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Progressivity in the Wealth Changes Experienced by Users of Formal Long-Term Care

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Abstract

With ageing populations in many Western populations, concerns have arisen about equity in the provision of long-term care (LTC). This study describes equity-relevant LTC policies and investigates how the proportional changes in wealth that users of formal LTC experience vary along the wealth distribution in Austria, Flanders, Germany and the Netherlands. It is found that users of formal LTC face significant negative wealth changes in Austria and the Netherlands: a progressive pattern appears in Austria, a regressive pattern in the Netherlands. Formal LTC users suffer no significant wealth changes in Germany, nor do the wealthier users in Flanders; a group of formal LTC users at the bottom of the wealth distribution in Flanders sees wealth increase. Several policy implications are deduced from the findings: informal care-giving ought to be encouraged and (co-)payments for formal LTC should be made means-tested – without setting minima. Furthermore, it is advised that the cumulative effect of various LTC policies is coordinated.

CONTENTS

1. Introduction

A trend of rising average life expectancy, in concurrence with declining fertility rates, is occurring worldwide (World Bank). These demographic changes have attracted attention particularly among policy-makers in Western countries, where concerns have arisen about the increasingly large population share of elderly people. Public expenditures are expected to rise, due to old age-related expenses such as public pensions. Given current tax arrangements and the decreasing proportion of working-age members among most Western populations, public income is not expected to match the increasing expenditures (Francesca et al., 2011).

An especially large worry are the burgeoning costs of long-term care (LTC). LTC can be defined as (i) living in a nursing home (whether temporarily or permanently), and/or (ii) receiving personal or nursing care at home, and/or (iii) receiving assistance with domestic tasks that cannot be executed due to health problems (including the provision of meals-on-wheels). Formal LTC is provided by professionals, whereas informal LTC is given by family, neighbours or friends, who are generally not formally trained.

While many policy documents stress the importance of controlling public spending on long-term care, equity considerations also feature frequently (Francesca et al., 2011). This research focuses on the latter concern.

1.1 Defining equity

'Equity' is no clear-cut concept, for it requires judging which inequalities are unfair. A common notion in the context of care *use* is that of horizontal equity, which describes the idea that people with equal needs should receive equal care – irrespective of, for instance, socioeconomic status. Regarding care *financing*, the idea of vertical equity is generally used: people with unequal ability-to-pay should make unequal contributions[1]. Vertical equity is usually assessed by looking at progressivity, which describes the extent to which people with more means make higher contributions.

1.2 Previous literature

A large literature exists on equity in healthcare more generally (for general overviews, see Fleurbaey & Schokkaert, 2011; O'Donnell et al., 2012), but LTC has received significantly less attention. Although

[1] In low- and middle-income regions, measures capturing lack of financial risk protection are more frequently applied. Often considered are the incidence (and severity) of (i) catastrophic spending and (ii) impoverishment. The first occurs when spending on care takes up such a large share of household income that the consumption of other necessary goods/service is forgone, whereas the latter happens when households are pushed below a set poverty line as a result of care expenses (Saksena et al., 2014). This study, however, concerns high-income countries.

several descriptive studies and policy documents are available, describing different LTC systems and their relevant features with regards to equity, little quantitative analysis has been undertaken. A number of papers discusses horizontal equity in LTC use (e.g. Konetzka, 2009; Rodrigues et al., 2014). One study was identified that examines LTC out-of-pocket payments as a share of income for elderly in Europe (Scheil-Adlung and Bonan, 2013). No studies were found specifically considering vertical equity in LTC financing. This seems a gap in the literature, which this research project aims to start filling.

1.3 Research question

This study looks at the proportional effect of using formal LTC – as opposed to only informal LTC, or not receiving any care at all – on one's wealth, along different wealth quantiles. Wealth (rather than income) was used as the measure of ability-to-pay, for elderly people typically have had the change to accumulate wealth throughout their lives and wealth therefore gives a better representation of the resources available to them. It, moreover, plays an important role in intergenerational inequality through bequest-giving to younger relatives (Albertini et al., 2012).

