstrate that the late-medieval public did not purchase single life annuities for children and argue this points to contemporaries having preferences other than for maximizing profits. We find that women were prominent investors in life annuities, but they also showed a preference for joint and survivor annuities, which were less profitable but provided insurance for (junior) family members. Finally, although the majority of joint and survivor annuities were purchased by family members, a substantial number were for people who appear not to have been related: we suggest godparenthood may help explain pairings of apparently unrelated adults and children.

Keywords: life annuities; investment behaviour; financial history

JEL: D10, D12, E21, G11, N13

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1. Introduction

In the later Middle Ages, the human life cycle was often visualized as 'the ages of man': representations of the various stages individuals would go through during their lifetimes.[1] These included such stages as youth, young adulthood, maturity and, at the very end, old age. Artists did not fail to point out how these stages would each present opportunities and challenges, and they painted a particularly bleak picture of old age. Late-medieval representation of the elderly is not unlike how present-day economic literature regards old age, identifying it as one of the life-cycle 'squeezes': periods during which a household's resources are at risk. Labour productivity decreases during old age, creating a so-called 'retirement squeeze'. This difficult period is preceded by others earlier in the life cycle, such as the 'early adulthood squeeze' brought on by marrying, setting up a household, having children and caring for them.[2]

Recent literature has suggested that people in the later Middle Ages used financial instruments to deal with the 'early adulthood squeeze' and 'retirement squeeze'.[3] Financial markets, it is argued, allowed newly-weds to borrow to set up a household, and they also provided individuals with opportunities to invest their savings and to disinvest when they were faced with large expenses, either at marriage or during old age. But even though broad participation in financial markets has been established for the later Middle Ages,[4] we are still not very well-informed about how individuals used financial instruments in the course of their lives. Our lack of knowledge of the age at purchase of financial instruments is without doubt a major problem standing in the way of a better understanding of market participation: we know the names, residences and sometimes even occupation or social status of thousands of investors in financial instruments, but generally not their age. As a result, we are still largely in the dark about the actual link between the life cycle and financial markets.

We know equally little about how men and women made use of financial markets throughout the life cycle. Male and female life cycles differed in certain respects, with men marrying slightly later and being more likely to remarry when widowed, and women marrying younger, less likely to remarry, and therefore being more likely to end up widowed. Male and female property ownership also differed: in the Low Countries women received a dowry when they married and one way to put this capital to use may have been to invest in financial markets. The reception of a dowry provided women with an investment opportunity, whereas the likelihood of ending up as a widow presented them with a considerable risk. Did this encourage women to make use of the opportunities financial markets offered for making investments? The fact that medieval women were prominent investors, for instance in annuities issued by towns in the Low Countries, seems to suggest so: in some instances they

[1] Burrow, *The ages of man*.
[2] Another difficult period is the 'middle adulthood squeeze', which is caused by adolescent children who require expensive education. However, since most late-medieval families did not spend much on their children's education, this period probably did not present them with any serious problems (Di Matteo, 'Wealth accumulation', 300).
[3] De Moor and Van Zanden, ' Girl power'; Bouman, Zuijderduijn, and de Moor, 'From hardship to benefit'; Pfister, 'The proto-industrial household'. A study of the more recent past is Backlund and Lilja, 'To navigate'.
[4] Zuijderduijn and De Moor, 'Spending'; De Moor and Zuijderduijn, 'Preferences'.

were the recipients of more than half of the annuities issued by town governments, such as in the north-eastern town of Zutphen.[5] If this is indeed a pattern, was this related to characteristics of the female life cycle,[6] such as women being recipients of dowries at marriage and being more likely than men to end up in widowhood? Or was it due to women being more passive and conservative than men, and aiming mostly to secure their own well-being and that of their children, as has also been suggested?[7] In this respect widows in particular are believed to have favoured specific financial instruments such as life annuities, which yielded relatively high returns and provided them with a secure income during the remainder of their lives.

In this paper we use a new dataset to explore late-medieval investment behaviour, focusing on the gender and age of annuitants of life annuities. We will pay particular attention to two types of annuities: those contracted on one life, and those contracted on two lives. These financial instruments still exist today and are known as 'single life annuities' and 'joint and survivor annuities'. Today's retirees can choose either one – just as their medieval predecessors could. The pros and cons of investing in 'joint' life annuities have been summarized as follows:

> By protecting women who outlive their husbands from the loss of pension income, joint and survivor annuities can improve economic outcomes for elderly widows. But joint and survivor annuities also reduce retirement income and consumption levels when both spouses are alive.[8]

Investing in a joint and survivor annuity to secure a certain income is relatively expensive; a single life annuity is less expensive, but does not offer security to the surviving spouse. The same differences apply to late-medieval life annuities.

In the later Middle Ages, life annuities were usually contracted between one or two annuitants on the one hand, and an institution on the other. Towns in particular often issued life annuities in an attempt to attract money; as a result they had to pay annuities until the annuitants passed away. One of these cities was Haarlem, to the west of Amsterdam. In the late fifteenth century Haarlem sold single life annuities, which could be obtained by paying a principal; in return Haarlem was under obligation to pay out an annual annuity until the annuitant passed away. The yield was usually 12.5%, which was quite high compared to other investment opportunities.[9] Haarlem also offered joint and survivor annuities, the yield of which was usually 10.0%; in return Haarlem had to make payments until the surviving annuitant passed away. Prospective investors thus had to decide on which type of annuity to invest in, and also who the annuitant would be; it was not necessary for the investor to be the annuitant, as annuities could also be bought for third parties.

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[5] Van Schaïk, 'The sale of annuities', 113. Elsewhere their participation was less spectacular, but still substantial, see the figures mentioned in: Hanus, *Tussen stad en eigen gewin*, 70

[6] Hanus, *Tussen stad en eigen gewin*, 72.

