



Network for Studies on Pensions, Aging and Retirement

Health and household expenditures

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DESIGN PAPER 103

NETSPAR INDUSTRY SERIES

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Netspar Design Paper 103, June 2018

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Acknowledgements

This paper is financially supported by Netspar (Netspar topicality project “Quantitative research into expenditures on elderly care and support”). We are grateful for the comments by the participants of the topicality project meeting and the Netspar Workshop on Pension Adequacy, Lieke Kools, Rudy Douven, and the referees. We thank Miquelle Marchand and Boukje Cuelenaere from CentERdata, for making additional questions about health-related expenditures available in the LISS panel, and Arthur van Soest for helpful suggestions and for making the consumption data available. We thank Mart van Megen for research assistance.

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Summary

We examine the effect of health on household expenditures in the Netherlands between 2009 and 2017, a period that is characterized by significant increases in out-of-pocket medical expenditures for long-term care. How health affects household spending is an empirical question: on the one hand, health can affect a household's budget through increased out-of-pocket medical expenditures or, for the working population, through reduced income. On the other hand, health can affect a household's consumption preferences; help with cleaning, gardening, and home maintenance will likely become more valuable in situations of poor health, while leisure activities can be constrained by poor health.

Using expenditure data from the Longitudinal Internet Studies for the Social Sciences (LISS), we estimate how total non-medical and medical expenditures change when health deteriorates, and how the relative shares of different expenditure categories vary with health. We estimate an expenditure-share demand system which includes health status, measured by general health, mental health, functional disabilities, and chronic diseases. We make use of within-household variation in health over time to allow for possible correlation between unobserved household-specific effects and health, such as time preferences that could influence both health and expenditures.

The results show that non-medical expenditures slightly decline after an adverse health shock, by between 3% (for general health) and 7% (for severe chronic conditions). Medical expenditures increase, but they do not seem to drive the decline in non-medical expenditures. Instead, preferences seem to change after the onset of an adverse health shock, with more spending on housekeeping and less spending on leisure activities. Since the 2015 long-term care reform, which increased out-of-pocket medical expenditures, unhealthy households spend less on leisure activities, a luxury good. A further increase in out-of-pocket medical expenditures may lead to the risk of unhealthy households having to cut back on necessities as well.

Samenvatting

We onderzoeken het effect van gezondheid op bestedingen van Nederlandse huishoudens. We analyseren de periode 2009–2017, waarin eigen betalingen aan medische uitgaven zijn toegenomen. Hoe gezondheid de uitgaven van huishoudens beïnvloedt, is een empirische vraag. Gezondheid kan het budget van mensen beïnvloeden, doordat noodzakelijke medische uitgaven toenemen of doordat het inkomen van mensen onder de beroepsbevolking afneemt. Daarnaast kan gezondheid ook de voorkeuren van huishoudens beïnvloeden: hulp bij het schoonmaken, tuinieren en onderhoud aan het huis zal waarschijnlijk waardevoller worden in slechte gezondheid, terwijl recreatieve activiteiten soms afnemen vanwege een slechte gezondheid.

Met behulp van bestedingsgegevens uit een representatief huishoudpanel, schatten we hoe de totale niet-medische en medische uitgaven veranderen wanneer de gezondheid verslechtert en hoe de uitgaven aan verschillende uitgavencategorieën variëren met gezondheid. Daarbij maken we gebruik van variatie in gezondheid binnen huishoudens over tijd. Op deze manier houden we rekening met correlatie tussen niet-waargenomen huishoudspecifieke kenmerken en gezondheid, zoals tijdspreferenties, die zowel gezondheid als bestedingen kunnen beïnvloeden. We onderzoeken diverse maatstaven van gezondheid, namelijk algemene gezondheid, geestelijke gezondheid, functionele beperkingen en chronische aandoeningen.

De resultaten laten zien dat niet-medische uitgaven licht dalen na een verslechtering van de gezondheid, tussen 3% (voor algemene gezondheid) en 7% (voor ernstige chronische aandoeningen). Medische uitgaven nemen toe maar lijken de daling van niet-medische uitgaven niet te veroorzaken. In plaats daarvan lijken voorkeuren te veranderen na een negatieve gezondheidsschok, met meer uitgaven aan huishoudelijke taken en minder uitgaven aan vrijetijdsactiviteiten. Na de hervorming van de langdurige zorg in 2015, die tot verhoging van de eigen betalingen aan medische uitgaven leidde, besteden huishoudens met gezondheidsproblemen minder aan vrijetijdsactiviteiten – een luxe goed. Een verdere toename van de eigen bijdragen voor medische zorg kan daarom reden tot bezorgdheid zijn voor mensen met gezondheidsproblemen indien zij ook moeten gaan bezuinigen op noodzakelijke uitgaven.

1. Introduction

Population aging leads to higher public spending on healthcare and long-term care in most Western countries.¹ In recent years, several countries (especially those with large public long-term care spending, see e.g. Swartz, 2013) have therefore proposed or have already implemented reforms that make long-term care insurance less generous; see for example Mayhew, Karlsson & Rickayzen (2010) for the UK and Wouterse & Smid (2017) for the Netherlands. While more private financing of long-term care could make public long-term care expenditures sustainable, higher out-of-pocket medical expenditures may also lead to greater financial strain among the elderly and near-elderly who experience long-term care needs.

This paper examines the effect of health on household expenditures in the Netherlands between 2009 and 2017, a period that is characterized by significant increases in out-of-pocket long-term care expenditures. The Dutch government aims to move care out of the nursing home and to increase the use of home care. Elderly people live longer in their own homes, and this motivated the government to transfer the responsibility of long-term care to municipalities as from January 2015. Domestic care and personal care are no longer financed by a national scheme, and the provision of care may now differ from one municipality to another. The 2015 long-term care reform was also accompanied by significant budget cuts and thus implied a shift away from publicly provided care to more individual responsibility. This leads to the question how people react to higher out-of-pocket long-term care expenditures.²

While the focus of this paper is on the expenditure patterns of retired households, we will also consider households of working age. This gives a broader perspective on the development of expenditures over the lifecycle and on the association with health. How health affects household spending is an empirical question. On the one hand, health changes can affect a household's budget through necessary out-of-pocket medical expenditures or, for the working population, through reduced income. García-Gómez, Van Kippersluis, O'Donnell & Van Doorslaer (2013) show that a health shock (measured by an acute hospitalization) on average results in a 5% percent

- 1 Expenditures on public health and long-term care have increased from 3.5% of GDP in 1970 to 7% of GDP in 2010 on average in the OECD. They are expected to rise further in the future (OECD, 2013).
- 2 In recent years, the funding of the Dutch healthcare system has also been subject to reform. In 2012 notable cuts were made in the basic healthcare package, resulting in, among other things, less compensation for physiotherapy and psychological consultation for mental health problems. In 2013 mandatory deductibles in health insurance were increased from EUR 220 per year in 2012 to EUR 360 in 2013. Since that same year, common mobility devices are no longer covered in the basic healthcare package.

reduction in personal income in the Netherlands. On the other hand, health can affect a household's consumption preferences. Help with cleaning, gardening, and home maintenance, for instance, may become more valuable in situations of poor health, while leisure activities can become less attractive.

Previous research identified various ways to establish how the marginal utility of consumption varies with health; see Finkelstein, Luttmer & Notowidigdo (2009). To determine whether a person's marginal utility of non-medical consumption varies with health, Finkelstein, Luttmer & Notowidigdo (2013) compared changes in subjective well-being after a health shock among Americans with different consumption levels (derived from permanent income). They found that the marginal utility of consumption declines after the onset of a chronic condition, which should express itself in reduced consumption. Kools & Knoef (2017) examined the impact of health shocks on financial well-being for a sample from European countries and found that physical health problems lead to a higher marginal utility of consumption, while cognitive health problems lead to a lower marginal utility of consumption. The contrary findings from the US and Europe could be due to different spending patterns. If Europeans consider recreation a more essential consumption good, it may require more money for them to continue these activities in poor health. Spending on transportation, on the other hand, is relatively high in the US (Banks, Blundell, Levell & Smith, 2016), and the question arises whether Americans continue to incur these costs when their health deteriorates. If not, this may partly explain the negative health state dependence of consumption seen in the US. It is also difficult to account for medical expenditures of Americans who are not fully covered by health insurance or even uninsured (see Finkelstein, Luttmer & Notowidigdo, 2013).