1.4 Background

1.4.1 Understanding old-age savings

Although wealth was deemed the most appropriate variable of interest for this research, it should be noted that wealth is no easy variable to explain. One's wealth in old age is the result of many events over a long period of time. The understanding of the accumulation of wealth may be aided by so-called life-cycle models (LCMs), which attempt to understand and predict individuals' saving behaviour. The first LCM was developed by Modigliani and Brumberg (1954) and supposes that individuals have a lifetime overview of their consumption and income. It is assumed that people desire a certain constant level of consumption (c*) throughout their life, with c* depending on the lifetime budget constraint (lifetime income + initial assets). People save or dis-save contingent on whether current income is above or below c*. A general prediction from the model is that people accumulate wealth during their working life and start dissaving as income drops after retirement. If the government were to reduce public pension payments, say, this would mean that post-retirement income falls, ceteris paribus. The model predicts that c* will be reduced because total lifetime income decreases. Pre-retirement income remains the same whilst c* is lower, so that pre-retirement savings increase (see Box 1). This implies that when public provisions become less generous, individuals will save more.

Box 1

Suppose there are two periods in life: pre-retirement and post-retirement.

y_{pre} = income before retirement
y_{post} = income after retirement
c^* = consumption

The tables below show that a reduction in public pension benefits decreases lifetime consumption and increases pre-retirement saving.

Table 1A – Generous public pensions

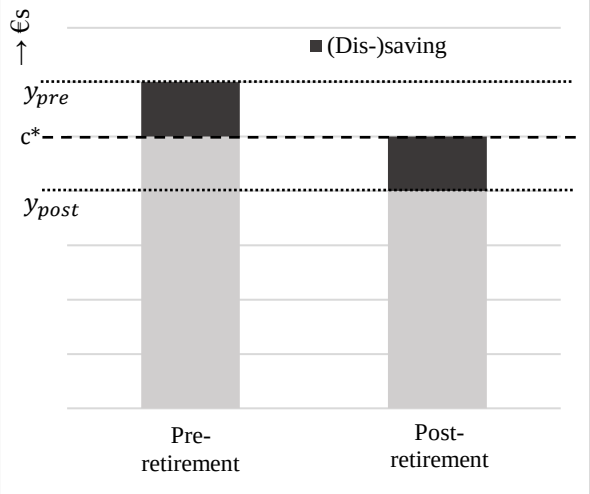
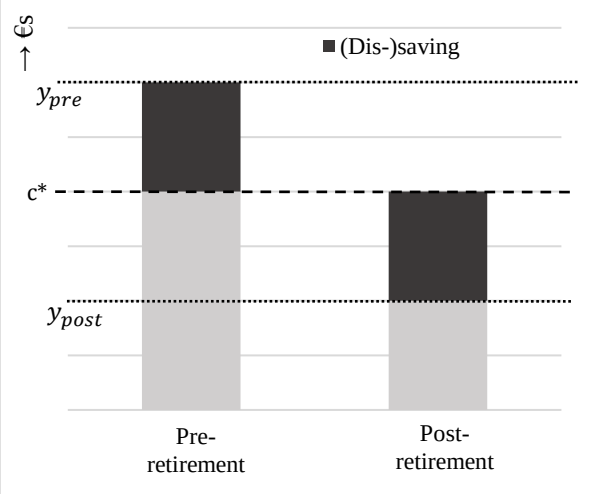


Table 1B – Reduced public pensions



Yet Modigliani and Brumberg's highly stylised model does not take account of the uncertainties people face, of which needing LTC is an important one. LTC is expensive and the financial consequences for elderly people using LTC can be severe. Kotlikoff (1986) developed an extended version of the earlier LCM, allowing for the risk of health expenditures at old age. In Box 2, using an adapted version of Kotlikoff's two-period model, it is shown that if people face the risk of (co-)payments for LTC, they insure themselves by increasing savings earlier in life.

1.4.2 Equity concerns

Research suggests that elderly individuals commonly experience financial difficulty as a result of care expenses, implying that people are myopic about their LTC risk and do not do enough precautionary saving (e.g. Lee and Kim, 2002). These findings hint that additional insurance through public LTC provision might be needed to moderate people's myopia resulting in under-saving. A number of theoretical papers have argued that, in the presence of myopia (or uncertainty), (partial) public LTC

insurance is Pareto-optimal (e.g. Rochet, 1991; Cremer & Roeder, 2013). Indeed, some form of public LTC provision is observed in most Western countries[2].

