

Income and wealth during the course of life

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CPB Background Document

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June, 24, 2019

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Summary

This paper analyzes whether households diminish their wealth during retirement as the life-cycle hypothesis suggests. We also consider the development of income during retirement. We use a balanced panel of two million households, of the Netherlands in 2006–2013. The analysis shows that gross income after retirement is considerably lower than before, but income is relatively stable during retirement. Most people do not diminish their wealth or sell their own house during retirement, which is not in line with the life-cycle hypothesis. Finally, we could not identify a bequest motive, as the trajectories of total wealth and bank deposits at the end of life hardly differ between households with and without children.

Samenvatting

Dit rapport onderzoekt of huishoudens interen op hun vermogen gedurende pensionering, zoals de levenscyclushypothese suggereert. We gaan ook na hoe het inkomen zich ontwikkelt gedurende hun pensioenperiode. We gebruiken een gebalanceerd panel van twee miljoen huishoudens, uit Nederland in 2006-2013. Uit de analyse blijkt dat het bruto inkomen na pensionering veel lager is dan daarvoor, maar gedurende de pensioenperiode relatief stabiel is. De meeste mensen teren niet of nauwelijks in op hun vermogen of verkopen hun eigen woning gedurende pensionering, anders dan de levenscyclushypothese suggereert. Ten slotte kunnen we geen erfenismotief identificeren, want de ontwikkeling van het totale vermogen en van bankdeposito's aan het eind van het leven verschilt nauwelijks tussen huishoudens met en zonder kinderen.

1 Introduction

Do households diminish their wealth during retirement? The life-cycle model by Modigliani and Brumberg (1954) suggests they do, but the empirical evidence in the literature does not support this hypothesis. The lack of support may be due to uncertainty about lifetime or medical expenses or due to a bequest motive, according to more recent models in the life-cycle literature. In addition, households may be restricted in diminishing their wealth because it is illiquid. As consumption during retirement can also be financed by income instead of by wealth, we investigate income changes due to retirement and other life events as well. The purpose of this paper is to sketch the trajectories of income and wealth during the course of life and the effects of life events in the Netherlands.

To gain more insight into household income and wealth during the course of life, we examine their trajectories in a balanced panel of over two million Dutch households. First, we analyze the trajectories of income in a balanced panel of households over the period 2006–2013. We compute the low (p25), median (p50) and high (p75) income percentiles to describe the income distribution at different ages. In addition, we identify to what extent the death of a spouse or a divorce influences income during retirement. Next, we track net wealth and its main components – housing wealth and financial wealth – to learn more about the wealth position of households at different ages, again using the p25, p50 and p75 measures. In addition, we study to what extent shocks in marital status affect wealth during retirement. We distinguish between retired couples with and without children to identify a potential bequest motive.

The gross income of Dutch retirees is roughly half the income of their working contemporaries. The reduction is probably due to both cohort and age effects. Income is significantly affected by changes in marital status: widowhood causes a decrease in household income, but a significant increase in personal income, especially for women.

We find no evidence of wealth decumulation during retirement. Bank deposits remain roughly stable for most age cohorts. At the higher end of the wealth distribution, the bank deposits of households increase, while stock ownership decreases at very high ages, making the portfolio less risky. There is no evidence that households exchange owner-occupied housing with rental housing at higher ages to extract wealth for consumption purposes.

Van Ooijen et al. (2015) also study the evolution of wealth during retirement. Their study is similar to ours, but includes a much smaller sample and a shorter time horizon. Moreover, the study pays less attention to the distribution of wealth. The authors find that Dutch households hold onto large amounts of wealth during retirement. If a member of a household is struck by a major disease, savings in financial assets increase. After the death of a spouse, net wealth decreases, however.

The rest of this paper is organized as follows. In section 2, we review the literature on the life-cycle hypothesis and on the trajectories of wealth during retirement. Section 3 provides some information on the micro-data used and presents the demographic characteristics of our sample. Section 4 describes the trajectories of income and wealth during the course of life and after life events. Section 5 concludes.

2 Literature review

Baseline life-cycle model

The life-cycle model developed by Modigliani and Brumberg (1954) assumes that the marginal utility of consumption diminishes as consumption increases. The implication is that a rational household smooths consumption over the life-cycle to maximize lifetime utility. Consequently, households save during working life and run down their assets during retirement. As the model does not include uncertainty about life expectancy, medical expenses or a bequest motive, utility is maximized when all wealth is depleted at the time of death. Empirical studies have been unable to match the model's predictions to the data, however.

Uncertainty about life expectancy

Yaari (1965) and Davies (1981) extend the life-cycle model by assuming that households face uncertainty about their remaining lifetime. In their models, households dissave at a slower pace than predicted by the standard life-cycle model of Modigliani and Brumberg. The extent to which households adjust the pace of wealth decumulation in the presence of an uncertain lifetime depends on the discount rate and the coefficient of relative risk aversion. As older households *ceteris paribus* face a relatively high mortality risk, the pace at which retired households deplete their wealth increases with age. However, the extent to which mortality risk affects consumption is not fixed, but rather depends on the coefficient of relative risk aversion. As a high coefficient of relative risk aversion indicates a low willingness to substitute consumption intertemporarily, the consumption of households with high relative risk aversion is more susceptible to mortality risk than the consumption of households with low relative risk aversion. Annuities can insure against longevity risk, but in practice people buy less annuities than could be expected.

Uncertainty about health expenses

Numerous studies extend the life-cycle model by including uncertainty about health care expenses. Kotlikoff (1986) demonstrates in a simple two-period model that savings increase when households face uncertainty about medical expenses. This result changes under alternative assumptions. For example, savings are at their lowest when the representative agent chooses to simply live with his/her illness and to a lesser extent when he/she insures against medical expenses. In Kotlikoff's model, the probability of getting ill is irrespective of age, and it abstracts from the distribution of medical expenses among American families. These shortcomings are explicitly addressed in Palumbo (1999). In his model, the probability of getting ill increases with age and the parameters used in the calibrations are based on actual data. Palumbo concludes that a model where households face uncertain medical expenses and mortality risk fits the data better than the standard life-cycle model. The difference in the fit of the two models is not particularly large, however.