An alternative approach, which we apply in this paper, is to examine the relationship between consumption and health when disposable income and non-discretionary medical spending are kept constant. Shapiro (2009) used panel data on non-medical consumption for the US and found a small negative effect of poor health on consumption.³ One challenge in estimating the effect of health on consumption preferences from observed expenditures is to disentangle the effect

3 To gain insight into the financial position of elderly persons, several studies have examined the evolution of wealth and income of elderly households, e.g. De Bresser & Knoef (2015), Van Ooijen, Alessie & Kalwij (2015), and Knoef et al. (2016) for the Netherlands. Several papers have tried to explain the motives that underlie the observed savings decisions of households by estimating the utility parameters of a lifecycle model that also allows for an effect of health on the marginal utility of consumption. Lillard & Weiss (1997) found a positive effect of health on the marginal utility of consumption, although this effect could be driven by higher out-of-pocket medical expenditures. De Nardi, French & Jones (2010) did not find evidence of health state dependence.

on the value of consumption from other motivational factors to change spending, such as a bequest. For example, a decline in consumption following an unexpected negative health shock may be evidence for decreasing marginal utility of consumption in poor health, but it may also operationalize the bequest motive. Moreover, health may have a differential impact on different spending categories. The composite effect of health on consumption depends on the relative importance of these categories in different health states. We address both issues, by examining the impact of health on total non-medical spending and on spending on different expenditure categories by estimating a demand system.⁴ Our approach is related to recent studies conducted by Banks et al. (2016), Hong, Pijoan-Mas & Rios-Rull (2015), and Babiarz & Yilmazer (2017). Banks et al. (2016) compared non-durable expenditures in the US and the UK between 1988 and 2009 and found large differences between the consumption profiles of households in these two countries. They reported an average annual rate of decline in spending on non-durable goods between the ages of 45 and 75 of 1% in the US and over 3% in the UK. By closely examining various factors, they found that about one fourth of the gap could be attributed to the level of medical expenditures, which are considerably higher in the US than in the UK. The remainder of the gap is explained by the uncertainty that households have about future medical expenditures. American households are inclined to save much more, hence consume less, in their earlier years for precautionary reasons. Consequently, at older ages, they have more resources left to spend as much of these savings turn out be superfluous. Roughly speaking, one could say that the long-term care system in the Netherlands is moving in the direction of individual responsibility. Higher deductibles for health insurance mean that the Dutch face the risk of higher out-of-pocket expenditures. Furthermore, as entry into nursing homes is discouraged and home care is not fully covered by insurance, individuals shoulder the responsibility for more aspects of care. We can therefore expect to see more precautionary saving in the future.

4 A third approach is to look at the willingness to pay for specific insurance coverage, such as insurance that covers geriatric care. A person's willingness to pay for such insurance is an indication that consumption becomes more valuable when health deteriorates; see also Van Ooijen, De Bresser & Knoef (2017), who examined the willingness to pay for geriatric care and its determinants.

2. Data

We have drawn data from the Longitudinal Internet Studies for the Social Sciences (LISS) for the 2009–2017 period. LISS is an internet-based panel of approximately 4,500 households that is representative for the non-institutionalized Dutch population. It is administered by CentERdata, which is affiliated with Tilburg University.⁵ Each month, all household members in the LISS panel receive a questionnaire on a variety of topics, including an annual health survey and a bi-annual survey on consumption. The survey on consumption, which was first fielded in 2009 and repeated in 2010, 2012, 2015, and 2017, records average monthly expenditures over the past year on a broad set of expenditure categories. It closely resembles the derived categories from the budget survey conducted by Statistics Netherlands, except for consumer durables such as vehicles and furniture. In the budget survey, consumers are asked to maintain a record of all expenditures over a one-week period (and spending on large-amount items over a period of four weeks). While eliciting expenditures in a longitudinal household survey cannot be as detailed as a diary-based budget survey, it has proven to provide a comprehensive measure of household expenditures; see e.g. Browning, Crossley & Weber (2003) and Crossley & Winter (2014). The fact that the same households are followed over time allows us to examine the evolution of household spending over a relatively long time span.

The survey on consumption first asks all household members aged 16 and above about expenditures in twelve categories that cannot be assigned to individual persons, such as food expenditures, and next asks them about personal expenditures in eight categories. For non-assignable expenditures, we use the value reported by the key respondent of the household, defined as either the person who owns or rents the property or, if several members are listed as owners or renters, the main earner. We use the reported value of the spouse if the key respondent does not know how much the household spends on a specific category. We calculate total expenditures as the sum of non-assignable expenditures plus personal expenditures of the key respondent and, if applicable, the spouse. Following the literature, we exclude financial transfers, such as alimony payments and loan repayments, from our consumption measure; see e.g. Attanasio & Weber (1995) and Aguiar & Bils (2015). We also exclude

5 CentERdata uses several approaches to ensure the representative character of the panel. First, households are recruited through address-based sampling to avoid self-selection into the panel. Second, household members receive an incentive to complete a questionnaire, which keeps attrition to a minimum. Third, households without a computer or internet connection are provided with these facilities.

expenditures on housing services because homeowners are not asked about the rental equivalent of their property and because the survey contains insufficient information about net housing wealth to impute rents. We discount the value of expenditures to the 2012 price level using the consumer price index.

For the empirical analysis, a change in the design of the questionnaire that took place in 2015 restricts us from using all categories in all waves. As from 2015, personal (nondurable) expenditures are combined into a single category, except for out-of-pocket medical expenditures. This redesign not only resulted in fewer categories – we no longer separately observe spending on clothing, personal leisure, and food eaten away from home – but also in somewhat lower reported total personal expenditure. It thus seems that people report personal spending less accurately when asked about aggregate expenditure categories, which confirms the results of Browning, Crossley & Winter (2014).

2.1 Sample selection

We started with a sample of 4,870 households where the key respondent and, if applicable, the spouse completed the survey on consumption and where the key respondent did not change over the years. We excluded 280 households due to missing or unreasonably low disposable household income, i.e. less than 70% of the social minimum, leaving us with a sample of 4,590 households.⁶

To calculate total household expenditures, we made sure that the key respondent or the spouse completed the survey on non-assignable expenditures and that both, if applicable, reported personal expenditures. For each category of non-assignable expenditures, we recorded the value reported by the partner if the key respondent reported 'do not know'. This left us with 4,247 households.⁷ We further restricted our sample to households with non-zero expenditures in the following essential spending categories: utilities, insurance, and food consumed at home. In total, 4,014 households satisfied this criterion. We changed the four highest expenditure values to the next highest value within each spending category to make total expenditures more robust against misreporting. We also corrected misreporting by a factor of 10 or 100 in a spending category by comparing reported expenditure across survey waves. Finally, we excluded a few outliers: five households with the highest (or lowest) level

6 We corrected a few outliers by comparing net household income across adjacent survey waves.

7 We do not consider personal expenditures of children living at home or other household members whose reported expenses are rather low. Moreover, including them would drastically reduce the value of the sample because of the high likelihood that at least one of the children (or another household member) would not answer the survey on consumption.

of expenditures and five households with the highest (or lowest) expenditure to income ratios. We thus ended up with a sample of 3,978 households.

For about 83% of our sample, i.e. 3,300 households, we were able to merge the questionnaire on health for both the key respondent and, if applicable, the spouse. We observed 2,116 households (i.e. 6,738 household-year observations) for at least two waves, which constituted our final sample.

2.2 Health

All participants of the LISS panel fill in a detailed health questionnaire at the end of each year, two or three months after their completion of the consumption survey. Since health is a diffuse concept with many dimensions, we apply various measures of health: general health, mental health, functional disability, and chronic diseases.

General health is based on the question: "How would you describe your health, generally speaking?" Respondents rate their health on a five-point scale ranging from poor to excellent. We consider someone to be in poor general health when the person reported being in poor or moderate health.

Mental health is based on the RAND Mental Health Inventory (MHI-5), which applies a score between 0 and 100, where 100 represents poor mental health. We consider someone to be in poor mental health when the reported MHI-5 score is above 40 (which is the median MHI-5 score among persons in our sample who report using depression medication).

Functional disability, i.e. the inability to perform daily activities, is measured in two ways. First, respondents indicate their overall level of functional disability by answering the question: "To what extent did your physical health or emotional problems hinder your daily activities over the past month, for instance in going for a walk, walking upstairs, dressing yourself, washing yourself, or visiting the toilet?", with five response options ranging from 'not at all' to 'very much'.

Second, respondents are presented an extensive list of activities which are important for functioning in daily life. This set of activities contains ten mobility items and thirteen activities of daily living (ADL) items and instrumental activities of daily living (IADL) items. Each item has five response options, ranging from the ability to perform

a task without any trouble to being unable to perform the task at all.⁸ Assessing one's ability to perform many different tasks along a broad (five-point) scale provides a detailed measure of functional disability. Being fully able is represented by a minimum score of zero, while a maximum score of 92 indicates that a person is unable to perform any of the listed activities. We consider a person to have poor functional ability when the functional disability score is above 15 (which is the median score among persons in our sample who report that health problems to some extent hinder their functioning in daily life).