Furthermore, a systematic review by Valtorta and Hanratty (2013)[3] finds that individuals from lower socioeconomic backgrounds are more frequently burdened by chronic illness in old age and are more likely to report (subjective) financial hardship than individuals with a higher socioeconomic status. Poorer people experiencing higher financial burden is at odds with the principles of vertical equity and may also increase intergenerational wealth inequality. Here, governments could intervene in order to reduce LTC expenses for poorer people. Such redistributive public policies are generally seen as desirable (Cusack et al., 2006; Jæger, 2006; Dion & Birchfield, 2010) and can also be argued to be Pareto-optimal (e.g. Naito, 1999). Note that, by improving vertical equity, horizontal equity may be increased as well; reduced expenses could mean poorer people no longer have to forego the care that richer people of equal need are receiving.

This study seeks to establish the extent to which progressivity in the wealth effects of formal LTC use exists. By comparing different countries, it aims to offer evidence-based recommendations on how vertical equity in LTC financing can be improved. The study examines four countries: Austria, Belgium (focusing on Flanders), Germany and the Netherlands. Formal LTC is publicly provided and/or highly regulated in these countries, so that the observed progressivity patterns in the wealth effects of using formal LTC can be linked to public policies and suggestions for increasing vertical equity in LTC financing can be deduced.

[2] Cremer & Roeder (2013) and other studies argue there might also be a role to play for private LTC insurance. However, private LTC insurance is marginal in most countries and so was left out of this analysis.

[3] Including 21 studies from the USA, 6 from Canada, 3 from Australia, 2 from the UK, and 1 each from Ireland, Italy, Japan, the Netherlands, New Zealand and South Korea.

Box 2 – Adaptation of Kotlikoff's extension (1986) on the traditional life-cycle model

Suppose again that there are two periods in life: young and old.

Consumption is now allowed to vary between the two periods, though it can never exceed the wage earned when young (old-age income as well as initial assets are ignored).

C_y = consumption when young
C_o = consumption when old
W = wage when young
$U(C_y)$ = utility of C_y
$U(C_o)$ = utility of C_o
β = time preference rate
$R = \frac{1}{1+r}$, where r is the (assumed to be constant) interest rate

Consider the expected utility in the base case scenario, EU^a:
(1) $EU^a = U(C_y) + \beta U(C_o)$
s.t. (2) $C_y + RC_o = W$

Maximising the optimization problem implies that C_y is chosen such that:
(3) $U'(C_y^a) = \beta U'(\left(\frac{[W-C_y^a]}{R}\right)/R)$

Now consider a scenario in which people face a risk of having to pay for LTC.

P = risk of needing LTC, with $0 < P \leq 1$
e = (co-)payment for LTC > 0*

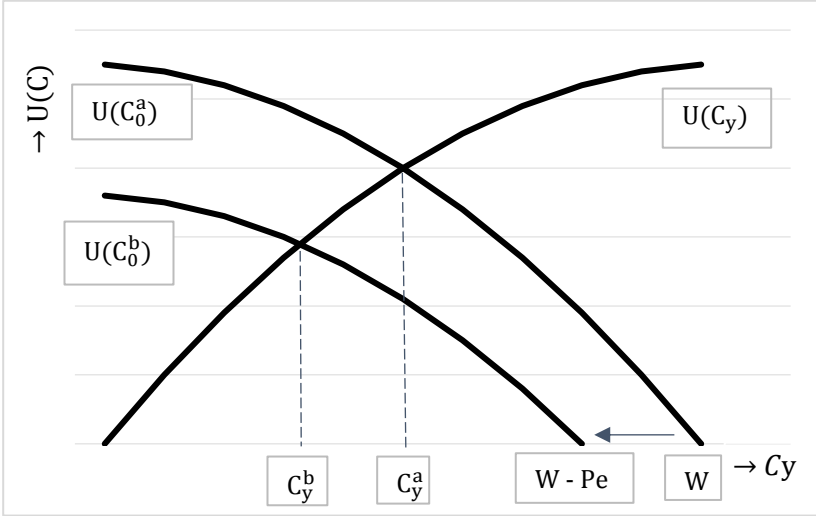
(4) $EU^b = U(C_y) + P\beta U(C_o - e) + (1-P)\beta U(C_o)$
s.t. (2)