[7] Jordan, *Women and credit*; McIntosh, *Working women*. For contemporary economies, see: Hinz et al, 'Are women conservative investors?'.

[8] Johnson et al., 'Single life vs. joint and survivor pension payout options'.

[9] Zuijderduijn and De Moor, 'Saving'.

A dataset of 431 life annuities issued by the city of Haarlem in 1482-1491 is used to explore how these financial instruments were connected to male and female life cycles and family life. The data concern investors from Haarlem, but also from numerous other cities in the northern Low Countries; most came from the ranks of the elite and the middling groups of urban society (section 2). Our data are quite unusual in giving ages at purchase of annuitants, and this therefore allow us to investigate how investment was linked to the life cycle (section 3). The data also provide insight in the (family) relationships of 'joint and survivor' annuitants (section 4). Combining these data allows a profile to be established of the life-cycle position of annuitants, as well as the family relationships underlying joint and survivor annuities.

2. Sample

In this paper we use the data of 431 life annuities issued by the town of Haarlem in 1482-1491. The data were compiled by Geertruida de Moor, based on the accounts of the treasurers of Haarlem (*tresoriersrekeningen*) who were responsible for annuity payments.[10] Fortunately they also recorded the age at purchase of the annuitants – something that was hardly ever done in the later Middle Ages. Why the treasurers of Haarlem decided to record age at purchase is unknown, but the reason is easy to guess: many late-medieval cities created a substantial public debt, including life annuities that had to be paid out until annuitants passed away. Recording the age at purchase may have allowed the treasurers to make projections of when urban public debt would decline due to the deaths of annuitants. Also, it may have helped them to prevent fraud, for instance when the heirs of an already deceased annuitant continued to claim payments.[11] However, in spite of these potential advantages, few other city governments appear to have recorded the ages of annuitants.

Towns in the Low Countries created substantial public debts by issuing annuities.[12] Haarlem raised 72,121 guilders by selling life annuities between 1482 and 1491[13] and on top of this, the city also raised 55,479 guilders by selling redeemable annuities; in these years, Haarlem's net revenues were less than 20,000 guilders per annum on average.[14] The city depended largely on financial markets to be able to pay taxes and other financial contributions to the ruler Maximilian of Habsburg (regent 1482-1493; regent 1506-1515), who was almost constantly pressed for cash that he required to pay for his military ventures.[15] Most of the

[10] De Moor, 'De tussen 1482/1483 en 1490/1491 bij de stad Haarlem afgesloten lijfrenten'.
[11] Zuijderduijn, 'Foreign investment', gives an example of the city of Leiden acquiring an *attestatie de vita* before paying an annuity to an elderly annuitant.
[12] Zuijderduijn, *Medieval capital markets*, chapter 3 and the literature cited there.
[13] Van Loenen reports life annuities worth 72,121 guilders sold in 1482-1483 and 1490-1491; De Moor reports life annuities worth 49,983 guilders. The discrepancy is probably due to De Moor not reporting annuities sold in Brabant and Flanders (Van Loenen, 'De rente-last', 131).
[14] Van Loenen, 'De rente-last', 131.
[15] Zuijderduijn, 'De schuldvraag', 29-30.

money Haarlem raised by selling annuities went to the ruler; only a small proportion was spent on public works.[16]

Of the life annuity sales, Haarlem raised 49,983 guilders (69%) by selling life annuities to inhabitants of the northern Low Countries, and the remaining 22,138 guilders (31%) by sales to inhabitants of Flanders and Brabant. Our sample concerns the life annuities sold in the northern Low Countries[17], totalling 431; of these 85 were sold to inhabitants of Haarlem, 315 to those of other cities in the county of Holland, and another 31 to people living outside of Holland, in the provinces of Utrecht and Zeeland. Of the funds thus raised, 18.2% came from Haarlem, 76.0% from cities elsewhere in Holland, and 5.8% from cities outside of Holland. Through annuity sales, the city government of Haarlem thus managed to attract funding from inside Haarlem, but also outside.

Between 1482 and 1491, Haarlem issued 132 single life annuities and 299 joint and survivor annuities (see table 1). Since investors in single life annuities ran a greater risk of the beneficiary dying before the investment was earned back, these annuities yielded the greatest returns: average interest rates can be calculated at approx. 12.2% per annum. On average, annuitants would have had to live for eight years to break even on their investment. For investors in joint and survivor annuities the risk of both annuitants dying before the investment was earned back was lower, which is reflected in the average interest rate of approx. 9.9% per annum; for these financial instruments, the break-even point was reached when the surviving annuitant lived for ten years.[18]

Before we discuss the social profile of the annuitants, it is important to point out that the majority of life annuities were offered for sale in the market; Haarlem sent representatives to cities, where they were to contact local brokers and get in touch with potential annuity buyers.[19] Only occasionally did cities force the wealthiest of their own citizens to invest in annuities; Haarlem could only wrest such ‘forced loans’ from the inhabitants of Haarlem itself though, and since the vast majority of the annuities in our sample were marketed outside of Haarlem, we may safely assume they were contracted by individuals who were not being pressured, but looking to invest in financial instruments befitting their needs.

[16] Zuijderduijn, ‘Het lichaam’, 118.
[17] For unknown reasons, De Moor only included annuity buyers from Holland, Zeeland and Utrecht, and excluded those from Flanders and Brabant. The latter are therefore not included in the dataset.
[18] Inflation rates at the time were modest at slightly over 1.0%; whether annuitants took inflation into account when they purchased an annuity is unknown.
[19] See the discussion in: Zuijderduijn, ‘Foreign investment’ and Feenstra and Muller, ‘Wie wil wachten op het zoet?’.