De Nardi et al. (2009) construct a model where single retirees extract utility from consumption and bequests and face uncertainty about future health, mortality risk and medical expenses. The authors then proceed to estimate the model using AHEAD data, which contain detailed information on single retired Americans of different ages and with a wide distribution of income and wealth. The results show that medical expenses play a key role in the decision to hold wealth during retirement: according to the model without medical expenses, wealth is fully depleted at age 94, while according to the model with medical expenses, 80,000 dollars of wealth is held. The authors state that the high quality of the data used explains the much more pronounced results than those found in, say, Palumbo (1999). Expenditures on care can be high, especially at the end of life.

Poterba et al. (2011) show that in the United States health shocks coincide with significant changes in wealth levels. Coile and Milligan (2006) find that the impact of a health shock depends on the mental and physical abilities of elderly. Van Ooijen et al. (2015) perform an analysis similar to Poterba et al. (2011) with Dutch data,

but find that the savings rate increases as health deteriorates. The authors explain this increase in savings rate by the lower level of consumption when health deteriorates. The broad coverage of health care insurance in the Netherlands in comparison to the United States reduces the uncertainty about health care expenses, according to Van Ooijen et al. (2015).

Bequest motive

A different strand of the literature enhances the life-cycle model by taking bequest motives into account. Hurd (1989) constructs a model where households obtain utility by bequeathing wealth to their heirs. The model assumes a constant marginal utility of bequests and a declining marginal utility of consumption. The implication is that higher endowments of wealth do not result in higher consumption during retirement: above a certain threshold, the marginal unit of wealth is bequeathed. As a consequence, higher wealth endowments result in a slower decumulation of wealth during retirement.

By exploiting two waves of the Dutch Social Economic Panel, Alessie et al. (1997) find that the elderly continue to save after retirement. The authors find some evidence of a bequest motive among the elderly. The fraction of respondents that indicate they save for their children increases until the age of 40, then decreases and only rises again very late in retirement.

Laitner (2001) constructs a hybrid model of the life-cycle model and so-called dynastic models. In dynastic models, households care about the utility of their dynasties as well as their own. In Laitner's model, households are heterogeneous in terms of their earnings ability. As such, households with relatively low ability descendants bequeath part of their wealth to smooth consumption across the dynasty. By contrast, households with relatively high ability descendants refrain from leaving a bequest, arguing that their descendants' consumption possibilities compare favourably with their own. The models' calibration implies that 84% of American net wealth is due to life-cycle saving and 16% to intergenerational transfers between dynasties.

De Nardi (2004) constructs an overlapping-generations model where older generations derive utility from bequeathing both financial capital and human capital. She assumes that leaving a bequest is a luxury good. The age-wealth pattern for the first half of the income distribution is expected to be similar for households with and without a bequest motive. These households are expected to diminish wealth during retirement, as they are unlikely to be able to leave a bequest. In absence of a perfect annuity market unintentional bequests are still possible. The age-wealth pattern for the upper half of the income distribution is expected to be more flat for households with a bequest motive than for households without this motive. The author concludes that a model with intentional bequests better explains the observed concentration of wealth than a model with unintentional bequests. De Nardi et al. (2009) argue that bequest motives are strongest for the wealthiest households. The authors find no evidence for the presence of a bequest motive, possibly because the dataset does not contain enough of the wealthiest households to identify this motive.

Composition of wealth

There are two arguments why households reduce their exposure to risky assets at older ages. First, exposure to risky assets should decrease with the depletion of human capital to maintain the optimal risk profile in the household portfolio. Second, households may choose to liquidate risky assets to finance consumption, as implied by the life-cycle model in the absence of bequest motives.

In their much cited paper, Poterba et al. (2011) study the composition and drawdown of wealth during retirement. The authors find that the evolution of wealth is highly contingent on changes in family status. For example, housing wealth remains roughly stable during retirement for single households and couples, while a divorce or the death of a spouse results in a significant decline. The authors find a similar pattern for net

financial assets. Making use of six waves of survey data, Coile and Milligan (2006) study how household portfolios evolve during retirement using fixed effects regressions. The authors find that many American retirees liquidate their assets (in particular home and vehicle ownership) as the share of liquid assets in their portfolio rises significantly with age. Using administrative tax data spanning 14 years and 164,000 Norwegian households, Fagereng et al. (2013) find that as retirement approaches, households reduce their exposure to risky financial assets. Once retired, the fraction of households that exit the stock market altogether increases significantly.

Wu et al. (2015) investigate the asset decumulation of Australian retirees and find that most households continue to save at higher ages. On average, shortly before death, households own as much wealth as at the beginning of the sample period. However, single households run down their assets faster than couples, especially when no house is owned. In addition, the authors find that most couples maintain homeownership during retirement. Only when the household dissolves due to death or divorce is the house sold more often.

3 Description of the data

Administrative data on household composition, income and wealth pertaining to 2006–2013 sampled by Statistics Netherlands are linked. Table 3.1 provides some of the demographic characteristics of the sample. More details can be found in the appendix.

Table 3.1 Demographic characteristics of the sample of Dutch individuals, 2006

	Unbalanced panel	Balanced panel
	Individuals	Individuals and couples
	Number of observations	
Sex		
Male	3897232	-
Female	4211291	-
Age		
25–35	913289	109933
35–45	842347	206896
45–55	1303609	285753
55–65	1651009	640649
65–75	934520	470932
75–85	354086	207312
85+	27476	18229
Total	8108523	1939704

Demographics

Our sample refers to around eight million individuals, with slightly more women than men. The elderly are oversampled to have enough observations at high ages. The balanced panel for 2006–2013 contains 0.77 million singles and 1.17 million couples. Table 3.1 provides more information on the age distribution in the sample. The balanced panel has higher net wealth than the Dutch population as a whole (Kooiman and Lejour, 2016, table 2.2).