The first-order condition is:
(5) $U'(C_y^b) = P\beta U'(\left(\frac{[W-C_y^b]}{R} - e\right)/R) + (1-P)\beta U'(\left(\frac{[W-C_y^b]}{R}\right)/R)$

Assuming that
(6) $\frac{\delta U(C_y)}{\partial C_y} > 0$ and $\frac{\delta U(C_y)}{\partial C_y \partial C_y} < 0$
(7) $\frac{\delta U(C_o)}{\partial([W-C_y]/R)} > 0$ and $\frac{\delta U(C_0)}{\partial([W-C_y]/R)\partial([W-C_y]/R)} < 0$,
Figure 1A shows that the introduction of the LTC risk decreases consumption when young, which increases savings:

(8) savings $S = W - C_y$
(9) $C_y^b < C_y^a$
(10) $S^b > S^a$

Figure 1A – Effect of introducing LTC risk



* If co-payments were set to zero, $P\beta U(C_o) + (1-P)\beta U(C_o)$ would collapse to $\beta U(C_o)$ and no changes in consumption and saving behavior would be observed.

2. Description LTC systems

2.1 Introduction

This chapter describes the LTC policies in each country that might affect vertical equity in the financing of formal LTC. Policies contributing to protection against large financial shocks for all LTC-users (i.e., without any pro-poor effects) are also mentioned. The following topics are discussed:

- cost-sharing arrangements
- informal care policies

2.1.1 Cost-sharing arrangements

While private co-payments by patients are desirable to prevent overconsumption due to moral hazard-effects (Manning et al., 1987), cost-sharing can have inequitable consequences if ability-to-pay is not taken into account. That is, the same amount of private payments constitutes a relatively larger burden for poor than for rich people. The height of payments might therefore be adjusted according to ability-to-pay. Note that adjusting based on income could still have inequitable consequences in terms of wealth. For example, co-payments might be calculated to be a certain share of income. If the share of income left over after LTC payments does not cover their remaining expenses, poor people might have to tap into their savings and decrease their wealth. If, at the same time, rich people do not need to reduce their wealth (their left-over share of income is higher in absolute terms), wealth inequality is increased. In the descriptions below, the word 'means-tested' indicates that income as well as wealth are taken into account.

2.1.2 Informal care policies

Though there is some dispute in the literature whether informal care is a substitute or a complement for formal care, the general finding is that for relatively low care needs, informal care works as a substitute (Bolin et al., 2007; Bonsang, 2009; Geerts & van den Bosch; 2011; Balia & Brau, 2014). This could mean that policies encouraging informal care use (e.g., offering support for informal carers, whether financial or in-kind) make it easier for dependent elderly to opt for informal care instead of formal care. They may then be able to forego the hefty costs that sometimes come with formal care and be protected against large financial shocks. Vertical equity may be increased if relatively more poor households opt for informal care.

2.2 Cost-sharing arrangements

2.2.1 Flanders and Austria

Austria and Flanders both provide in-kind healthcare (including medical LTC) through a public healthcare insurance, whilst non-medical LTC is subsidised through other programmes. In Flanders, total yearly private payments for healthcare are capped through income-dependent maxima. There is also a reimbursement system in place for low-income patients. To enable the purchasing of non-medical LTC, a means-tested cash benefit that varies with disability status is available to people over 65. Individuals in need of LTC who are younger than 65 can apply for an income- and social situation-dependent *income replacement allowance*; if they are below a certain income threshold an additional disability-dependent benefit is available. Vouchers that significantly reduce the labour costs for (non-medical) home care services can be used by all LTC patients. Some patients receive further subsidies for home care, for which eligibility depends on standardised income and care needs. An additional public LTC insurance was set up in 2001[4], which pays a monthly flat-rate cash benefit regardless of financial resources. It is available to all people assessed sufficiently dependent and is intended to provide additional support for people needing LTC. (See Willemé (2010) for a detailed description of the Flemish LTC system.)