Finally, the presence of a chronic disease is based on two questions: first, an affirmative answer to the question whether someone takes medicines for a specific disease, and second whether a physician has diagnosed a disease in the past year. Following the methodology of Smith (1999), we distinguish between the following eight chronic diseases: hypertension, high blood cholesterol, diabetes, cancer⁹, heart disease, stroke, chronic lung disease, and arthritis. We consider a person chronically ill if he or she has more than two chronic conditions (to indicate comorbidities). We also considered the occurrence of more than one chronic condition.

One reason why it is important to look at various measures of health is that different health problems require different combinations of cure and care. For instance, we expect that functional limitations lead to demand for extra care and support. Especially for older individuals such care is likely to coincide with permanent changes in one's lifestyle. Our measure of mental health, on the other hand, focuses on depression and other issues that can at least be alleviated by curative medicine. Such distinctions are important because permanent lifestyle changes and temporary curable problems may impact consumption in different ways.

2.3 Descriptive statistics

Figure 1 shows average monthly non-medical household expenditures for different age and birth cohorts. Non-medical household expenditures increase between the ages of 25 and 45. After age 45 they stay constant for singles and decline somewhat for couples.

- 8 The ADL items are: dressing, walking, bathing, eating, using the toilet, and getting in and out of bed. The IADL items are: preparing meals, shopping, telephoning, taking medicine, house-keeping, wayfinding, and performing administrative tasks. The mobility items are: walking 100 meters, sitting for two hours, getting up from a chair, walking (several) stairs, kneeling, stretching arms, moving a chair, carrying groceries such as a heavy bag, picking up a small coin from a table.
- 9 One can argue whether cancer is a chronic disease, it depends on the type of cancer whether it has long-term consequences for expenditures.

Table 1 lists the various consumption categories and shows expenditure shares across categories for several age groups. Households consisting of older persons spend relatively little on food and transportation but more on house cleaning and gardening, medical services, and gifts compared to young households. Table 1 also shows financial satisfaction (“How satisfied are you with your financial situation?”), measured on an 11-point scale ranging from 0 (not satisfied) to 10 (completely satisfied). Financial satisfaction is higher among two-person households than among single-person households and is higher for older age groups.

Figure 2 shows the distribution of per person out-of-pocket medical expenditures for different age groups. Two things are noticeable: first, median out-of-pocket medical expenditures have increased since the January 2015 reform and the higher mandatory deductibles that have been introduced, particularly for older persons, and second, the risk of having high out-of-pocket expenditures has increased substantially since the reform. This holds in particular for older persons. Note that for quite a substantial number of individuals the out-of-pocket expenditures are higher than the mandatory deductible.

Table 2 shows, as expected, that the prevalence of chronic diseases and functional disabilities is higher among individuals aged 65 and older than among the working age population, while mental health problems are more common among the working-age population. About one third of the elderly and less than 10% of the working age population in our sample have more than two chronic conditions. For general self-reported health, we observe much less of a difference in health between both age groups. This is probably because the perception of good health changes as people age, as shown by Lindeboom & Van Doorslaer (2004) and Van Ooijen, Alessie & Knoef (2016).

3. Empirical model

To examine how much of the development of consumption over the lifecycle is explained by changes in health (and how much by other factors), we estimate the following linear regression model:

$$\ln C_{ht} = \beta_0 + \beta_1 H_{ht} + age_{ht} \beta_{age} + year_{ht} \beta_y + D_{ht} \delta_1 + v_h + \varepsilon_{ht}, \quad (1)$$

where the dependent variable C_{ht} represents the logarithm of total non-durable expenditures for household h in period t and H_{ht} depicts poor health. Health is expressed by an indicator variable, where a household is in poor health when either the key respondent or, if applicable, the spouse is in poor health. We estimate separate models for different indicators of health. age_{ht} is a vector representing dummies for different age groups; $year_{ht}$ is a vector of dummy variables for the survey waves; and D_{ht} is a vector that represents household demographic and socio-economic characteristics, including marital status, the number of household members, the logarithm of income, homeownership status, retirement status, and a dummy variable denoting whether the key respondent attained higher education. The error term is decomposed into two components: v_h is a time-invariant unobserved household-specific effect (potentially correlated with the regressors), and ε_{ht} is an idiosyncratic error term, which for example represents measurement error in consumption as well as omitted factors that affect expenditures.

To allow for possible correlation between unobserved household-specific effects and health, we use within-household variation in health to estimate the coefficients. We accomplish this by fixed effects estimation.

Because of recent reforms, out-of-pocket medical expenditures have risen substantially since 2015 (as shown in Figure 2). We therefore expect that a change in health not only influences the consumption preferences of households, but also their budget (due to necessary medical expenditures). To address this, we include the logarithm for out-of-pocket medical expenditures ($\ln OOP_{ht}$) as a covariate in some specifications of the regression model.

After examining the effect of health on total expenditures, we explore how health affects the allocation of expenditures across different categories conditional on a given level of total expenditure. We use the well-known Almost Ideal Demand System (AIDS) developed by Deaton & Muellbauer (1980); however, given the relatively short period of analysis, we assume that relative prices have been constant over time.

This model allows us to examine in detail how expenditure shares vary with health. Specifically, we estimate the following expenditure–share demand functions:

$$w_{ht}^k = \beta_0^k + \beta_1^k H_{ht} + age_{ht} \beta_{age}^k + year_{ht} \beta_y^k + D_{ht}^k \delta_1 + \beta_2^k \ln C_{ht} + \varepsilon_{ht}, \quad (2)$$

where w_{ht}^k is the budget share of household h at time t for category k , and C_{ht} is total non-durable spending on all goods/services included in the demand system, deflated by the consumer price index at time t . Parameters are restricted to ensure that the budget shares add up to one. The model is estimated by three-stage least squares, a combination of instrumental variable regression and seemingly unrelated regression since the total non-durable spending variable C_{ht} is included in both sides of the equation and therefore regarded as endogenous. We use net household income as an instrument, which is standard in the literature. It is assumed that income is correlated with total non-durable spending but unrelated to the budget share (other than via total non-durable spending).

The dependent variables in this system are the expenditure shares of the categories explained earlier. By design, the system shows how increased demand for one group of goods is financed by decreased demand for another group. Hence, differences in budget allocations to the specific consumption categories because of a change in health allow us to identify which categories are complements to and which substitutes for poor health. Moreover, they allow us to examine and compare these health-related shifts before and after the January 2015 reform.

Finally, we examine whether poor health affects a household's financial satisfaction through an increase in out-of-pocket (OOP) medical expenditures. We estimate a similar linear regression model as equation (1):

$$Fin.sat_{ht} = \beta_0 + \beta_1 H_{ht} + age_{ht} \beta_{age} + year_{ht} \beta_y + D_{ht} \delta_1 + \beta_2 \ln C_{ht} + \beta_3 \ln OOP_{ht} + v_h + \varepsilon_{ht}, \quad (3)$$

4. Results

4.1 Total expenditures

Table 3 shows us the relation between health and non-medical household expenditures. The fixed effects estimation results show that poor general health leads to a reduction in non-medical consumption of about 3%. When the possible channel through necessary out-of-pocket medical expenditures is accounted for, by controlling for medical spending in columns 3 and 4, the results stay virtually the same. This suggests that the consumption of non-medical goods becomes less valuable in poor health, although the effect is only small. Thus, necessary out-of-pocket medical expenditures, on average, do not seem to result in financial strain. Such result is plausible in our system of universal insurance for virtually all medically necessary procedures and generous long-term care, especially in the first years of our sample.

All specifications include age effects to capture the lifecycle pattern in consumption, as well as time-specific fixed effects.¹⁰ To derive an unbiased lifecycle pattern it is important to account for cohort effects: older cohorts may for instance have a lower lifetime income, which, regardless of their age, results in a lower level of consumption. We accomplish this by estimating the model with fixed effects (i.e. columns 2 and 4). Column 4 shows that non-medical consumption rises by approximately 5.5% between the age categories 45-54 and 55-64 and decline slightly (but not significantly) thereafter. Thus, in addition to health, the data do not provide sufficient evidence that aging leads to lower non-medical consumption. Column 4 further shows that between 2009 and 2017 consumption declined by about 18%, which likely reflects the aggregate economic situation over the period of analysis.

In Table 4, we repeat our analysis for different health measures. The results show that for households where at least one person gets a health problem that limits a person's functioning in daily life, consumption declines by 4.9%. A relatively large reduction of 7.3 % is also found for households where at least one member has more than two chronic conditions. Consumption does not respond significantly to the onset of mental health problems.

Table 5 examines potential heterogeneous effects before and after the 2015 long-term care reform, by estimating in equation 1 the separate effects of poor health for the periods before and after 2015. Only the fixed effect results are reported in the table. For the period after the 2015 reform, compared to the period before the reform,

10 In FE models these age effects are identified off individuals who cross one of the age thresholds in the model.

we find slightly (but not significantly) larger (i.e. less negative) coefficients for general and mental health, and similar coefficients for functional problems and chronic illness. The results thus suggest that, although out-of-pocket medical expenditures increased after January 2015, they do not force households with at least one member with health problems to cut back on non-medical expenditures. This implies that households still have some ability to protect consumption against health shocks in the current system.¹¹

4.2 Disaggregate spending

To examine how a change in health affects expenditures across different categories we estimate a demand system as specified in equation (2). We again distinguish between different definitions of health. We first examine whether households with at least one person in poor health allocate their consumption differently compared to households without health problems.