Table 1. Haarlem life annuities issued in the northern Low Countries, 1482-1491

	One life	**Two lives**	**All**
All	132	299	431
Haarlem	14	71	85
Holland excl. Haarlem	101	214	315
Outside Holland	17	14	31
Yield: mean/ median (in guilders)	12.2/ 12.5	9.9/ 10	
Price: mean/ median (in guilders)	107.1/ 96	119.8/ 100	

Source: life annuities dataset.

Before we proceed to our analysis, it is important to get an idea of the social background of the investors. Life annuities cost about 100 guilders on average (table 1), about one to two year's wages for a skilled worker. Life annuities therefore were an option for people who either had sufficient savings, or had received a sizable inheritance.[20] The precise social background of the vast majority of the 728 annuitants in our sample is unknown. We know some came from the ranks of the elites,[21] such as one lord and 18 ladies (*joffers*), who are also likely to have been noble persons. Another 42 annuitants could call themselves master (*meester*), which suggests they had studied at a university.[22] On the other hand we also encounter a few persons who were certainly from middling groups, such as a tailor,[23] a barber,[24] a painter[25] and a cooper.[26] Another social group we can distinguish is the clergy: among the annuitants there were 77 religious men and 18 religious women (13% of all annuitants). Among the males, we encounter three monks and 74 priests; among the women nine nuns and nine beguines.[27] Clergymen seem to have preferred single life annuities over joint and survivor annuities, which were proportionally much more popular among clergywomen (table 2). In the literature, life annuities have been portrayed as an ideal way to provide for family members entering into a religious community and therefore requiring a fixed annual income (something called *zuster-* or *kloosterprovene*).[28] Although ages at

[20] Evidence for saving by late-medieval middling groups in Dordrecht and other cities in Holland is presented in Zuijderduijn and Van Oosten, 'Breaking the piggy bank'. Evidence of people from middling and lowering groups holding financial instruments is presented in Zuijderduijn and De Moor, 'Preferences of the poor'.
[21] Recent literature on urban elites investing in public debt includes Baguet, 'Social change'; De Vijlder and Limberger, 'Public or private interests?'; Stasavage, *States of credit.*
[22] E.g. Albrecht Dirksz. from Amsterdam and Pieter Bartholomeus van Wassenaar from Leiden, who had studied medicine, and Wouter Egbertsz. from Dordrecht, who had studied theology.
[23] Roelof Roelofsz. from Dordrecht and Govert Jansz. and Martijn Jansz. from Dordrecht.
[24] Thomas Jansz. from Dordrecht.
[25] Simon Jansz from Dordrecht.
[26] Willem Gerritsz. from Dordrecht.
[27] The monk and nuns lived in Mariënbron in the region Dordrecht, Koningsveld and St. Agnes in the region The Hague, St. Michielsklooster, St. Catharijneklooster and Porta Coeli Heemstede in the region Haarlem, Leeuwenhorst and Rijnsburg in the region Leiden.
[28] Bakker, *Bedelorden*, 131-132; De Moor, *Verborgen en geborgen*, 487; Schilder, *Amsterdamse kloosters*, 91; Verloren van Themaat et al, *Oude Dordtse lijfrenten*, 57; Stoop, *Schrijven in commissie*, 66. De Moor points out

purchase for religious persons were relatively high – 38 years for clergymen and 37 for clergywomen – average ages at purchase for monks and nuns were lower and in line with the idea they received life annuities from relatives to help them provide for life as clergy.[29] Of the clergymen and clergywomen who contracted joint and survivor annuities, 44% did so with relatives, while there are no indications of relatives being involved in 56% of the cases. What seems a straightforward alternative – contracting a joint and survivor annuity with a fellow religious person – was only implemented in six contracts.[30] Religious persons' investment in annuities has also been explained by their lack of access to some other investment opportunities: in the Low Countries the clergy and secular clergy, such as canons regular and beguines, were usually barred from investing in land, and were therefore forced to turn to financial instruments.[31] Indeed authorities often put restrictions on the alienation of landed property to the clergy, making it impossible for religious women and men to invest in real estate.[32]

Table 2. Religious persons as annuitants

	One life	**Two lives**
Males	34	43
Females	3	15

Source: life annuities dataset.

3. Ages at purchase

For the vast majority of the annuitants, it is difficult to say much about their social status: we have to make do with names and family relationships, age at purchase, and principal sums. Yet these data do provide possibilities to study the relationship between the life cycle and family conditions on the one hand and participation in financial markets on the other. Our sample provides data on the age at purchase of 730 annuitants (132 in single life annuities, 598 in joint and survivor annuities). The average age of the annuitants was 29.3 years; single life annuitants were slightly older at 31.1 years, and joint and survivor annuitants slightly younger at 28.9 (table 3). Among single life annuitants males were older on average, while among joint and survivor annuitants females were older; even though the differences are not big, they may be connected to gendered investment patterns.

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that life annuities were sometimes purchased in anticipation of children entering into religious communities (De Moor, *Verborgen en geborgen*, 93).

[29] The mean age at purchase of three monks was 31 (with a range of 30-33) and that of nine nuns was 29.8 (with a range of 16 to 50); quite a few of the latter were in their early twenties, which was a common age for professing (Zuijderduijn, 'Living la vita').

[30] Including the sisters Elizabeth and Baarte Vranckendr. (both beguines) and Elizabeth and Janneken Aarmsdr. (both beguines).

[31] Callewier, *De papen van Brugge*, 250-251. Regarding financial instruments, the clergy also faced restrictions with respect to mortgages on land; annuities issued by cities such as Haarlem (which were not secured on land) may therefore have been their instrument of choice.