Austria's public healthcare services are extensive and come with limited co-payments, co-payment exemptions for low-income patients, and a cap on pharmaceutical expenses. Patients wanting to purchase non-medical LTC are aided by a cash benefit that depends on disability status[5]. In 2008, an additional cash benefit varying with standardised income was introduced for patients in need of 24-hour care. Non-medical LTC costs beyond what the cash benefit can cover are to be borne by the patient. Nonetheless, payments may be reduced and generally come with some form of means-testing, though the arrangements vary per region. (See Riedel & Kraus (2010) for a detailed description of Austria's LTC system.)

2.2.2 Germany and the Netherlands

Germany and the Netherlands provide LTC through a public LTC insurance scheme. Patients can choose between in-kind services or cash benefits. In Germany, in-kind services are covered up to a fixed amount, after which costs are fully borne by the patient. Cash benefits are 50% lower than the monetary value of covered in-kind services and depend on the level of care needed as well as whether the patient wishes to receive informal home care, formal home care, or institutional care. Those unable to cover out-of-pocket

[4] Contributions are compulsory for Flemish residents; in the Brussels region the insurance is optional.
[5] Although the majority of patients receive this benefit from the federal government, some receive their benefit from their provincial government.

payments can apply for social assistance. (See Schulz (2010) for a detailed description of Germany's LTC system.)

In the Netherlands, cash benefits can only be used to purchase home care and are 25% lower than the value of in-kind services covered. The height of the cash benefit depends on the care needed. All patients pay a contribution towards the care they receive, which has set minima (depending on the type of care received) as well as income-dependent maxima[6]. Assistance with domestic tasks was excluded from the public insurance from 2007 onwards[7]. It is now provided by the municipalities, who have some freedom in setting co-payments – though they cannot exceed a set maximum. (See Mot et al. (2010) for a detailed description of the Dutch LTC system.)

2.3 Informal care policies

2.3.1 Flanders and the Netherlands

Flanders has extensive informal care provisions. It provides up to 12 months of paid leave, and caregivers receive an additional cash benefit. The use of informal care is high in Flanders, though so is the use of formal care. In the Netherlands, employees can take paid leave for up to 10 days and unpaid leave for a maximum of 6 times the weekly working hours every 12 months. The Netherlands has a strong tradition of formal care use instead of relying on social support; informal care use is very low.

2.3.2 Germany and Austria

In both Germany and Austria care has historically been provided informally. German policy aims to incentivise informal care-giving indeed. The public insurance covers only basic needs and further support is expected to be provided by relatives. Though paid leave is not provided, unpaid leave can be taken up to 6 months. An additional allowance is available for caregivers who are not already being paid through the cash benefit the dependent is receiving. Cash benefits are predominantly chosen over in-kind care (Schulz, 2010) and formal care use in Germany is among the lowest in Europe. In Austria, paid leave is provided for up to 10 days but unpaid leave is only possible when caring for a terminally ill person. Working part-time instead of full-time to care for relatives is possible for up to 24 months. Critique has been voiced that there is a lack of transparency about service provision and eligibility at the regional level (Riedel & Kraus, 2010).

[6] From 2013 onwards, household assets were also incorporated in the assessment to determine the height of co-payments.

[7] From 2015 onwards, all healthcare-related LTC was also excluded from the public insurance scheme and incorporated in the regular healthcare arrangements. The data set, however, does not go beyond 2013.

See Chapter 4 of Francesca et al. (2011) for more detail about provisions for informal care-giving in Europe.

3. Hypotheses

In the following, the expected cumulative effect of each country's LTC policies is described. 'Progressive' means that wealthier people are expected to experience larger wealth effects in proportional terms. Any policy that does not take ability-to-pay into account is assumed to have a regressive effect. For non-means-tested payments, the rationale is that the same absolute payment may have a bigger wealth effect for poorer people. Similarly, when subsidies are independent of ability-to-pay, this means that any residual costs not covered by the subsidy are the same for everyone and so constitute a heavier burden for the less well-off.