Figure 3 shows the estimated coefficients of pooled OLS models for different definitions of health among the different categories. For the categories transport and leisure, the share of consumption is negatively associated with most measures of health – though this relationship is not statistically significant for some definitions of health. Households where at least one person has a mental health problem do not spend less on transportation than households without mental illnesses, suggesting that mental health problems do not affect their mobility. For leisure, having chronic diseases is not associated with lower spending. The share of consumption spent on housekeeping and gardening is positively associated with health problems. Households with serious chronic conditions (i.e. three or more conditions) have a higher share of out-of-pocket medical expenses than households without chronic illness. For the other measures of poor health, we do not observe a significant association. Also, for utilities, insurance, and food at home no association between health and consumption shares is found. All changes in expenditure shares are smaller than 2 percentage points.

Next, we focus on the within-household change in health over time to rule out the confounding influence of time-constant unobserved factors that are correlated with health. Figure 4 shows both the between-household estimates (left) and the within-household estimates (right). The between-household estimates show a very similar pattern compared with the pooled OLS results of Figure 3: in poor health,

11 The results are virtually identical in a specification that does not control for medical expenditures.

households spend less on transport and leisure and more on housekeeping, gardening, and medical care. When we focus on within-household variation compared to between-household variation, the most important difference is that transportation increases with health problems (although the increase is not statistically significant), while on average households in poor health spend relatively less on transportation than households in good health. This difference may be due to unobserved characteristics that are different between households in poor and in good health. Another possible explanation is that between-household variation captures the long-run consequences of changes in health better than variation over time, especially since our panel only spans eight years and households are rarely observed across the entire period. Furthermore, the 'signal to noise' ratio is smaller when investigating within variation (as we just use the deviations from the mean as signal). Measurement error in health status is therefore a greater problem in estimates of within variation and may introduce attenuation bias.¹² In the remainder of the analysis we therefore only report the cross-sectional (pooled OLS) estimates.

In Figures 5 to 7 we study heterogeneity in the relationship between health and disaggregate spending. We compare the working age population with older households, couples with single-person households, and the period before and after the 2015 reform. Figure 5 shows pooled OLS estimates for households where the key respondent is younger than 65 or aged 65 or older. We see that the positive relationship between the expenditure share on utilities and poor health is driven by the working-age population (who spend less time at home when healthy). The expenditure share for housekeeping is relatively high for old households with functional restrictions; younger disabled persons are more likely to have a spouse or cohabiting children who can help around the house. When we compare the expenditure shares of single-person households with couples (see Figure 6), we note that singles are much more responsive to changes in health (except for the budget share allocated to leisure, which also changes for couples). Single-person households in poor health allocate on average a smaller share of their budget to food at home and transport, but spend more on housekeeping, leisure, and utilities (the latter is only significant for general health). Couples only seem to reduce their expenses for leisure.

Figure 7 compares the relationship between poor health and budget shares, in the periods before and after the reform of long-term care. It shows that, after the reform, households with at least one person in poor health spend more on out-of-pocket

12 Van Ooijen, Alessie & Knoef (2016) show that self-reported health is much less persistent than objective health from administrative medical records, which they ascribe to measurement error in self-reported health.

medical expenditures. The budget share increases by 1 to 2 percentage points, which is a substantial increase relative to the low baseline budget shares (see Table 1). However, as we showed in the previous section, out-of-pocket medical expenditures do not significantly influence total non-medical expenditures, which we would expect if higher out-of-pocket medical expenditures lead to more financial strain. On the other hand, the figure shows that, in the period after the reform, people in poor health spend somewhat less (but not significantly different from zero) on leisure, which is a luxury good on which households can economize.

4.3 Financial satisfaction

The results in Sections 4.1 and 4.2 show that poor health leads to slightly lower non-medical expenditures and slightly higher medical expenditures (at least for chronic diseases in the fixed effects results). We also find that after the 2015 reform households in poor health do not adjust their overall consumption much and that they substitute only a small part of their budget away from leisure towards medical expenditures. This suggests that the financial situation of households is barely affected by increased out-of-pocket medical expenditures after 2015.

To examine whether a change in health affects the self-perceived financial situation of households we estimate equation 3 using a linear model, where financial satisfaction is the dependent variable (measured on an 11-point scale from 0, not satisfied, to 10, completely satisfied). Table 6 shows that after controlling for disposable income, poor general health has a significant negative effect on financial satisfaction. In line with the previous section, the coefficients do not change after we control for out-of-pocket medical expenditures and non-medical expenditures. Potential explanations for the remaining negative effect of health on financial satisfaction are an increase in the bequest motive or a reduction in the overall satisfaction of persons in poor health. In other words, a person's reporting behavior may become more pessimistic.

Table 7 shows the results for other definitions of health. As was the case for general self-assessed health, poor health measured by mental health problems relates negatively to financial satisfaction, but chronic conditions and functional disabilities do not affect a household's financial satisfaction. For all specifications, controlling for the level of medical expenditures does not affect the results. When we study potential heterogeneity of poor health on financial satisfaction, it appears that for all definitions of health there are no significant differences between the period before and after the reform (see Table 8). This piece of evidence also suggests that the reform did not lead to greater financial strain among households with medical needs.

5. Conclusion

In this paper we have investigated the effects of health on spending patterns. We used data on expenditures by Dutch households between 2009 and 2017 and investigated in what way total non-medical and medical expenditures change when health deteriorates. Furthermore, we estimated a demand system to find out how the shares on different expenditure categories vary with health status. Finally, we showed how financial satisfaction changes with health. Health is multidimensional, and our data allowed us to investigate several measures of health, such as general self-reported health, mental health, functional disability, and chronic diseases.

The results show that, when the health of one or more household members worsens, non-medical expenditures decline slightly, by between 3% (for general health) and 7% (for severe chronic illnesses). Medical expenditures increase after a health shock, at least for households with chronic diseases and especially after the 2015 long-term care reform. Increases in medical expenditures, however, do not seem to drive the decline in non-medical expenditures after a health shock. This suggests that preferences change after a health shock (i.e. households in poor health value non-medical consumption less), or that bequest motives become stronger in poor health.¹³ The results also show that, in addition to health, there is no clear evidence that aging leads to lower non-medical consumption.

Compared to households in good health, those in poor health spend more on housekeeping and relatively less on leisure (this applies particularly to couples, who spend less on family vacations). Households in poor health spend less on transportation than those in good health, but after a change in health status we do not find a drop in relative transportation expenditures. Transportation expenditures even seem to increase after a negative (mental or general) health shock. These contrary results may reflect differences between short-term and long-term effects of health problems, or they may be due to unobserved differences between households in poor and good health. Also single person households seem to be more responsive to changes in health compared to couples.

In the Netherlands the trend is that households become increasingly responsible for the financial effects of their health and long-term care. The question arises then whether this results in greater financial stress and how people react on this.

13 Indeed, a sub-analysis of the budget shares over the period 2009–2012 shows that elderly persons with functional disabilities or severe chronic conditions spend on average a 1.5 percentage point higher share of their budget on gifts than their healthy counterparts (figure 8). While bequest motives may explain this, more research is needed to explore this mechanism.

The long-term care reform in 2015 in the Netherlands has increased out-of-pocket medical expenditures. However, we did not find a decline in the financial satisfaction of unhealthy households relative to healthy households after the reform. On the other hand, we did find that expenditures on leisure were cut more by unhealthy households after the reform compared to healthy households, which may justify concern.