[32] Zuijderduijn, *Medieval capital markets*, 59-62.

Gendered patterns also become clear when we look at the age distribution of single life annuitants and joint and survivor annuitants (figures 1 and 2). Among the single life annuitants men outnumbered women (59% to 41%) and they were in the majority in every age category. Males aged 30-50 were particularly keen investors: 53.8% of all male annuitants were in this age category. Among the joint and survivor annuitants the patterns is reversed: females outnumbered males (57% to 43%) and women were in the majority in every age category. Our sample thus suggests that two-life annuities were preferred by/for women, and one-life annuities by/for men. Even though it is difficult to explain this pattern, it may be useful to point out that Haarlem's single life annuities were apparently not often used to provide a bride with a dowry – which was the practice elsewhere in late-medieval Europe, for example in Italy.[33] In that country, family members used single life annuities to provide newly-wed wives with a dowry; by doing so, the marriage gift contributed to the new household, and it was also protected against mismanagement or even misappropriation by the husband. Since the latter could not really alienate the annuity, the financial instrument was sure to be there when the husband passed away and the wife became a widow. The absence of a peak in figure 1 at women's average age at first marriage (which was around 25 to 30) suggests that even though families in the late-medieval Low Countries had similar concerns with respect to securing marriage portions,[34] this did not often bring them to use a single life annuity as a dowry.

Table 3. Ages of annuitants

	One life	**Two lives**	**All**
N	132	598	730
Mean age	31.1	28.9	29.3
Median age	32	29	30
Males			
N	77	251	328
Mean age	32.4	28.0	29.2
Median age	33.5	28	31
Females			
N	51	332	383
Mean age	29.1	29.7	29.6
Median age	29	30	30

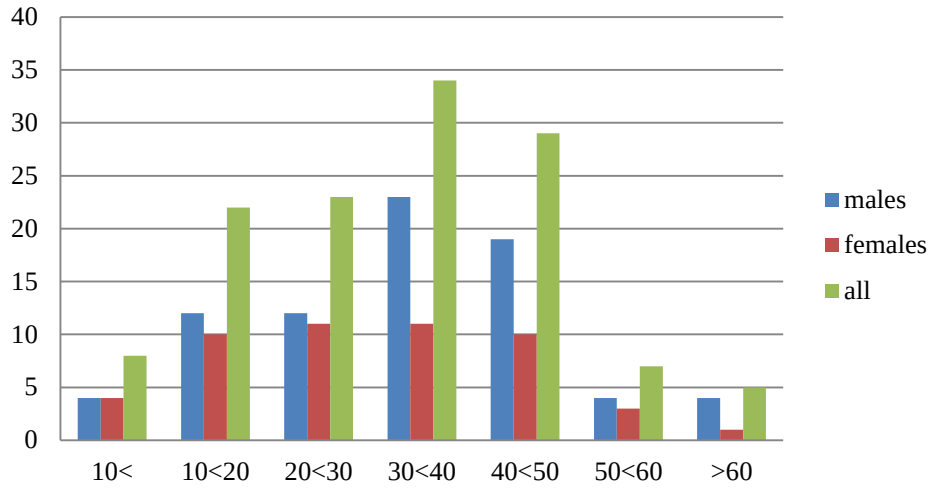
Source: life annuities dataset
One life: gender unknown in two instances
Not all ages are known

Children did not feature much as single life annuitants (6.1% of all single life annuitants), but they were more prominent as joint and survivor annuitants (17.3% of all joint

[33] Kirschner reports on this practise in Italy (Kirschner, *Marrigae, dowry, and citizenship*, 85 Pezzolo, 'Bonds and government debt, 150).
[34] Zuijderduijn, 'Grave concerns'.

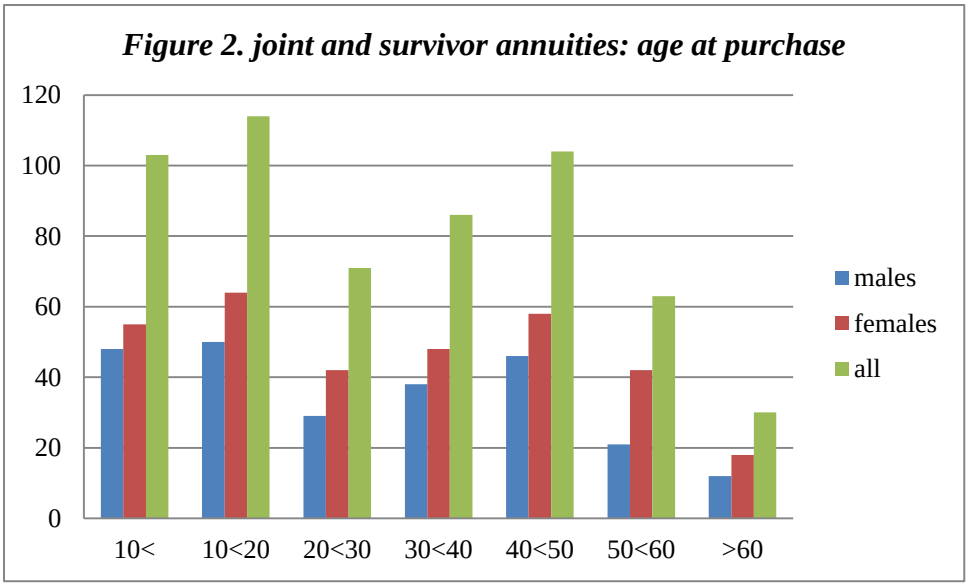
and survivor annuitants) (figures 1 and 2). The low number of single life annuities purchased on behalf of children provides further clues with respect to investment behaviour. From a strictly economic point of view, purchasing a single life annuity for a child could well have been most profitable. Once children had survived the first couple of years, their life expectancy was quite high, and taking out a single life annuity for them would have been relatively profitable – this high profitability was due to Haarlem not adjusting yields to take account of the age at purchase.[35] The high profitability of investing in various life annuities is demonstrated in the appendix: a single life annuity on a child was likely to bring a return that was at least 25% more compared to alternative uses of life annuities, and to raise the return per annum by at least 2.5 percentage points. Figure 3 gives the expected return on single life annuities per age at purchase: an investor taking out a single life annuity for a child aged less than one could expect a return of 9.1%. The line increases to a maximum of 9.3% at an age at purchase of five, and then declines. Yields drop below 8% at the age of 30, and below 6% at the age of 47. After an age at purchase of 67, losses rather than profits were to be expected because the average annuitant did not live long enough to reach the break-even point; the yield at an age at purchase of 68 was -0.2%. Figure 3 also gives the number of annuitants per age category: the most profitable age categories – children and teenagers – were underrepresented.