3.1 Austria

TABLE 3A – Overview relevant policies Austria

Policy	**Description**	**Expected effect**
Cost-sharing		
Medical LTC covered through public insurance	Co-payments mostly not means-tested, but they are limited; cap on pharmaceutical expenses	Regressive
Non-medical LTC subsidised but residual costs borne by user	Co-payments may be means-tested but this is not nationally regulated	Unknown
Benefits		
Cash benefit for non-medical LTC	Not means-tested	Regressive
24-hour care benefit	Only people below income threshold are eligible	Protection low-income groups
Informal care		
Paid leave	Up to 10 days	
Unpaid leave	Only when caring for terminally ill person	
Flexible hours	Working part-time instead of full-time for up to 24 months	

Healthcare co-payments, although regressive (Sanwald & Theurl, 2015), are small and so not expected to have much effect. Patients needing full-time care are a minority of the total population of LTC users and so the effect of the 24-hour cash benefit is also expected to carry relatively little weight. The universal cash benefit for non-medical LTC is independent of financial resources and therefore expected to work regressively. This, however, may be mitigated by means-tested payments. Means-tested payments for LTC services are not regulated nationally in Austria and little data is available, so it is unknown how

widespread their use is and how progressive they are. The overall expected effect of Austria's LTC policies on the progressivity in the wealth effects of formal LTC use is ambiguous.

3.2 Flanders

TABLE 3B – Overview relevant policies Flanders

Policy	**Description**	**Expected effect**
Cost-sharing		
Medical LTC covered through public insurance	Income-dependent maxima on yearly healthcare payments; reimbursement for low-income groups	Protection for all
Non-medical LTC subsidised but residual costs borne by user		Regressive
Benefits		
Cash benefit (≥ 65)	Means-tested, for individuals ≥ 65	Proportional
Additional Flanders-specific cash benefit	Flat-rate, not means-tested	Regressive
Income replacement allowance (< 65)	Income- and social situation-dependent, for individuals < 65	Protection for all
Additional < 65 cash benefit	Only people below income threshold are eligible, for individuals < 65	Protection low-income groups
Subsidy labour costs	Not means-tested	Regressive
Additional subsidies labour costs	Only people below income threshold are eligible	Protection low-income groups
Informal care		Protection for all
Paid leave	Up to 12 months uninterrupted leave, up to 5 years interrupted leave	
Cash benefit for care-givers	Amount varies per region	

In Flanders, many measures are in place to protect poorer households from financial shocks due to formal LTC use. Healthcare expenditures can get reimbursed, everyone below a certain income threshold gets the maximum cash benefit for their disability level, and high subsidies are available to enable paying for home carers. Less poor LTC users seem to be protected too. Maximum yearly healthcare payments are small. The calculation of the means-tested benefits is mostly done in a proportional manner. The flat-rate

allowance from the public LTC insurance as well as the vouchers severely reducing labour costs are available to all LTC users, regardless of financial resources. Informal care provisions are extensive, which enables households to opt for informal instead of formal care, allowing them to avoid the high costs associated with formal LTC. Although worries have arisen about the financial protection of elderly people having to enter a nursing home, nursing home residents form a minority of the population of LTC users. The expectation is to see no significant effect of LTC use on wealth for any of the quantiles.

3.3 Germany

TABLE 3C – Overview relevant policies Germany

Policy	**Description**	**Expected effect**
Cost-sharing		
Basic LTC needs covered through public insurance	Choice between cash or in-kind benefits	Protection for all
Non-basic needs not covered	Co-payments not means-tested	Regressive
Benefits		
Social assistance	Only people below means-threshold are eligible	Protection for limited-means groups
Informal care		Protection for all
Unpaid leave	Up to 6 months	
Cash benefit for care-givers	Only if care-giver is not being paid through the cash benefit the dependent receives	

The coverage of basic needs and the availability of social assistance for those struggling with private payments imply that poorer individuals are protected from severe wealth effects of LTC use. The encouragement of informal care-giving, like in Flanders, allows people to avoid the high formal LTC payments and is expected to contribute to the financial protection of all LTC users. However, the fact that co-payments for non-covered care are not means-tested, suggests German policy may have a regressive effect. Overall, the effect of LTC use on wealth is expected to be regressive, but small.