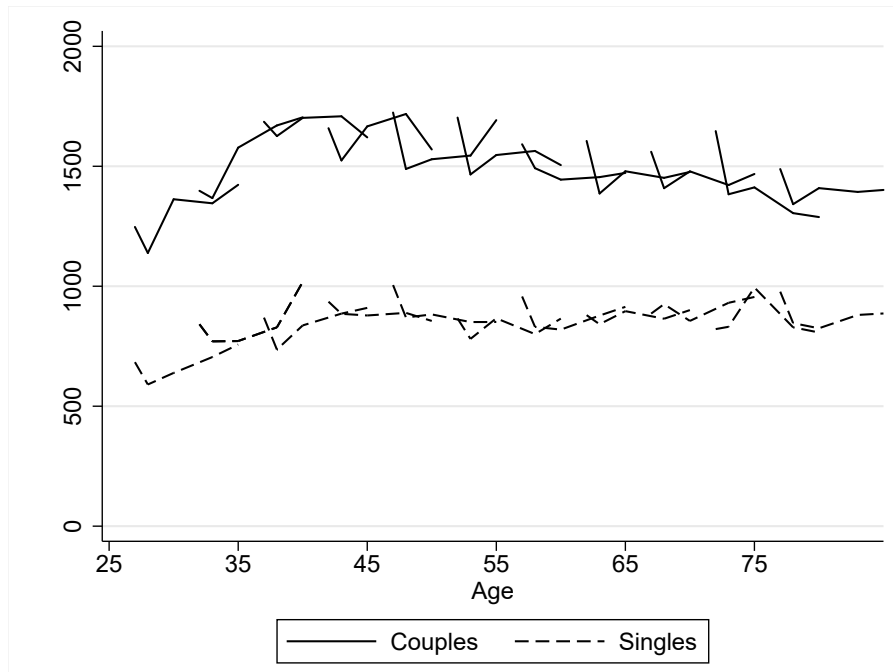
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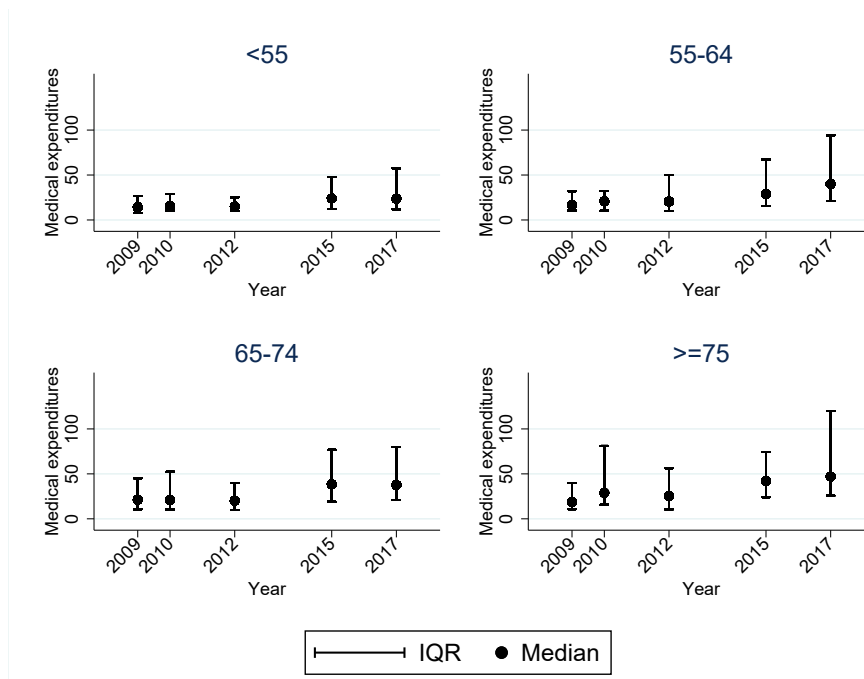
Figures and tables

Figure 1: Average non-medical household expenditures over the lifecycle for different years of birth cohorts.



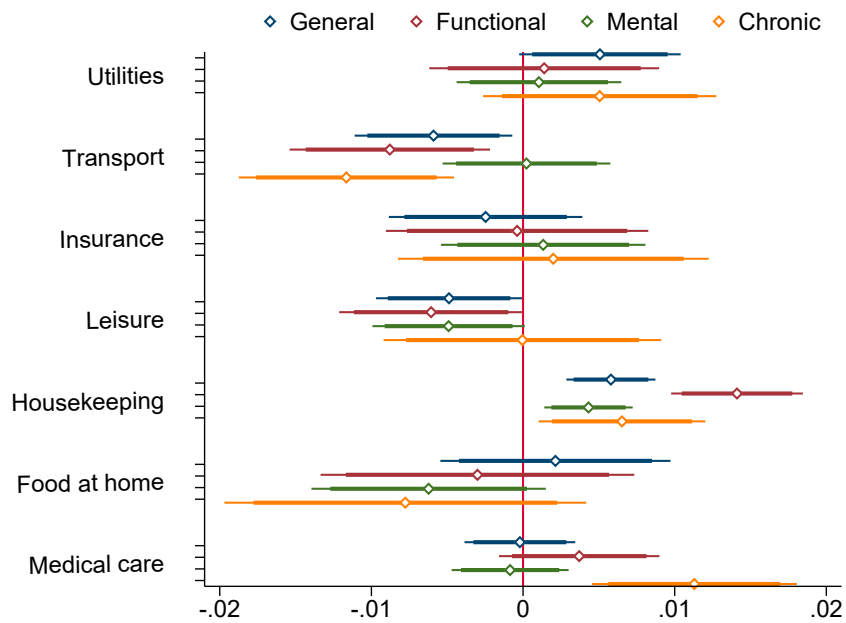
Source: LISS 2009–2017. Table 1 shows the composition of non-medical household expenditures.

Figure 2: Distribution of per person out-of-pocket medical expenditures by age.



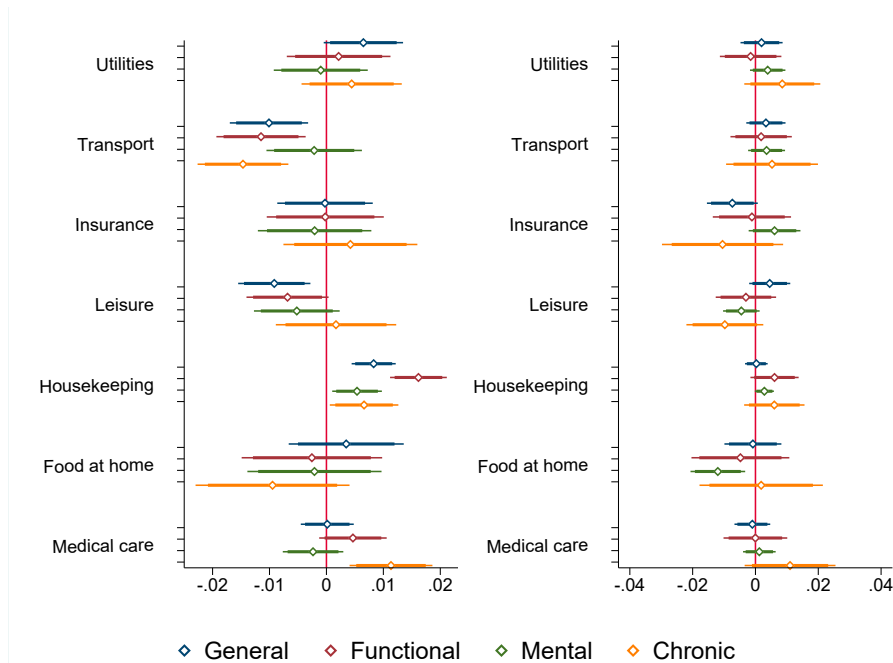
Source: LISS 2009–2017. Each line shows the 10th percentile, first quartile, median, third quartile, and 90th percentile. Medical expenditures of couples are divided by two.

Figure 3: Health and consumption shares, cross-sectional estimates.



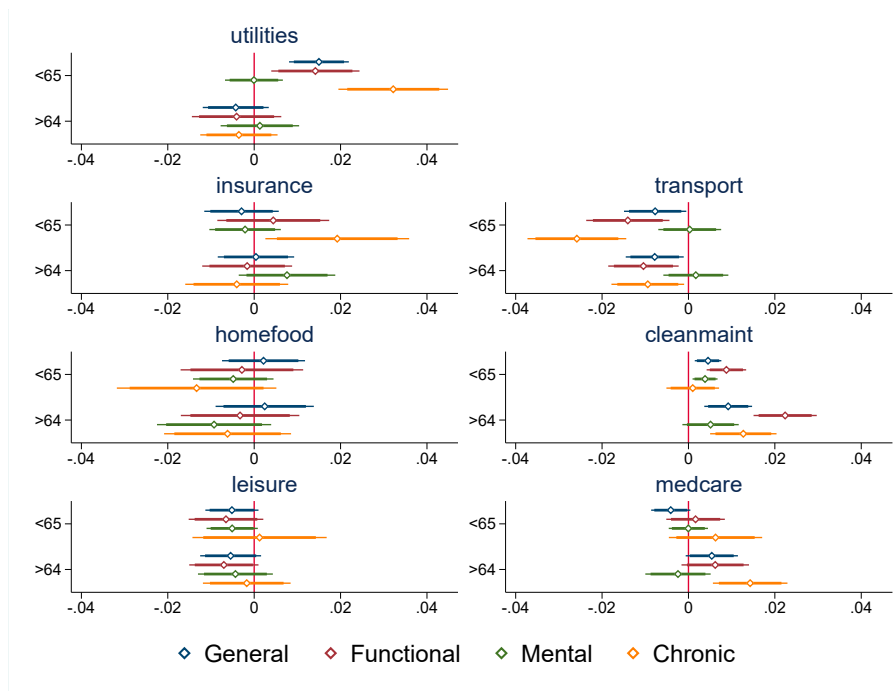
Source: LISS 2009–2017. 90% and 95% confidence intervals are reported.