Figure 1. single life annuities: age at purchase

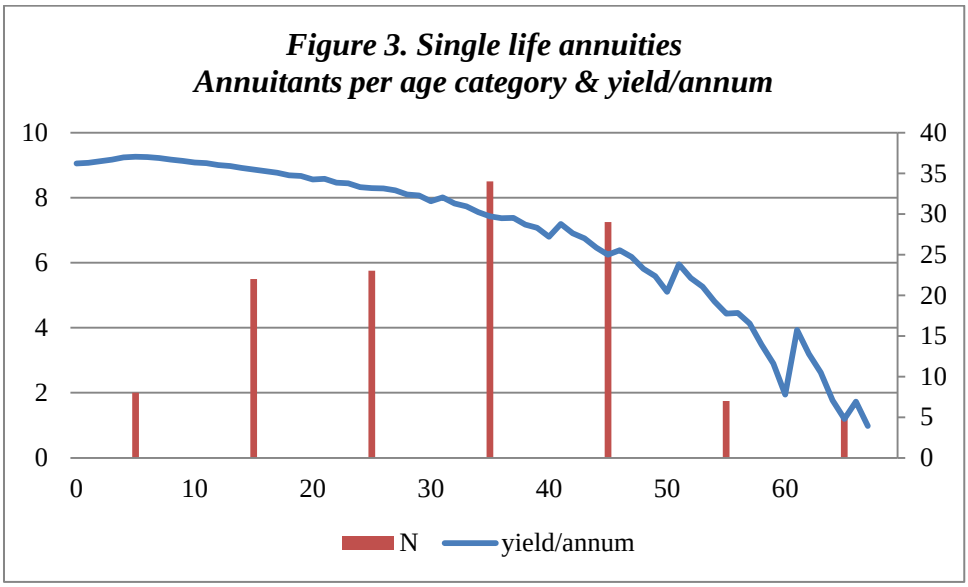


Source: life annuities dataset.

[35] A regression analysis of interest rate as a function of age showed a very low correlation of r^2 0.01: age only explains 1% of variation in the interest rates on Haarlem's single life annuities.



Source: life annuities dataset.



Left axis: yield/annum in %
Right axis: N of annuitants per 10-year age category (0<10, 10<20 etc.).
Source of life expectancies: taken from Herlihy's calculations of age-specific life expectancy for Pistoia in 1427 (Herlihy, *Renaissance Pistoia*, 283-286); life annuities dataset.

Whereas children hardly appear as single life annuitants, no fewer than 117 children were joint and survivor annuitants. Based on this, should we conclude that many investors were driven by considerations other than maximizing profit? To answer this question we should begin by asking whether investors *did* not try to maximize their profits, or *could* not maximize their profits. To begin with the latter: Haarlem did allow the investing public to purchase annuities for children, selling a modest number of single life annuities to annuitants aged 0-9 (6% of all single life annuities); six of these were at interest rates of 12.5%, one was

at 11.8% and another one at 10.0%.[36] Apparently the city did not fervently oppose selling single life annuities to children, it just was not very successful in doing so: a contemporary report states how, when Haarlem tried to sell single life annuities in 1471, prospective investors refused to invest in single life annuities, demanding joint and survivor annuities instead.[37] This suggests that the investing public's preferences may have been behind the overrepresentation of children in joint and survivor annuities: at purchase, 117 of these financial instruments contained an annuitant aged 0-9 (39% of all joint and survivor annuities). It has been suggested that parents refrained from investing in child single life annuities because they feared their children would demand the annuity once they reached adulthood.[38] This was not the case in Haarlem though: here, investors could stipulate in the contract that they themselves would receive the annuity they purchased for a child, and their spouse after they had passed away, followed by the child only after both parents had passed away. Numerous contracts issued by Haarlem contain this stipulation, so it would have been perfectly possible for parents and other adults to profit from a financial instrument that 'speculated' on a child's longevity.[39] In addition a single life annuity on a child provided a fixed income in the event the parent(s) passed away; for children this amounted to an insurance against orphanhood. All of this does not explain why investors preferred joint and survivor annuities over single life annuities. Perhaps we should consider another characteristic of late-medieval society that could have influenced investment behaviour: the fear of untimely death.[40] If investors *believed* children ran an equally great (or greater) risk of dying as adults, they may have *perceived* single life annuities contracted on children as too risky, and may have preferred joint or survivor annuities that insured both adult and child of a lifelong income. To be sure, our best data on late-medieval demography indicates that children's life expectancy was considerably higher than that of adults, so investing in single-life annuities on children would usually have been beneficial for adults and children. However in a time when demographic data were unavailable, contemporaries may have perceived the risk of a child dying prematurely as too high, causing low demand for single life annuities on children.