3.4 The Netherlands

TABLE 3D – Overview relevant policies Netherlands

Policy	**Description**	**Expected effect**
Cost-sharing		
LTC needs mostly covered through public insurance	Choice between cash or in-kind benefits	Protection for all
Most covered LTC comes with co-payments	Payments have income-dependent minima and maxima	Regressive
Assistance with domestic tasks not covered through the public insurance from 2007 onward	Co-payments are capped and can be means-tested, arrangements vary per region	Unknown
Informal care		
Paid leave	Up to 10 days	
Unpaid leave	Up to a maximum of 6 times the weekly working hours every 12 months	

Although most formal LTC in the Netherlands is covered, all care comes with co-payments. Between the set minima and maxima, the co-payment is calculated as a share of income. Due to the fixed minimum co-payment amounts, low-income groups may be paying a relatively larger share of income, whilst high-income groups may be paying a relatively lower share of income as a result of the maximum co-payment amounts. Moreover, given that the distribution of wealth is generally found to be more strongly skewed to the right than income (and that income and wealth are strongly related), a certain share of income may constitute a larger proportion of total ability-to-pay for poorer households than wealthier ones (Jantti et al., 2008). The Dutch policy is therefore expected to work regressively.

3.5 Summary

(1) HYPOTHESIS AUSTRIA: The effect of LTC use on wealth along the wealth quantiles is ambiguous.
(2) HYPOTHESIS FLANDERS: LTC use is not expected to significantly affect the wealth of LTC users.
(3) HYPOTHESIS GERMANY: The effect of LTC use on wealth is expected to be regressive but small.
(4) HYPOTHESIS NETHERLANDS: The effect of LTC use on wealth is expected to be regressive.

4. Methods

4.1 Data

The Survey of Health, Ageing and Retirement in Europe (SHARE) was used[8]. This is a Europe-wide database of individuals older than 50, with extensive information on health, socioeconomic status, and social and family networks. Five waves are available to researchers, which were conducted in 2004[9], 2007, 2009, 2011 and 2013. Where possible, individuals and their spouses have been followed over time. To make up for attrition, supplementary samples were taken at each follow-up wave. The 2009-wave focuses on family background and childhood events, and was not used for this study. The other waves are similar but vary due to iterative adaptation of the questionnaire. This study makes use of the Harmonised SHARE panel data set, which combines and streamlines the 4 waves of interest.

4.2 Country selection

Deciding which countries to include in the analysis was done through elimination. Not all European countries take part in the SHARE project and not all participating countries conducted the 4 waves of interest. The countries with data for all 4 waves are: Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden and Switzerland. In Denmark, France, Italy, Sweden and Switzerland, the governance of LTC is largely regionalised (Schulz, 2010; Joël et al. 2010; Tediosi & Gabriele, 2010; Fukushima et al., 2010; Francesca et al., 2011). The possibilities for regional-level analysis are restricted due to SHARE's limited sample size for each country. Yet national-level analysis in these countries would not allow for explaining the results with reference to the LTC policies in place. Spain first introduced comprehensive LTC legislation midway through the data set (January 2007) and is still working on the gradual implementation of various policies, leading to a similar problem with the interpretation of the results (Fernanda Guttiérrez et al., 2010). These countries were excluded from the analysis. Policy in Belgium differs between Flanders and Wallonia. Splitting them up led to the Wallonian data set having too little observations, hence only Flanders was included in the final analysis.