Figure 4: Health and consumption shares, between-households estimates (left), and within-households estimates (right).



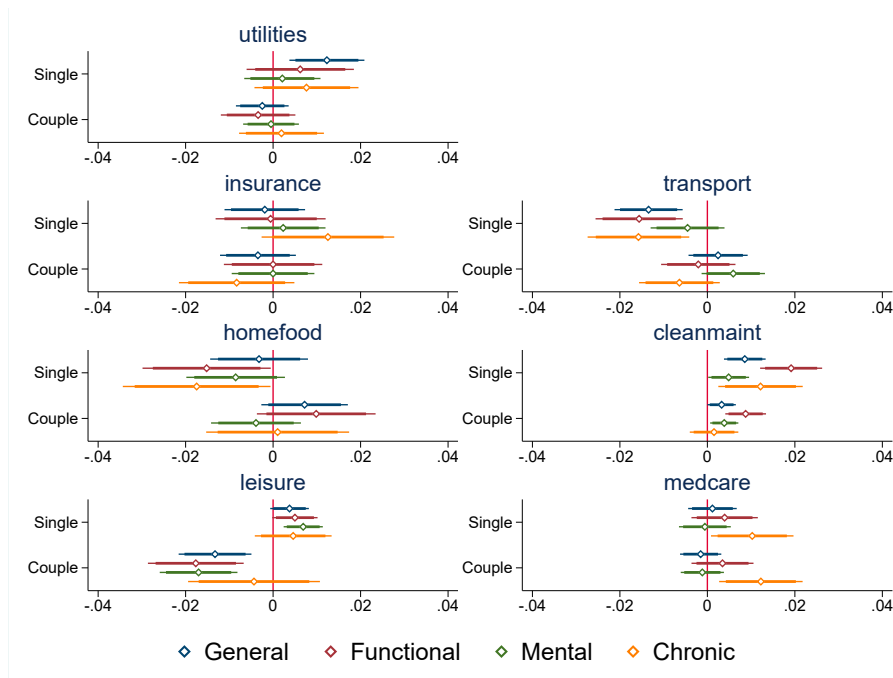
Source: LISS 2009–2017. 90% and 95% confidence intervals are reported.

Figure 5: Health and consumption shares, cross-sectional estimates.



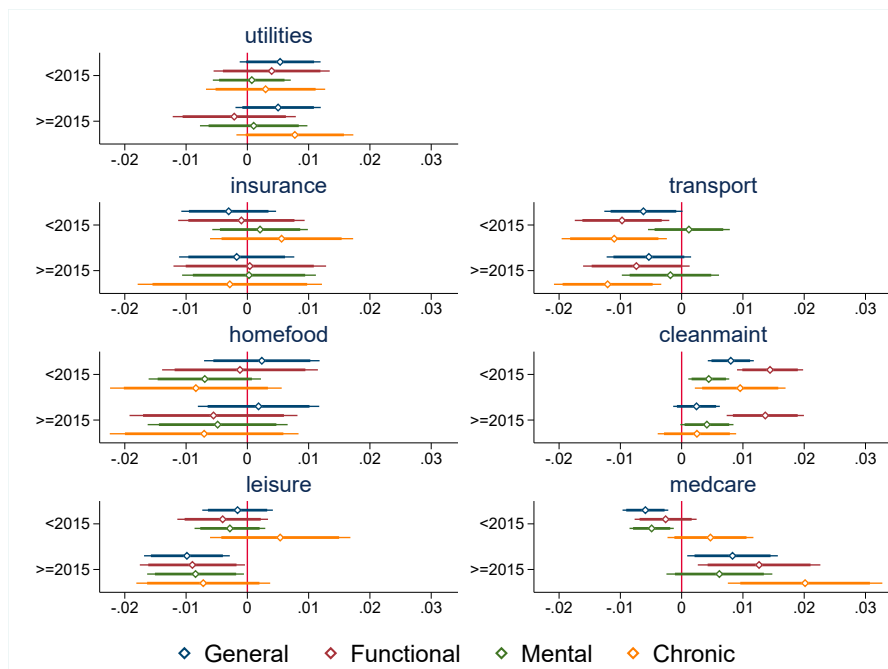
Source: LISS 2009–2017. 90% and 95% confidence intervals are reported.

Figure 6: Health and consumption shares, cross-sectional estimates.



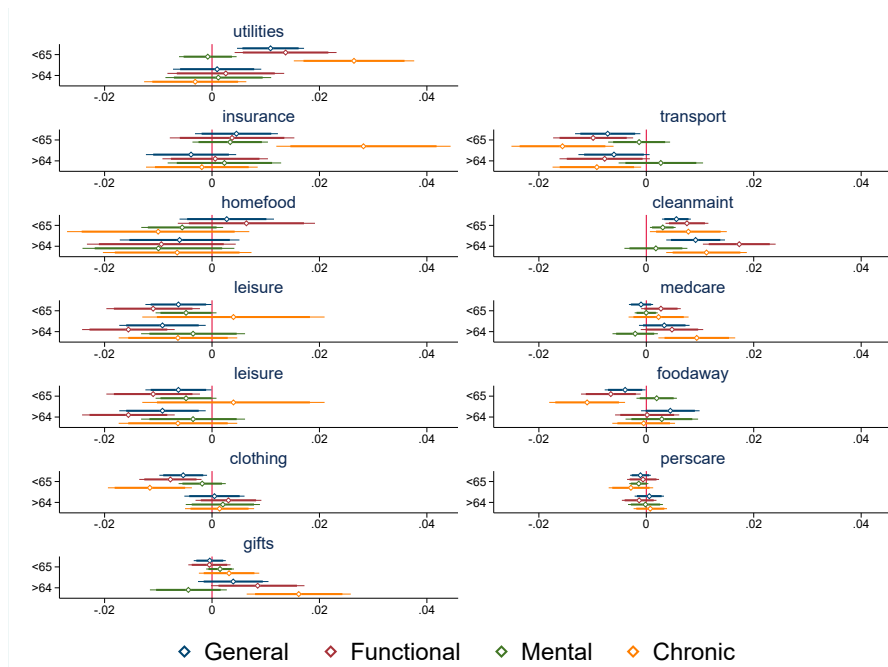
Source: LISS 2009–2017. 90% and 95% confidence intervals are reported.

Figure 7: Health and consumption shares, cross-sectional estimates.



Source: LISS 2009–2017. 90% and 95% confidence intervals are reported.

Figure 8: Health and consumption shares, cross-sectional estimates, 2009–2012



Source: LISS 2009–2012. 90% and 95% confidence intervals are reported.

Table 1: Average share of total non-durable expenditures and financial satisfaction by age and marital status, 2009–2012.

Category	Single-person household				Two-person household			
	< 55	55-64	65-74	> 74	< 55	55-64	65-74	> 74
Household	74.6	76.1	76.3	73.6	77.5	77.7	78.1	78.3
– Food at home	20.6	20.0	19.0	18.3	20.1	20.4	20.7	20.3
– Utilities	14.8	16.7	16.8	16.4	11.6	12.4	12.1	12.9
– Insurance (incl. health insurance)	14.1	15.1	15.8	14.8	13.6	14.5	14.6	15.9
– Transportation	8.7	8.3	8.2	6.6	8.7	8.1	7.5	6.6
– House cleaning/ gardening	2.4	2.7	3.6	5.2	2.4	2.4	2.3	3.3
– Family vacations (leisure)	1.6	1.2	0.2	0.0	9.0	10.7	11.0	9.7
– Childcare	0.6	0.0	0.0	0.0	3.4	0.0	0.0	0.0
– Other	10.2	9.9	10.1	8.2	7.0	6.3	7.0	6.2
Medical	1.6	2.2	2.5	4.1	1.7	2.8	3.0	3.5
Personal	25.4	23.9	23.7	26.4	22.5	22.3	21.9	21.7
– Clothing	5.8	5.1	5.1	5.7	6.5	6.8	6.2	6.8
– Food away from home	5.0	4.2	3.8	3.5	3.6	3.0	2.6	2.4
– Personal leisure	4.4	4.2	4.2	3.6	3.7	3.5	3.3	2.7
– Gifts	2.9	3.5	4.3	7.6	3.0	3.6	4.5	5.1
– Personal care	2.6	2.6	2.8	2.9	2.8	2.9	2.9	3.1
– Tobacco	2.3	2.0	1.3	0.9	1.2	1.2	1.1	0.2
– Education	1.0	0.7	0.4	0.3	0.5	0.4	0.3	0.2
– Other	1.4	1.6	1.9	2.1	1.1	0.9	1.1	1.1
Total monthly expenditures	1178 (494)	1200 (539)	1212 (620)	1286 (673)	2133 (800)	2069 (897)	2036 (826)	1940 (822)
Financial satisfaction (scale 0–10)	6.1 (2.0)	6.3 (2.1)	6.8 (1.9)	7.4 (1.6)	6.8 (1.6)	7.0 (1.7)	7.4 (1.3)	7.5 (1.3)
Observations	1047	587	446	276	1076	637	533	185

Source: LISS 2009–2012. Standard deviations in parentheses.