Income and wealth

We observe income both at the household and at the individual level. At the household level, we observe gross income, and the most important source of income of the household. Gross income consists of labour income, company profits, income from wealth (including mortgage interest payments and the rental value of homeownership), social security income, pension income and received alimonies.¹ At the individual level, we observe personal gross income.²

The dataset also includes several components of wealth at the household level. Included variables are total wealth, financial wealth and its components (stock, bonds and savings accounts), wealth in real estate (including the primary residence), business wealth, other wealth, mortgage debt and other debt. Here, total wealth is the sum of total assets minus total debt. While the data are rich in their components, they also have some omissions. In the Netherlands, a significant share of mortgages is combined with a savings or investment account. To pay off these mortgages, the household saves each year, leaving the principle unchanged until the mortgage reaches maturity. The compiled savings of these mortgages are not included in the data. In addition, minor debts are not included. Pension is not included in the wealth statistics, but is in the income statistics. All figures for income and wealth are inflated by the consumer price index and expressed in euros of 2013.

4 Empirical results

In this part of the analysis, we track the income and wealth trajectories of households over the period 2006 to 2013. We define the age of the household as the age of the member with the highest income during the sample period. To gain more insight into the distribution of income and wealth, most graphs include the low (25th), median (50th) and high (75th) percentiles of the distribution.

4.1 Income during the course of life

The income of cohorts before pension age in 2013 exceeds that of cohorts after pension age. Younger couples earn around twice the income of elderly couples at the median. This is at least partly due to the significant increase in the participation of Dutch women in the labour force during the past decades. The income distribution is skewed with relatively few people with very high incomes. The mean values of household income surpass the median values for all combinations of age and household status in Table 4.1.

Income trajectories in a balanced panel

To gain more insight into the evolution of income during the life-cycle, we restrict the sample to a balanced panel of singles and couples.³ Figure 4.1 shows the trajectory of gross income for singles (left panel) and couples (right panel). Each line corresponds to a specific birth cohort, observed during 2006–2013. Earlier in the life-cycle, gross income increases strongly each year, especially at the higher end of the income distribution. Due to early retirement, the income in all three percentiles gradually falls before the official retirement age of 65.

¹ Received alimonies are observed in the data, whereas the payment of alimonies is not.

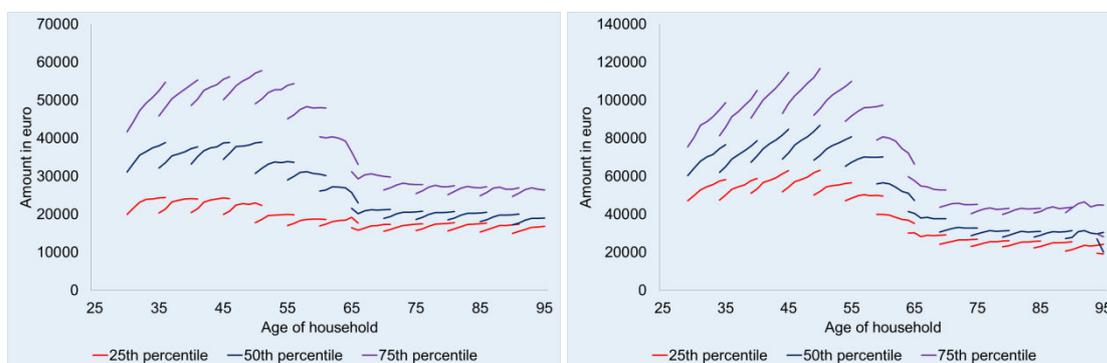
² Individual income does not include income from wealth since it is difficult to allocate this to individual household members.

³ In our definition of a balanced panel, we only include households that satisfy two conditions: (1) they are observed for the full sample period and (2) the composition of adults is constant during this period.

Table 4.1 Gross income by age and household status, 2013

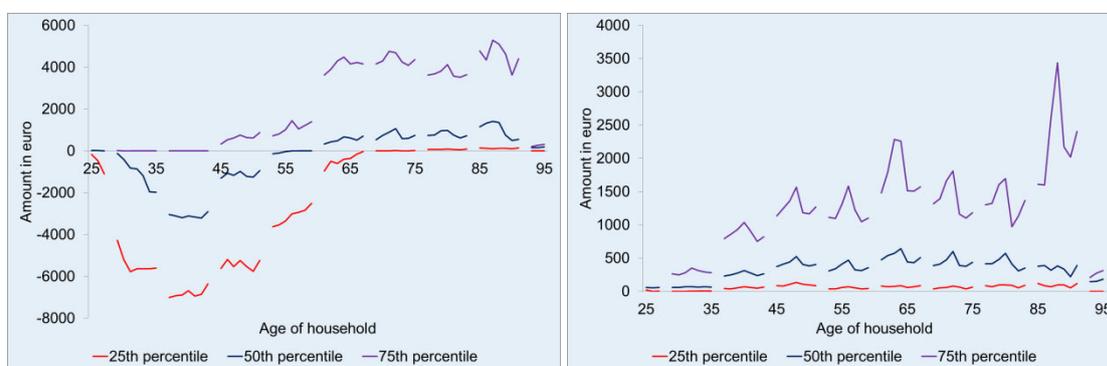
Age	Singles		Couples	
	Median	Mean	Median	Mean
euros per year				
25–35	37275	40448	73714	78970
35–45	37636	42818	79351	89061
45–55	37982	44385	85665	96643
55–65	29896	37149	65701	76110
65–75	22008	27622	38574	48070
75–85	20710	25203	31719	39147
85+	20259	25014	31282	39395

Figure 4.1 Income over the life-cycle for singles (left) and couples (right), 2006–2013



The fraction of households for which pension income is their primary income source increases from 20% at age 59, to 50% at age 63 and 80% at age 65 in 2006–2013. Income during retirement is significantly lower than the income earned by the working population, especially at the higher end of the income distribution. Consequently, the income distribution becomes much less skewed at higher ages. While the income of younger households generally increases, the income of Dutch retirees is relatively stable.