Returning to figures 1 and 2, the proportion of single life annuitants over 50 was low – understandable considering annuitants' slim chances of reaching the break-even point. The oldest single life annuitant was Claas Pietersz., whose age at purchase was 70; his chances of profiting were quite low (see figure 3) but perhaps Claas was in good health and confident that he would live for many more years? Altogether only 9.4% of all single life annuitants were over 50 and 16.3% of all joint and survivor annuitants. The two oldest in the latter category were the 80-year-old widow Lobburch Simonsdr., who took out a contract with her

[36] Haze Jacob Walichsdr. (age 4, yield 12.5%), Margriet Claas Jansdr (age 8, yield 12.5%), Agnes Claas Jansdr (age 6, yield 12.5%), Pieter Willemsdr. (age 5, yield 12.5%), Katrien Jansdr. (age 9, yield 12.5%), Adriaen Everts. Lappen (age 6, yield 10%), Joost Adriaan Jacobsz. (age 5, yield 11.8%), Daniël Gerolfsz. Van Vorselaar (age 5, yield 12.5%).

[37] …*because some demanded to purchase* [joint or survivor annuities]… (…*mar om datter eenige waren die niet coipen en wilden dan om twee liven.*…) (Van Loenen, 'De rente-last', 8).

[38] Jord Hanus suggests this was a likely scenario (Hanus, *Tussen stad en eigen gewin*, 76).

[39] Van Loenen, 'De rente-last', 4. Van Loenen gives the example of a joint and survivor annuity on Anthonis Bladelijn aged 18, and Margriet van Diepenbroeck, aged 14, to be collected by Pieter Bladelijn (Van Loenen, 'De rente-last', 12; cf. idem 13-16).

[40] The fear of untimely death is mentioned in: Herlihy, *The Black Death*, 80-81. It should be distinguished from the risk of untimely death, as mentioned in: Imhof, *Lebenserwartungen*, 38.

44-year-old daughter Geertruid Jan Florisdr., and the 80-year-old Katrien Pietersdr., who took out an annuity contract together with 39-year-old Joriden Harmansz. de Smid. Such investments were perhaps still not very prudent – a single life annuity on the younger annuitant would have had a higher yield – but including a much younger annuitant did at least reduce the risk of losing the entire investment because of the death of the surviving annuitant.

Finally, in the literature widows have been identified as prominent investors in life annuities. Since wives often outlived their husbands, they were likely to inherit, and at some point face the question of what do with the estate. One option was to invest in a life annuity, which yielded a relatively high lifelong return. Indeed some historians have noticed that widows could be quite prominent participants in late-medieval financial markets;[41] it has been suggested this was also because widows had the freedom to invest, whereas wives were usually subject to their husbands.[42] Our dataset does not contain many widows though: only eight, who contracted eleven joint and survivor annuities (and not one single life annuity). Their average age was 55.6, and that of their fellow annuitants 21.4; in ten cases their fellow annuitants were their children.[43] We should also point out that these widows had joint contracts with nine females and only two males. Contrary to what has been observed elsewhere,[44] the widows in our sample also did not invest high sums, purchasing life annuities worth 8.6 guilders on average (the average of joint and survivor annuities involving parent-child pairings was 11.2 guilders, see table 5). Only two widows invested more than 11.2 guilders: Geertruide Foppendr. from Leiden, together with her daughter Barbare, bought an annuity worth 12 guilders, and Margriet Hendriksdr., also from Leiden, together with her daughter Reinse, purchased an annuity worth 15 guilders.

4. Gender and life cycles

Joint and survivor annuities can tell us something about how financial markets were used in family life. Who were the people who paired up in a joint and survivor annuity contract? Our sample contains 299 joint and survivor annuities: the city accounts explicitly mention family relations in 142 contracts and we were able to deduce family relations in another 62, mainly by comparing surnames. Of course, this is not a watertight method, so these deduced family relations are recorded separately. Table 4 shows that 8.8% of the joint and survivor annuities were purchased by couples, 29.0% by a parent and a child, 25.3% by siblings, and 5.7% by other family members. This means that more than two thirds of the joint and survivor annuities were a 'family affair'.[45]

[41] Hanus, *Tussen stad en eigen gewin*, 72, 76. Others such as Manon van der Heijden found a much lower share of widows (Van der Heijden, *Geldschieters van de stad*, 164).
[42] Van der Heijden, *Geldschieters van de stad*, 161-162.
[43] Only the relationship between Geertruida Frederiks Weinen, the 65-year old widow of Jan Roemer, and six-year-old Dirkje Jan Claasdr. Ruysch is unknown.
[44] Tracy, *A financial revolution*, 154-156; Hanus, *Tussen stad en eigen gewin*, 72, 76.
[45] Hanus arrived at similar figures for Bois-le-Duc (Hanus, *Tussen stad en eigen gewin*, 76).

Couples invested in joint and survivor annuities at an average age of 43.2 (table 5): their actions must be regarded as an attempt to secure an income during old age and to provide for the longest-living partner. The average age of the elder spouse was 48.0, that of the younger spouse 38.0. Couples invested in an annuity worth 17.8 guilders per annum on average: they received the equivalent of more than 70 day wages of a skilled labourer, [46] or about three month's wages. Such an amount could make a crucial difference during old age, and especially during widowhood. In the parent-child category the average age was lower (28.5): the older annuitant was 43.0 on average, the younger one 11.2. The value of the annuities was also relatively low at 8 to 12 guilders, equivalent to 44 to 48 day wages. This does not come as a big surprise, since one might assume children usually did not contribute savings to the principal; couples probably had more scope for investing in larger annuities. Moving on to the next category, the average age of the siblings contracting joint and survivor annuities was 22.5; the older annuitants were 26.1 on average, the younger 19.1. In the 'other family' category the average was 27.1; the older annuitants were 39.1 on average, the younger 14.2. It appears that this category mostly consisted of aunts and uncles paired with nieces and nephews.