Table 2: Prevalence and distribution of different health measures

Variable	mean	sd	p5	p50	p95
Age < 65					
General health	1.93	0.75	1	2	3
Mental health	25.48	16.91	4	20	60
Functional ability	4.56	8.18	0	1	21
Chronic conditions	0.53	0.96	0	0	3
Poor general health	0.17	0.38	0	0	1
Poor mental health	0.16	0.37	0	0	1
Poor functional ability	0.08	0.26	0	0	1
> 2 Chronic conditions	0.09	0.28	0	0	1
> 3 Chronic conditions	0.03	0.17	0	0	0
Age ≥ 65					
General health	2.08	0.7	1	2	3
Mental health	22.71	15.7	4	20	52
Functional ability	7.57	9.14	0	5	26
Chronic conditions	1.49	1.33	0	1	4
Poor general health	0.24	0.42	0	0	1
Poor mental health	0.12	0.33	0	0	1
Poor functional ability	0.14	0.35	0	0	1
> 2 Chronic conditions	0.31	0.46	0	0	1
> 3 Chronic conditions	0.13	0.34	0	0	1

Notes: LISS panel 2009–2017.

Table 3: Estimates of the effect of health on household expenditures.

Dependent variable: logarithm of total non-medical household expenditures.

	General health		General health	
	(1) RE	(2) FE	(3) RE	(4) FE
Poor health dummy	-0.02 * (0.011)	-0.028 ** (0.014)	-0.023 ** (0.011)	-0.029 ** (0.014)
Age 35-44	0.142 *** (0.024)	0.111 ** (0.040)	0.14 *** (0.024)	0.11 ** (0.040)
Age 45-54	0.139 *** (0.024)	0.127 ** (0.048)	0.133 *** (0.023)	0.125 ** (0.048)
Age 55-64	0.155 *** (0.023)	0.172 ** (0.054)	0.145 *** (0.023)	0.17 ** (0.054)
Age 65-74	0.156 *** (0.028)	0.164 ** (0.062)	0.145 *** (0.028)	0.161 ** (0.062)
Age 75 and over	0.142 *** (0.030)	0.142 ** (0.071)	0.128 *** (0.030)	0.139 ** (0.071)
Year 2010	-0.073 *** (0.010)	-0.073 *** (0.010)	-0.073 *** (0.010)	-0.073 *** (0.010)
Year 2012	-0.082 *** (0.011)	-0.087 *** (0.012)	-0.081 *** (0.011)	-0.087 *** (0.012)
Year 2015	-0.139 *** (0.011)	-0.149 *** (0.014)	-0.152 *** (0.012)	-0.154 *** (0.014)
Year 2017	-0.167 *** (0.012)	-0.176 *** (0.015)	-0.181 *** (0.013)	-0.182 *** (0.016)
Couple	0.296 *** (0.019)	0.268 *** (0.050)	0.282 *** (0.020)	0.263 *** (0.050)
Single female	0.044 ** (0.017)	0.29 ** (0.091)	0.042 ** (0.017)	0.287 ** (0.091)
In disposable income	0.323 *** (0.017)	0.181 *** (0.028)	0.322 *** (0.017)	0.18 *** (0.028)
Retired	0.031 * (0.018)	0.017 (0.025)	0.032 * (0.018)	0.018 (0.025)
Household members	0.047 *** (0.008)	0.062 *** (0.017)	0.047 *** (0.008)	0.063 *** (0.017)
Homeowner	0.161 *** (0.014)	0.094 ** (0.044)	0.16 *** (0.014)	0.094 ** (0.044)
Higher education	0.08 *** (0.013)	-0.008 (0.058)	0.076 *** (0.013)	-0.009 (0.058)
In medical spending			0.014 *** (0.003)	0.005 (0.003)
Constant	4.022 *** (0.124)	5.121 *** (0.219)	4.017 *** (0.123)	5.119 *** (0.219)
Number of observations	6738	6738	6738	6738
Number of households	2116	2116	2116	2116
R-squared	0.53	0.41	0.54	0.42

Notes: Clustered robust standard errors in parentheses. Data are from the LISS panel 2009-2017.

Table 4: Estimates of the effect of health on household expenditures. Dependent variable: logarithm of total non-medical household expenditures.

	Mental health		Functional disability		Chronic conditions	
	(1) RE	(2) FE	(3) RE	(4) FE	(5) RE	(6) FE
Poor health dummy	-0.021 ** (0.011)	-0.02 (0.013)	-0.041 ** (0.014)	-0.049 ** (0.022)	-0.038 ** (0.017)	-0.073 ** (0.029)
Age 35-44	0.138 *** (0.024)	0.112 ** (0.040)	0.14 *** (0.024)	0.111 ** (0.040)	0.139 *** (0.024)	0.109 ** (0.040)
Age 45-54	0.131 *** (0.023)	0.128 ** (0.048)	0.134 *** (0.023)	0.125 ** (0.048)	0.132 *** (0.023)	0.123 ** (0.048)
Age 55-64	0.142 *** (0.023)	0.174 ** (0.055)	0.147 *** (0.023)	0.17 ** (0.054)	0.145 *** (0.023)	0.167 ** (0.055)
Age 65-74	0.142 *** (0.028)	0.166 ** (0.062)	0.149 *** (0.028)	0.162 ** (0.062)	0.148 *** (0.028)	0.162 ** (0.062)
Age 75 and over	0.123 *** (0.030)	0.143 ** (0.071)	0.134 *** (0.030)	0.142 ** (0.071)	0.132 *** (0.030)	0.142 ** (0.071)
Year 2010	-0.074 *** (0.010)	-0.074 *** (0.010)	-0.074 *** (0.010)	-0.073 *** (0.010)	-0.074 *** (0.010)	-0.073 *** (0.010)
Year 2012	-0.082 *** (0.011)	-0.088 *** (0.012)	-0.081 *** (0.011)	-0.086 *** (0.012)	-0.081 *** (0.011)	-0.085 *** (0.012)
Year 2015	-0.154 *** (0.012)	-0.157 *** (0.014)	-0.152 *** (0.012)	-0.153 *** (0.014)	-0.152 *** (0.012)	-0.152 *** (0.014)
Year 2017	-0.181 *** (0.013)	-0.184 *** (0.016)	-0.18 *** (0.013)	-0.18 *** (0.016)	-0.18 *** (0.013)	-0.178 *** (0.016)
Couple	0.281 *** (0.020)	0.263 *** (0.051)	0.283 *** (0.020)	0.262 *** (0.050)	0.281 *** (0.020)	0.261 *** (0.051)
Single female	0.042 ** (0.017)	0.29 ** (0.089)	0.043 ** (0.017)	0.3 *** (0.089)	0.041 ** (0.017)	0.294 ** (0.091)
In disposable income	0.323 *** (0.017)	0.181 *** (0.028)	0.321 *** (0.017)	0.181 *** (0.028)	0.324 *** (0.017)	0.182 *** (0.028)
Retired	0.031 * (0.018)	0.018 (0.025)	0.03 * (0.018)	0.018 (0.025)	0.031 * (0.018)	0.017 (0.025)
Household members	0.048 *** (0.008)	0.063 *** (0.017)	0.047 *** (0.008)	0.062 *** (0.017)	0.047 *** (0.008)	0.063 *** (0.017)
Homeowner	0.16 *** (0.014)	0.094 ** (0.044)	0.159 *** (0.014)	0.095 ** (0.044)	0.16 *** (0.014)	0.092 ** (0.044)
Higher education	0.076 *** (0.013)	-0.009 (0.058)	0.075 *** (0.013)	-0.009 (0.058)	0.075 *** (0.013)	-0.008 (0.058)
In medical spending	0.014 *** (0.003)	0.004 (0.003)	0.014 *** (0.003)	0.005 (0.003)	0.014 *** (0.003)	0.005 (0.003)
Constant	4.012 *** (0.123)	5.105 *** (0.219)	4.022 *** (0.123)	5.104 *** (0.219)	4.001 *** (0.123)	5.102 *** (0.219)
Number of observations	6738	6738	6738	6738	6738	6738
Number of households	2116	2116	2116	2116	2116	2116
R-squared	0.54	0.42	0.54	0.41	0.54	0.41

Notes: Clustered robust standard errors in parentheses. Data are from the LISS panel 2009-2017.