Figure 4.2 Income from total wealth (left) and financial wealth (right), 2006–2013, IPO sample



We next examine the trajectory of income from wealth. Figure 4.2 shows the trajectory of income from total wealth (left) and income from financial wealth (right). Here, income from financial wealth includes accrued interest, dividends and coupon payments on bonds. Income from total wealth also includes income from real estate,⁴ mortgage interest paid and income from other wealth. At younger ages, income from total wealth is negative for the 25th and 50th percentiles, mainly due to mortgage interest payments. Income from total wealth rises at higher ages, as mortgages are more likely to be paid off, and simply because homeownership is less prevalent. Only at the 50th and 75th percentiles and at higher ages does income from total wealth turn positive. Figure 4.2 is based on a smaller sample, due to availability of data.

The income earned from financial wealth is positive at all ages for all three percentiles. At the 25th and 50th percentiles, income from financial wealth remains roughly stable over time. At the 75th percentile, however, income is much more volatile. This is likely related to stock market performance, as dividends increased prior to the financial crisis of 2008 and subsequently fell.

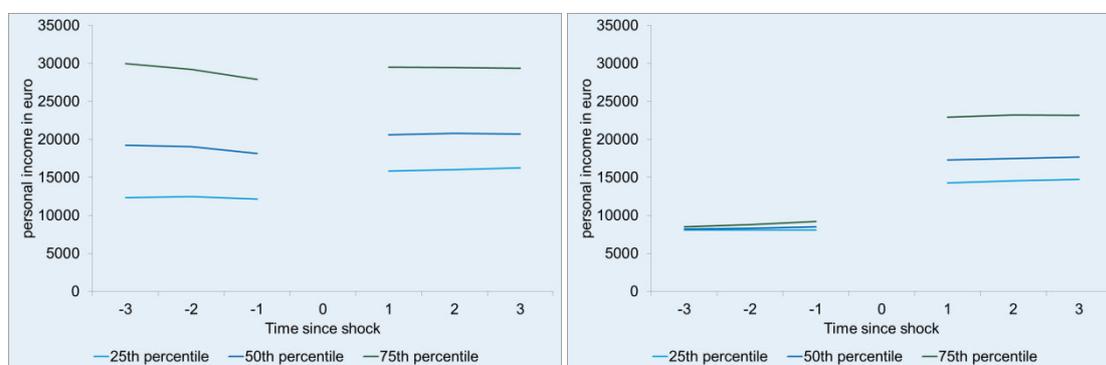
4.2 Income after life events

The income effect of becoming single due to separation or the death of a spouse

Becoming single due to separation or the death of a spouse may have a substantial income effect, despite institutions that dampen it. Single households in the Netherlands receive a higher public pension than couples (per person). Supplementary (occupational) pensions accrued during marriage are normally divided between both partners after separation.

Figure 4.3 shows the effect of divorce on personal income for men (left panel) and women (right panel). The sample is restricted to people above 65. At time $t = -1$, the partners are married, and at $t = 0$, the partners are divorced. There is a clear disparity in the effect between men and women. For men, gross income increases somewhat after a divorce, possibly due to the increase in the public pension. However, the income after divorce may be overstated as paid alimonies are not included in our data. The increase in personal income for women is much more pronounced: prior to the shock, the income at the three percentiles is similar, around the level of the public pension income. The supplementary pensions of women retired in 2006–2013 are generally low due to the low labour market participation of these female cohorts. After divorce occurs, income increases significantly for all three percentiles.

Figure 4.3 Personal gross income before/after divorce above 65, men (left) and women (right), 2006–2013

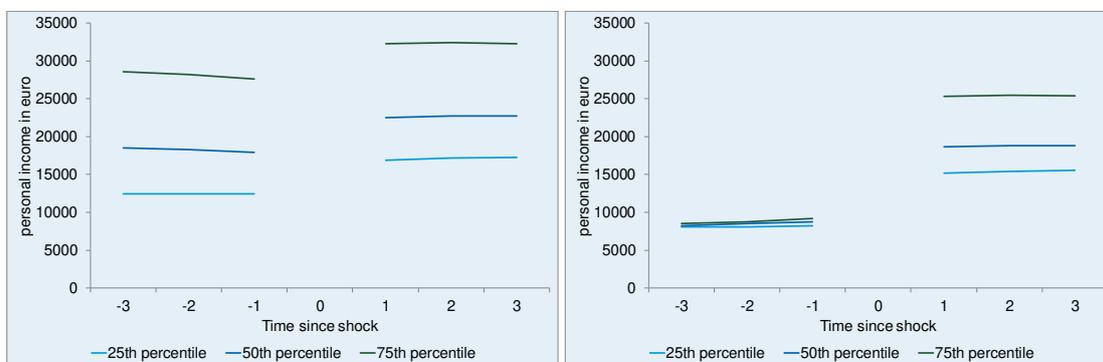


⁴ Annual income from real estate is measured according to fiscal law and is about 0.6% of the value of the house.

The effect of widowhood on income can be far-reaching. The majority of Dutch pension funds offers a survivor's pension to the surviving spouse, generally up to a maximum of 70% of accrued pension benefits. In addition, under certain conditions, the surviving spouse will be eligible for the *Algemene nabestaanden wet*, a benefit paid by the government to ensure a minimum income to survivors.