Most joint and survivor annuities were shared by males and females (50.7%), another 16.5% involved two males, and 32.8% involved two females. Males were older on average when the annuitants were a couple (this reflects the fact that husbands tended to be older than wives) but also when the annuitants were siblings (table 5). Females were older on average when the annuitants were parent and child, and in the case of other family relations, or when the connection was unknown. When we take a closer look at the parent-child pairings (table 6), it appears that women were in the majority as parents (66.3%) and children (58.1%). So when joint and survivor annuities were purchased, mothers were more likely to be an annuitant than fathers, and daughters more likely than sons. We should not go so far as to see this as indicating female preference though, as it is usually impossible to determine whether these investments were contracted at the initiative of the mother or of other family members. What it probably does reflect, though, is the logic of intergenerational transfers in the late Middle Ages: in Holland there was a partible inheritance system where both men and women inherited. To prevent the inheritance process from breaking up the family land and producing small, uneconomic units, men would usually buy out women's share in real estate and compensate them with money or annuities. In the end, intergenerational transfer thus often resulted in men receiving real assets (land, houses) and business inventories, and women financial assets (cash, annuities). The effect was that women were forced to do something we would nowadays describe as 'modern': to invest in financial markets. This amounts to a paradox of women's participation in financial markets, which can point to both females' weak position with respect to males, who prevented them from holding real estate, and to their empowerment as investors.

Finally, there is an interesting pattern in the 'unknown' category: here the average age of the first annuitants was high in pairings of males with males (38.4) and females with females (44.2), while that of the second annuitant was rather low (13.2 and 15.3 respectively).

[46] De Vries and Van der Woude, *The first modern economy*, 610-611.

This suggests the existence of contracts involving adults and non-related children (or at least the Haarlem city government was unaware of a family relationship). Table 7 provides a closer look at the 'unknown' category, and confirms the predominance of the large age-gap – and also in pairings of males and females (which is not picked up in table 6). In 83.7% of the cases the gap was larger than ten years, and in 67.4% of the cases it was larger than 20 years. So in the absence of family relationships, many joint and survivor annuities were contracted by people from different generations. Perhaps the most straightforward explanation for this is godparenthood, which was very common in the late Middle Ages, and created strong relations between non-relatives[47] - and may have led to children and godparents entering into financial contracts.

A final pattern worth mentioning concerns priests: five joint and survivor annuities were contracted between priests and their illegitimate children. Thus, Jan Pauw, a priest in Amsterdam, contracted a joint and survivor annuity with Jan 'his natural son'. The average ages of these fathers (40) and illegitimate children (six years of age) suggest that the children were in fact conceived when the men were already priests; in these cases a joint and survivor annuity may have served as some sort of child support.[48]

Table 4. Family relations in joint and survivor annuities

	Certain	**Deduced**	**Total**
Couple	26	-	26 (8.8%)
Parent-child	81	5	86 (29.0%)
Siblings	19	56	75 (25.3%)
Other family	3	14	17 (5.7%)
Unknown	-	93	93 (31.3%)

Source: life annuities dataset.

[47] Alfani and Gourdon, 'Spiritual kinship', 15.
[48] Cf. a similar pattern Hanus, *Tussen stad en eigen gewin*, 77.

Table 5. Joint and survivor annuities: gender composition

	m-f			**m-m**			**f-f**		
	Av. age male	Av. age female	Av. value	Av. age male1	Av. age male 2	Av. value	Av. age fem 1	Av. age fem 2	Av. value
Couple	45.0 (26)	41.3 (24)	17.8 (26)	-	-	-	-	-	-
Parent-child	23.4 (36)	28.3 (35)	11.8 (37)	50.3 (12)	11.2 (13)	12.7 (14)	43.1 (33)	16.4 (28)	10.0 (35)
Siblings	22.4 (25)	16.2 (25)	13.9 (25)	25.3 (14)	20.2 (14)	8.1 (15)	32.3 (21)	22.1 (22)	10.8 (22)
Other family	25.8 (14)	32.6 (14)	7.8 (14)	-	-	-	22.3 (3)	6.7 (3)	9.3 (3)
Unknown	31.8 (39)	35.1 (42)	13.1 (42)	38.4 (18)	13.2 (18)	10.1 (18)	44.2 (33)	15.3 (31)	9.5 (33)
Total	29.8 (130)	30.8 (140)	13.2 (144)	37.5 (44)	11.0 (46)	10.2 (47)	40.29 (90)	17.1 (84)	10.0 (93)

Source: life annuities dataset.

Table 6. Joint and survivor annuities: parent-child pairings

	Male parent	**Female parent**	**Total**
Male child	14	22	36
Female child	15	35	50
Total	29	57	-

Source: life annuities dataset.

Table 7. Age gap for the 'unknown' category

	0-9	**10-19**	**20+**	**Total**
m-f	8	6	24	38
m-m	3	5	10	18
f-f	3	3	24	30
Total	14	14	58	

Source: life annuities dataset.