*Table 5: Fixed effects estimates of the effect of health on household expenditures.
Dependent variable: logarithm of total non-medical household expenditures.*

	(1) General	(2) Mental	(3) Functional	(4) Chronic
Year < 2015	-0.043 ** (0.015)	-0.025 * (0.014)	-0.057 ** (0.025)	-0.09 ** (0.034)
Year ≥ 2015	-0.021 (0.018)	-0.011 (0.018)	-0.058 ** (0.024)	-0.099 *** (0.030)
$\beta < 2015 = \beta \geq 2015$; p-value	0.19	0.47	0.96	0.74
Number of observations	6738	6738	6738	6738

Notes: Clustered robust standard errors in parentheses. Data are from the LISS panel 2009–2017. Each regression also contains controls for age effects as well as household demographic and socioeconomic characteristics, including marital status, number of household members, logarithm of income, homeownership status, retirement status, and a dummy variable denoting whether the key respondent attained higher education. All specifications also contain the control variable logarithm of medical expenditures.

Table 6: Estimates of the effect of health on household financial satisfaction.

	General health		General health	
	(1) RE	(2) FE	(3) RE	(4) FE
Poor health dummy	-0.425 *** (0.050)	-0.125 ** (0.057)	-0.424 *** (0.050)	-0.123 ** (0.057)
Age 35-44	-0.101 (0.106)	-0.039 (0.185)	-0.108 (0.106)	-0.049 (0.186)
Age 45-54	0.004 (0.100)	0.019 (0.223)	-0.003 (0.100)	0.007 (0.223)
Age 55-64	0.033 (0.096)	-0.103 (0.250)	0.025 (0.097)	-0.118 (0.250)
Age 65-74	0.36 ** (0.116)	0.115 (0.279)	0.352 ** (0.117)	0.1 (0.279)
Age 75 and over	0.597 *** (0.128)	0.088 (0.306)	0.59 *** (0.129)	0.075 (0.307)
Year 2010	-0.026 (0.043)	-0.029 (0.043)	-0.023 (0.043)	-0.024 (0.043)
Year 2012	-0.035 (0.047)	-0.041 (0.050)	-0.031 (0.047)	-0.033 (0.050)
Year 2015	0.04 (0.049)	0.063 (0.059)	0.048 (0.052)	0.074 (0.062)
Year 2017	0.112 ** (0.055)	0.166 ** (0.067)	0.12 ** (0.058)	0.179 ** (0.070)
Couple	0.079 (0.089)	-0.089 (0.218)	0.064 (0.090)	-0.112 (0.219)
Single female	0.094 (0.085)	-0.422 (0.652)	0.092 (0.085)	-0.447 (0.654)
In disposable income	1.368 *** (0.078)	1.005 *** (0.125)	1.352 *** (0.081)	0.991 *** (0.126)
Retired	0.185 ** (0.079)	0.106 (0.105)	0.184 ** (0.079)	0.106 (0.105)
Household members	-0.216 *** (0.035)	-0.154 ** (0.064)	-0.219 *** (0.035)	-0.159 ** (0.064)
Homeowner	0.468 *** (0.066)	0.122 (0.166)	0.459 *** (0.067)	0.114 (0.166)
Higher education	0.191 *** (0.057)	0.128 (0.172)	0.187 ** (0.057)	0.128 (0.171)
In medical spending			0 (0.012)	0.001 (0.013)
In non-medical spending			0.05 (0.057)	0.081 (0.069)
Constant	-3.835 *** (0.578)	-0.612 (0.975)	-4.044 *** (0.610)	-1.026 (1.030)
Number of observations	6158	6158	6158	6158
Number of households	2071	2071	2071	2071
R-squared	0.29	0.23	0.29	0.23

Notes: Clustered robust standard errors in brackets. Data are from the LISS panel 2009-2017. Dependent variable: 11-point measure of the degree to which the key respondent feels satisfied with his/her financial situation.

Table 7: Estimates of the effect of health on household financial satisfaction.

	Mental health		Functional ability		Chronic conditions	
	(1) RE	(2) FE	(3) RE	(4) FE	(5) RE	(6) FE
Poor health dummy	-0.405 *** (0.053)	-0.18 ** (0.060)	-0.502 *** (0.077)	-0.093 (0.090)	-0.102 (0.098)	0.066 (0.144)
Age 35-44	-0.128 (0.104)	-0.045 (0.182)	-0.094 (0.108)	-0.04 (0.186)	-0.116 (0.109)	-0.037 (0.186)
Age 45-54	-0.038 (0.100)	0.019 (0.220)	0.007 (0.102)	0.016 (0.224)	-0.027 (0.103)	0.026 (0.223)
Age 55-64	-0.035 (0.097)	-0.106 (0.247)	0.042 (0.099)	-0.11 (0.251)	-0.009 (0.100)	-0.098 (0.250)
Age 65-74	0.291 ** (0.117)	0.114 (0.278)	0.386 ** (0.118)	0.112 (0.280)	0.326 ** (0.119)	0.123 (0.280)
Age 75 and over	0.488 *** (0.128)	0.083 (0.305)	0.637 *** (0.130)	0.086 (0.307)	0.537 *** (0.131)	0.092 (0.307)
Year 2010	-0.024 (0.043)	-0.024 (0.043)	-0.03 (0.043)	-0.026 (0.043)	-0.029 (0.043)	-0.027 (0.043)
Year 2012	-0.034 (0.047)	-0.035 (0.050)	-0.031 (0.047)	-0.035 (0.050)	-0.037 (0.047)	-0.041 (0.050)
Year 2015	0.032 (0.052)	0.065 (0.062)	0.046 (0.052)	0.071 (0.063)	0.038 (0.052)	0.061 (0.063)
Year 2017	0.123 ** (0.057)	0.176 ** (0.070)	0.124 ** (0.058)	0.177 ** (0.071)	0.119 ** (0.058)	0.166 ** (0.071)
Couple	0.045 (0.091)	-0.087 (0.220)	0.058 (0.091)	-0.122 (0.219)	0.012 (0.092)	-0.133 (0.220)
Single female	0.102 (0.085)	-0.464 (0.669)	0.11 (0.085)	-0.424 (0.665)	0.092 (0.087)	-0.437 (0.667)
In disposable income	1.365 *** (0.080)	0.995 *** (0.126)	1.361 *** (0.082)	0.996 *** (0.126)	1.389 *** (0.082)	0.995 *** (0.126)
Retired	0.174 ** (0.080)	0.113 (0.105)	0.167 ** (0.078)	0.105 (0.105)	0.176 ** (0.080)	0.106 (0.106)
Household members	-0.211 *** (0.035)	-0.157 ** (0.064)	-0.219 *** (0.035)	-0.16 ** (0.064)	-0.216 *** (0.035)	-0.161 ** (0.064)
Homeowner	0.458 *** (0.067)	0.123 (0.165)	0.458 *** (0.067)	0.114 (0.166)	0.479 *** (0.069)	0.111 (0.167)
Higher education	0.195 *** (0.058)	0.127 (0.170)	0.185 ** (0.058)	0.125 (0.172)	0.2 *** (0.058)	0.124 (0.172)
In medical spending	-0.006 (0.012)	-0.001 (0.013)	-0.004 (0.012)	0 (0.013)	-0.005 (0.012)	0 (0.013)
In non-medical spending	0.052 (0.057)	0.079 (0.069)	0.047 (0.057)	0.081 (0.069)	0.062 (0.057)	0.085 (0.069)
Constant	-4.117 *** (0.607)	-1.072 (1.029)	-4.135 *** (0.614)	-1.099 (1.031)	-4.462 *** (0.623)	-1.122 (1.030)
Number of observations	6158	6158	6158	6158	6158	6158
Number of households	2071	2071	2071	2071	2071	2071
R-squared	0.28	0.23	0.28	0.22	0.26	0.21

Notes: Clustered robust standard errors in brackets. Data are from the LISS panel 2009-2017.

Dependent variable: 11-point measure of the degree to which the key respondent feels satisfied with his/her financial situation.

Table 8: Fixed effect estimates of the effect of health on household financial satisfaction.

	(1) General	(2) Mental	(3) Functional	(4) Chronic
Year < 2015	-0.147 ** (0.070)	-0.208 ** (0.066)	-0.077 (0.108)	0.052 (0.158)
Year ≥ 2015	-0.099 (0.074)	-0.125 (0.088)	-0.111 (0.110)	0.073 (0.152)
$\beta < 2015 = \beta \geq 2015$; p-value	0.58	0.37	0.78	0.86
Observations	6158	6158	6158	6158

Notes: Clustered robust standard errors in brackets. Data are from the LISS panel 2009–2017. Dependent variable: 11–point measure of the degree to which the key respondent feels satisfied with his/her financial situation. Each regression also contains controls for age effects as well as household demographic and socioeconomic characteristics, including marital status, number of household members, logarithm of income, homeownership status, retirement status, and a dummy variable denoting whether the key respondent attained higher education.

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This is a publication of:
Netspar
Phone +31 13 466 2109
E-mail info@netspar.nl
www.netspar.nl

June 2018