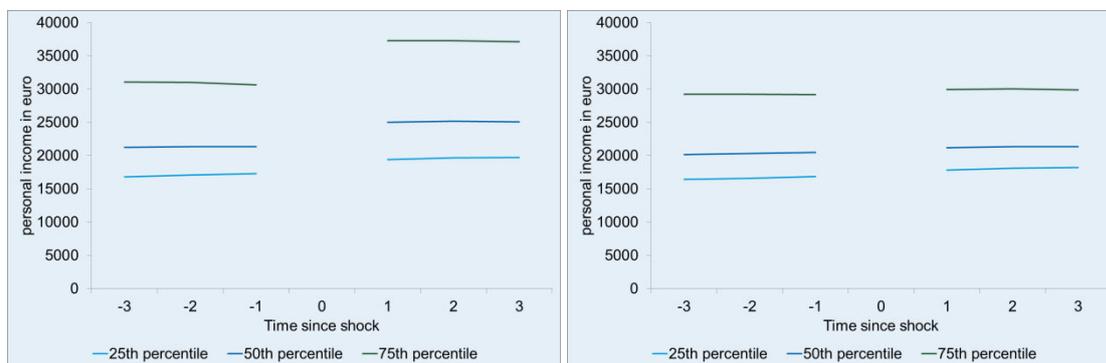
The income of both men and women increases after widowhood, partially due to the higher public pension, but the increase is much more pronounced for women. The income effects of widowhood in Figure 4.4 are highly reminiscent of the income effects of divorce in Figure 4.3. Before the shock occurs, the income of retired women is almost identical for all three percentiles, which reflects the relatively low share of women receiving income from supplementary pension plans in these cohorts. The divergent development in income for men and women after widowhood is likely due to the same reason: men participate in funded pension schemes more often than women, so that the survivor's pension received by men is much lower and often zero after widowhood.

Figure 4.4 Personal income after widowhood for men (left) and women (right), 2006–2013



Household income decreases after widowhood for both men and women, but the effect is again most pronounced for women. At the median, men lose around 18% of household income, while women lose around 25%. After correction for changes in household size by dividing the income of couples by 1.4, income rises somewhat; see Figure 4.5.

Figure 4.5 Corrected household income after widowhood, men (left) and women (right), 2006–2013



4.3 Wealth during the course of life

We proceed to investigate the evolution of wealth over the life-cycle. Table 4.2 provides a first glance at the distribution of household wealth by age and household status. There is substantial heterogeneity in household wealth both within and between cohorts and household types. Indeed, the mean values far exceed the median values in all age cohorts and household types, while older age cohorts hold substantially more wealth than younger cohorts.

Table 4.2 Wealth by age for singles and couples, 2013

	Singles		Couples	
	Median euro	Mean	Median	Mean
25-35	1095	13707	-7742	32386
35-45	2249	43143	18055	114373
45-55	7033	93617	85987	214454
55-65	16501	118243	131447	254425
65-75	24472	150096	163409	299176
75-85	27918	152691	153933	274417
85+	26301	150820	149662	295280

Single households generally hold significantly less wealth than couples, except for the youngest cohort. The negative median wealth of couples is mainly due to the decline in house prices after 2008. Single households often rent a house, which explains why their median wealth is positive. Cross-section data suggest that households do not dissave during retirement: both median wealth and mean wealth remain roughly stable.

Table 4.3 Wealth by year for singles and couples, 2006-2013

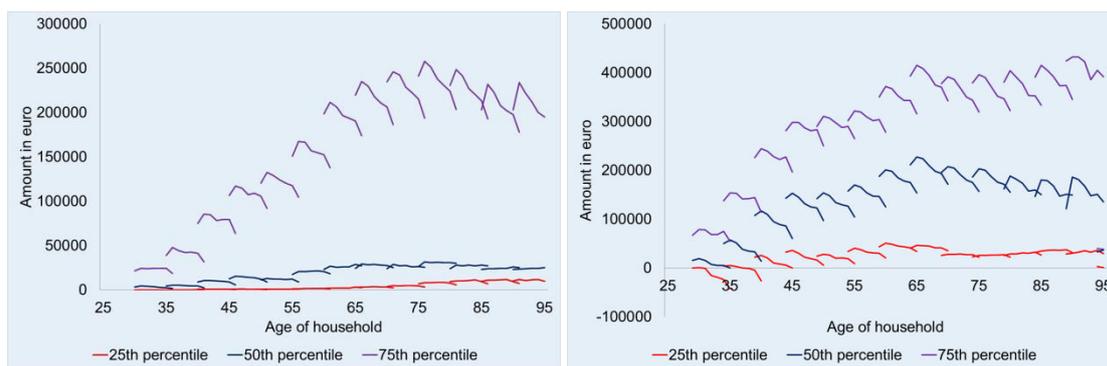
	Singles		Couples	
	Median euro	Mean	Median	Mean
2006	21252	135256	143635	264314
2007	22226	143721	158864	286023
2008	23431	151640	172285	300244
2009	23732	145661	167897	290055
2010	24244	146016	155938	288291
2011	24328	141967	148575	275250
2012	23706	139696	146393	274569
2013	21658	131079	126409	254507

Table 4.3 displays the mean and median values of net wealth between 2006 and 2013. For single households, median wealth (after correction for inflation) rises by around 3000 euros between 2006 and 2011 and declines thereafter, especially between 2012 and 2013. The year-by-year change in wealth for couples is much more pronounced. As the housing market booms, median wealth increases by 30,000 euros in the two years prior to the financial crisis. From 2008 onwards, net wealth falls significantly as the housing market collapses. In 2013, median net wealth is below the level of 2006.