5. Conclusion

The life annuities Haarlem sold between 1482 and 1491 to elites and middling groups in various cities in the northern Low Countries provide new insights into the late-medieval investing public because they include the age at purchase of annuitants. From an economic point of view, purchasing single life annuities for children would have been most profitable. But even though Haarlem allowed investors to take out single life annuities for children, only

a few people decided to do that; this was the case even though this was by far the most profitable type of life annuity available. Investors might have perceived the risk of untimely death as too high to justify purchasing annuities for children, or they might have given more weight to incentives other than just profit. In this respect, recent studies have claimed financial instruments could be used not only for financial gain, but also to deal with specific moments during the family life cycle. The single life annuity might for instance have been useful in providing women with a dowry. Our analysis does not contain many single life annuities on women at the average age at first marriage, though. Another use of financial instruments might have been by widows looking to reinvest inherited wealth in a single life annuity to secure their livelihood during old age. However, the number of widows in our sample is very low. In fact women did not feature prominently among single life annuitants: most of these financial instruments were for men in their thirties and forties. Women were in the majority among joint and survivor annuitants though. Since these financial instruments had two annuitants, the risk of losing the investment due to death was less compared to single life annuities, but so were the returns. In this respect most women in our sample held less risky financial instruments than men, who were more likely to invest in single life annuities. Whether this finding tells us all that much about female preferences remains difficult to tell, since we are generally unaware of the decision-making process leading to the investment. The fact that women formed the majority of investors in Haarlem´s life annuities could be a reflection of either female investment behaviour, or of male decision-making on behalf of women.

Our dataset also allows for an analysis of pairings of joint and survivor annuitants. The majority of these concerned two family members teaming up. Where annuitants were parent and child, there was an overrepresentation of mothers and daughters. We speculate that this female presence may be due to the 'paradox' of female participation in financial markets: in partible inheritance systems, heirs reorganize real estate, taking real estate from women and compensating them with either financial instruments or cash (which they can then use to purchase financial instruments). This inheritance system barred women from property ownership and drove them into financial markets; the large number of women among Haarlem's annuitants may have been the result of this. Investment was not only a family affair though: joint and survivor annuities were also contracted between non-kin. Such financial instruments were often characterized by a considerable age gap between the annuitants: non-related adults and children teamed up in an investment. We suggest godparenthood may explain this phenomenon and that in this way joint and survivor annuities may also have been used to strengthen relationships between non-kin. Future research should indicate the degree to which annuities were used to consolidate spiritual kinship.

Life annuities provided annuitants with a secure income: most of Haarlem´s annuitants received an annuity equivalent to several months' wages for an unskilled worker, and clearly this could make a crucial difference during old age. The majority of these financial instruments were contracted by adults, presumably after they had amassed the necessary savings or inherited wealth. By investing in a life annuity, they assured the annuitant(s) of an additional income. In terms of insurance, joint and survivor annuities may have been

particularly attractive since they could be used to secure two generations: the older annuitant received a steady lifelong income, which could also be used to support the younger annuitant. The younger annuitant was assured of an income in the event the older annuitant passed away. Since such an income could be of crucial important for the well-being of orphans, increasing their ability to remain above subsistence level, and perhaps also to acquire a skill during adolescence, for younger annuitants joint and survivor annuities may have amounted to an insurance against impoverishment in the event of a parent passing away.

To summarize, our analysis did not yield clear-cut links between life-cycle events such as first marriage or widowhood and investing in a life annuity. Such an investment nevertheless provided family members with financial security, regardless of the life-cycle stage: single life and joint and survivor annuities provided annuitants with a lifelong income, and offered protection against the 'retirement squeeze' during old age. Women were in the majority among Haarlem's joint and survivor annuitants; this is also likely to have been due to women being driven to investing in financial markets because of inheritance patterns, but this gendered pattern of investment may also have reflected preferences in crafting lifelong ties with kin and non-kin alike.

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Appendix

Table 8 gives six scenarios for investing 200 guilders in life annuities. Investors deciding to purchase a single life annuity on a child, would receive an annuity of 25 guilders. Assuming life expectancy at birth was approx. 25 years, the investors could expect to earn 25 x 25=625 guilders on average. Since the principal of 200 guilders would not be recovered, the net yield would be 425 guilders in 25 years, or a nominal yield of 8.5% per annum.[49] Another scenario would have been to invest the 200 guilders in a single life annuity on an adult. Assuming the life expectancy of the average adult was 15 years, the expected return would be 15 x 25=375 guilders on average. The net yield would be 175 guilders over 15 years, or 5.9% per annum.[50] The four other scenarios for investing in life annuities do not exceed a 6.0% return per annum either: clearly the highest return was to be had for single life annuities on children.

Table 8. Scenarios 200 guilder investments in annuities

	Expected return (guilders)	**Yield per annum**
Single life annuity of 200 guilders on child	625	8.5%
Single life annuity of 200 guilders on adult	375	5.8%
Single life annuity of 100 guilders on parent, and single life annuity of 100 guilders on child	500	6.0%
Joint and survivor annuity of 200 guilders on two children	500	6.0%
Joint and survivor annuity of 200 guilders on two adults	375	5.8%
Joint and survivor annuity of 200 guilders on parent and child	500	6.0%

Assumptions: interest for single life annuity is 12.5%, for joint and survivor annuity 10.0%; life expectancy for child is 25 years, for adult 15 years. Life expectrancies based on Herlihy, *Medieval and renaissance Pistoia*, 283-286. Evidence of life expectancies in fifteenth-century Holland probably being as high as in Italy: Zuijderduijn, 'Living la vida apostolica'.

We used nominal interest rates since this was probably closest to late-medieval practice: annuities were paid out in hard cash to the annuitant, and we are unaware of annuitants reinvesting these sums. However, if we were to use a compound interest-rate scenario and assume late-medieval investors reinvested their annual returns immediately at a 12.5% yield, we end up with an end result of 6171 guilders – a yield of 173% per annum over the 35-year period.

[49] 425/25=17 guilders per annum; 17/200 guilders=8.5%.
[50] 175/15=11,7 guilders per annum; 11,7/200 guilders=5.9%.