Net wealth trajectories in a balanced panel

Total wealth declines for households during 2006–2013, with roughly similar trajectories for all ages. Figure 4.6 displays the trajectory of total wealth for single households (left panel) and couples (right panel) during the course of life. Net wealth consists of all wealth components registered by the tax authorities, including housing wealth, financial wealth, business wealth, mortgage debt and other debt.⁵ Most cohorts display similar trajectories in total wealth. For a correct interpretation of the graphs, the age, time and cohort effects must be discerned. For example, the downward trajectory of wealth in Figure 4.6 may be interpreted as dissaving at high ages, while it probably reflects the decline in housing prices – a period effect. In addition, the cohort effects may explain a significant fraction of the difference in wealth between adjacent cohorts. This may stem from differences in permanent income, differences in tastes and differences in experienced shocks earlier in life.

Figure 4.6 Total wealth during the course of life for singles (left) and couples (right), 2006–2013



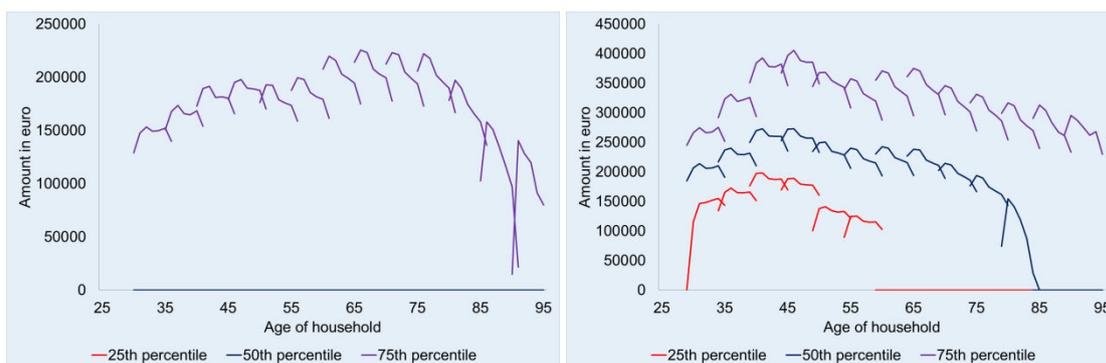
The wealth distribution is much more skewed for single households than for couples, because homeownership is much less prevalent among single households. Irrespective of household status, the youngest households hold zero or negative wealth at the 25th percentile. The negative wealth position of younger households is likely due to turmoil in the housing market. The median household has significantly more wealth, at around 25,000 euros for most age cohorts for single-person households and 200,000 euros for two-person households at the end of their careers. At the 75th percentile, single-person households and two-person households own around ten and two times the wealth of their median contemporaries, respectively.

⁵ Some asset classes, including pension wealth, are not included in the data.

Housing wealth

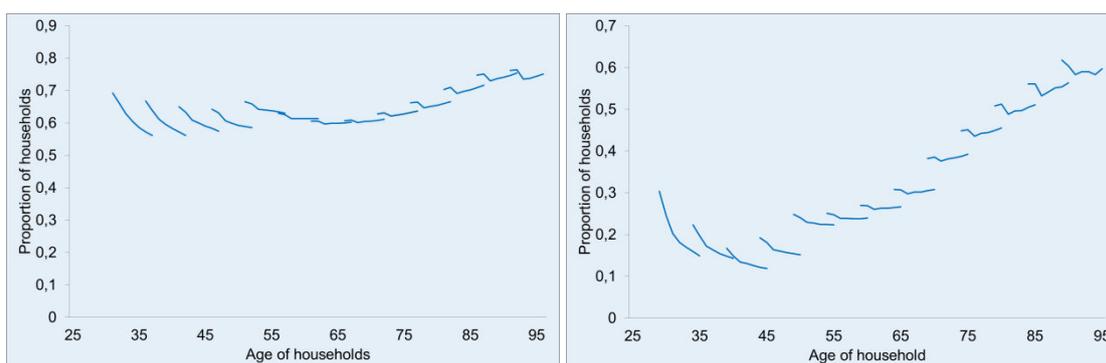
Housing wealth increases and declines for households of all ages during the boom and the bust in 2006–2013. A significant part of the housing wealth trajectories (see Figure 4.7) reflects price developments. The housing wealth of singles (left panel) is significantly lower among the oldest cohorts, mainly because older generations have significantly lower homeownership than younger generations. Hence, the time and cohort effects are prevalent in the two graphs, while the age effects are difficult to identify.

Figure 4.7 Housing wealth during the course of life for singles (left) and couples (right), 2006–2013



Households may liquidate their housing wealth at higher ages by moving from an owner-occupied house to a rented house.⁶ The renting rate – the fraction of households with a rented house – is plotted in Figure 4.8 for singles (left) and couples (right). At each age cohort, the renting rate is much higher for singles than for couples, while the trajectories are somewhat similar. The renting rate for cohorts early in the life-cycle declines, as households move from a rented house to an owner-occupied house. As age progresses, the renting rate gets flatter, but never significantly increases. Indeed, it appears that very few households move from an owner-occupied house to a rented house during retirement. The increase in the renting rate, as measured by the vertical distance at specific ages in Figure 4.8, reflects that homeownership is less prevalent among older cohorts.

Figure 4.8 Renting rate of housing for singles (left) and couples (right), 2006–2013



⁶ Another option to extract wealth for consumption purposes is to move to a cheaper house. This would not show up in the figures for the renting rate of housing.

Financial wealth

Households do not run down their bank deposits (see Figure 4.9), although bank deposits are the most liquid of all the wealth components. Regardless of the position in the wealth distribution, households do not seem to decumulate bank deposits during retirement. In fact, deposits of households at the 75th percentile increase at a steady pace, even at very high ages. At the 25th and 50th percentiles, deposits of singles roughly maintain their initial values. For couples, we also find that the deposits of the median household increase at very high ages.

Figure 4.9 Bank deposits for single households (left) and couples (right), 2006–2013

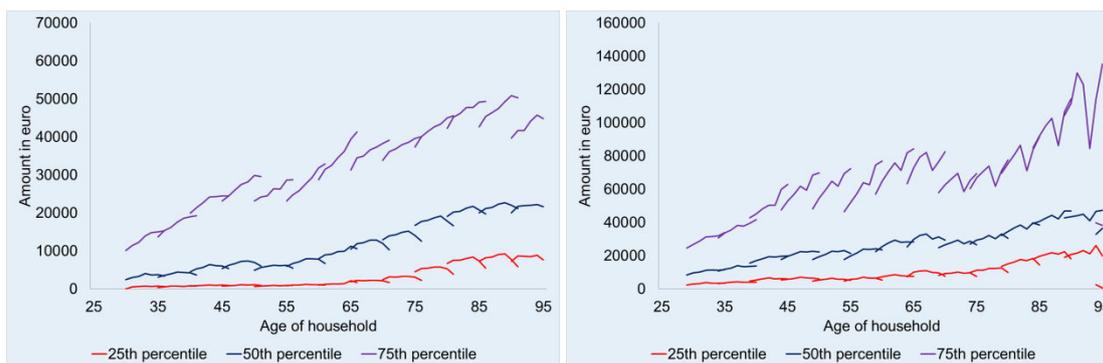
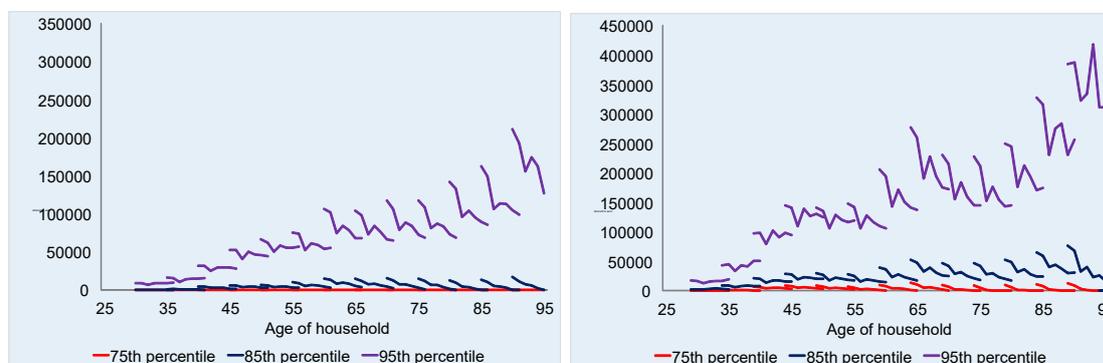


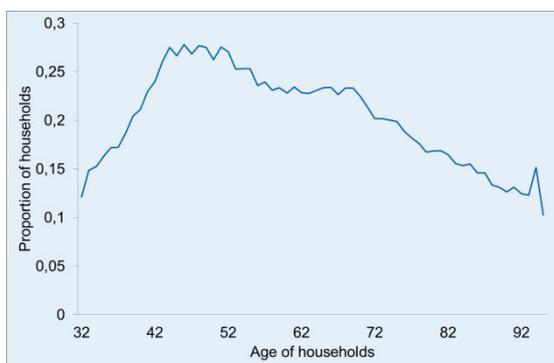
Figure 4.10 shows the trajectory of risky assets (the sum of stocks and bonds) for singles (left panel) and couples (right panel). Because households at the 25th and 50th percentiles hold no risky assets, we examine the trajectories for the 75th (bottom) 85th (middle) and 95th (top) percentiles. The Dutch stock market index reached its peak in 2006, and plummeted in 2007 and 2008, losing around 60% of its value. This pattern is clearly visible in the figure. For single households, wealth in stocks and bonds at the 75th percentile equals zero. At the 85th percentile, wealth is positive at the beginning of the sample period, but falls to zero in subsequent years. A similar pattern is found for couples at the 75th percentile. Households at the 95th percentile hold large sums of wealth in risky assets. For households between the ages of 60 and 80 at the 95th percentile, wealth amounts to around 100,000 euros for singles and around 200,000 euros for couples. Wealth in risky assets is higher for older cohorts, peaking at around age 90 for both singles and couples, possibly due to bequests and/or selection effects, as wealthier people might live longer. The age effect in stocks and bonds is not easily identified, as the period and cohort effects have a significant influence on the wealth trajectories in Figure 4.10.

Figure 4.10 Stocks and bonds for single households (left) and couples (right), 2006–2013



The fraction of households that holds stocks increases strongly with age, peaks around age 45–50 and declines thereafter (Figure 4.11). At age 90, around 14% of households hold stocks in their portfolio. The decline in the fraction of households with stocks supports our hypothesis that households reduce their exposure to risky assets at older ages, although cohort effects may play a role as well.

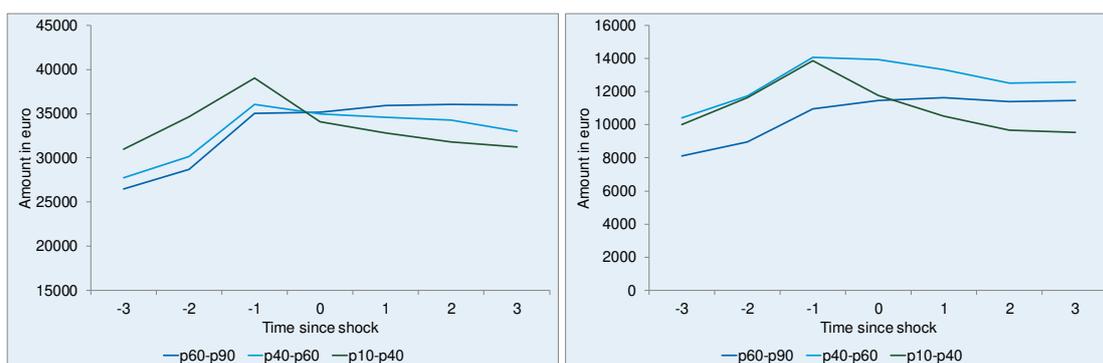
Figure 4.11 Fraction of households with stocks by age, 2012



4.4 Wealth decumulation after life events

The bank deposits of households with median or high replacement rates are relatively stable around retirement. Households who experience a sharp decline in gross income around retirement run down their bank deposits in the first year of retirement, probably to maintain consumption. The replacement rate measures gross income after retirement divided by gross income before retirement.

Figure 4.12 Evolution of bank deposits around retirement for different replacement rates, homeowners (left) and renters (right), 2006–2013



The trajectories of total wealth and bank deposits at the end of life hardly differ between households with and without children. Wealth at death in 2007–2013 is more or less equal to wealth in 2006, irrespective of age and household status (see Tables 4.4 and 4.5). For people in their fifties, death might be unexpected, while for people in their eighties this probably holds less, but their behaviour is similar. The elderly without children do not decumulate wealth before death, although a bequest motive is less likely for this group. The elderly with children generally do not accumulate wealth for a bequest. Parents may prefer transfers to children while alive. Households without children are on average wealthier than those with children (not reported in Tables 4.4 and 4.5).

The Australian elderly consume somewhat more out of wealth than the Dutch elderly, but also less than the life-cycle hypothesis suggests. Residual wealth at the death of pensioners in Australia is around 90% of the assets recorded at the beginning of the sample (Wu et al., 2015, p. 37). The lower decumulation of wealth in the Netherlands is probably due to the higher pension incomes.

Table 4.4 Median of the ratios of total wealth at death to total wealth in 2006

	Age in 2006			
	50–59	60–69	70–79	80–89
With children				
Single households	1.00	1.00	1.00	1.00
Couples, one partner dies	1.00	1.02	1.03	1.01
Couples, both partners die	0.97	0.93	0.94	0.91
Without children				
Single households	1.02	1.03	1.03	1.01
Couples, one partner dies	1.00	1.03	1.04	1.02
Couples, both partners die	0.98	0.97	0.98	0.98

Table 4.5 Median of the ratios of bank deposits at death to bank deposits in 2006

	Age in 2006			
	50–59	60–69	70–79	80–89
With children				
Single households	1.00	1.02	1.01	1.00
Couples, one partner dies	1.01	1.04	1.07	1.02
Couples, both partners die	1.08	1.00	1.00	0.96
Without children				
Single households	1.04	1.06	1.05	1.02
Couples, one partner dies	1.01	1.07	1.08	1.05
Couples, both partners die	1.08	1.05	1.05	1.02

5 Conclusions

This paper analyses income and wealth trajectories during the course of life in the Netherlands. We find that income remains roughly stable during retirement, but at a lower level than in the years before. We find no evidence of household dissaving during retirement, unlike the life-cycle hypothesis suggests. Consumption during retirement is mainly financed by the pension income.

The bank deposits of households with median or high replacement rates are relatively stable around retirement. Households who experience a sharp decline in gross income around retirement run down their bank deposits in the first year of retirement, probably to adjust consumption gradually. Saving deposits remain roughly stable during retirement.

Very few households move from an owner-occupied house to a rented house to liquidate their housing wealth. The share of housing wealth in the portfolio increases, as households pay down on their mortgage debt. The fraction of households holding stocks and bonds decreases at high ages, but the value of stocks and bonds among the wealthiest households still increases at very high ages.

The trajectories of wealth and bank deposits at the end of life hardly differ between households with and without children. Precautionary saving and saving with a bequest motive are difficult to disentangle, as these motives are overlapping (Dynan et al., 2002).

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Appendix

Data compilation

We constructed a panel using administrative data files from Statistics Netherlands. The panel contains information on personal income (IPI data), household income (IHI data) and household wealth (IVB data). Statistics Netherlands has information on the income and wealth of all Dutch citizens, but allows researchers to use only a sample of the total population for privacy reasons. Additional information on the components of income was taken from a smaller sample (IPO data).

The starting point for constructing the panel was GBAHUISHOUDENSBUS, a data file that contains information on the general characteristics of Dutch households and their members. Each citizen was identified uniquely by the variable RINPERSOON, a string of random numbers. Each RINPERSOON then featured a number of characteristics such as the household to which they belong (again defined by a string of random numbers), the 'key person' in the household (defined as the RINKERNPERSOON), the type of household in which they live, their position in the household and the number of household members. We then proceeded to merge the data with GBAPERSOONTAB, which includes citizen-specific information such as year of birth and sex. Next, we merged the data with GBABURGERLIJKESTAATBUS, which provides information on marital status, followed by GBAADRESOBJECTBUS, which contains information on the address of each household. Finally, KINDOUDERTAB includes information on parenthood, which helps us identify a bequest motive, while GBAOVERLIJDENTAB allows us to see how much wealth is held shortly before death.

Then, information on income and wealth was added. We used the INTEGRAAL PERSOONLIJK INKOMEN (IPI) dataset to extract information about income at the individual level (rinpersoon), available for 2005–2013. The INTEGRAAL HUISHOUDINKOMEN (IHI) dataset, available for 2005–2013, contains information on income at the household level. We then proceeded to merge the data with the INTEGRAAL VERMOGENSBESTAND (IVB) dataset to extract information on the wealth components of Dutch households in 2006 to 2013. The resulting dataset includes around eight million individuals and the balanced panel includes nearly two million households.

We used the INKOMENSPANELONDERZOEK (IPO) for the analysis of income from wealth (Figure 4.2 only). Although this data file has a significantly lower coverage (100,000 key persons) of the Dutch population, it contains valuable information on all components of income, such as pension income, labour income, income

from social security benefits, and income from wealth. We constructed the dataset in the same fashion as the IVB/IHI dataset. Some of the variables contain errors, especially the variable that indicates the value of the mortgage. For example, if the value of the mortgage is X in year t , 0 in year $t+1$ and back at X in year $t+2$, we assumed the value of the mortgage in year $t+1$ to equal X as well.