4.3 Variables

4.3.1 Ln(wealth) and LTC use

The dependent variable is ln(wealth). The natural logarithm was used because the main research interest was *relative* changes in wealth for LTC users. Taking the log of a skewed variable like wealth also

[8] See Börsch-Supan et al. (2013) for methodological details. The SHARE data collection has been primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: N°227822, SHARE M4: N°261982). Additional funding from the German Ministry of Education and Research, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

[9] 2005 in Belgium

renders it more normally distributed, making the Multiple Linear Regression assumptions more likely to hold. Wealth is defined as standardised total household worth and can be computed from wealth- and income-related questions in the SHARE questionnaire. Nominal euro values were adjusted to real values using yearly consumer price indices. Imputation methods were used, either to create single values for bracket indications, or to fill missing values. Total household worth was standardised to enable individual-level analysis, which was done through dividing it by the square root of household size. This standardisation method has been argued to be inappropriate for larger households, since not everyone might enjoy wealth to the same extent (OECD, 2013). As most households in the samples consisted of two or less people (from 82% in Flanders up to 88% in Austria), this was not deemed an issue.

The main regressor of interest is a dummy variable taking value 1 if the respondent indicates to have used formal long-term care in the previous 12 months. The dummy was constructed based on various questions (changing slightly over the different waves) regarding the use of formal care at home or in institutions. Other regressors were used to control for factors expected to be related to formal LTC use as well as to wealth, in order to avoid biased estimation.

4.3.2 Gender and Age

A considerable literature describes the existence of wealth differences by gender (e.g. Ozawa & Lee, 2006; Yamokoski & Keister, 2006; Ruel & Hauser, 2013), and gender differences in formal LTC use appear to be present too (European Commision, 2009; Gruneir et al, 2013; Mudrazija et al., 2015). LTC use has been found to increase with age (de Meijer et al., 2009), and greatly increase near-death (Weaver et al., 2009). Wealth and age are also expected to be positively related, for living longer allows for more saving (assuming income to be greater than expenses and ignoring exogenous wealth shocks)[10]. Yet, as discussed in Section 1.4, people typically starting dissaving after a certain point. Age² was included as a control variable to account for these non-linearities.

4.3.3 Income and Education

Standardised income (in real euros, using the same standardisation method) and years of education were included to capture socioeconomic status. Socioeconomic status has been shown to be related to wealth as

[10] A complicating factor might be that age also represents cohort. For instance, individuals born before the Second World War may have suffered more hardships and significantly lower real incomes than individuals born after. Therefore, although these individuals are older and so have had longer to save, their cohort, on average, might be poorer than some of the younger cohorts. The longitudinal structure of the data set partly overcomes this issue: the same households are followed over time, meaning that the 'age' variable partly captures the effect of age on wealth within households as opposed to just across households.

well as use of care (Allin et al., 2009; Motel-Klingebal et al., 2005; Bonsang, 2009). Note that, before retirement, income largely reflects one's returns to labour (which is generally deemed an indicator of socioeconomic status). After retirement, income usually consists of public and private pension benefits. Whilst public pension benefits are not related to pre-retirement income (which reflects socioeconomic status), private pensions benefits are. That is, even after retirement, income reflects socioeconomic status.

4.3.4 Changes in household size and Living alone

'Changes in household size' was included as a regressor for its importance in explaining standardised household wealth. A reduction in household size, for instance, means that total household wealth is shared by less people and that standardised wealth increases. It can also mean that less informal support is available so that formal care is resorted to. Leaving this control variable out could therefore lead to a spurious positive relationship when regressing standardised wealth on formal care use. 'Changes in household size' is defined as a dummy variably taking value 1 if the household size in the current wave is different to the household size in the previous one. The 'Living alone' (dummy) variable, though similar, was included for its different relationship with wealth. Due to economies of scale in household size, having lived alone for a long time (rather than changing to a one-person household after, for example, a death) may be negatively related to wealth.

4.3.5 Health indicators

Health indicators were also added, for health was expected to be related to formal LTC use as well as wealth. Examples of how poor health might affect wealth are: expenses beyond those for formal LTC; reduced cognitive capacity to make wise investment decisions, or purposely altered financial decisions as a result of the perceived health status (Turra & Mitchell, 2002; Atella et al., 2012); a reduced ability to generate and save income. Conversely, individuals that are restricted due to their health might decrease consumption, therewith increasing savings[11].

LTC use has been found to be determined by measures of disability more than indicators of general (self-reported) health status (de Meijer et al., 2009). The number of limitations in activities of daily living (ADLs)[12] was included to capture physical disability. Limitations in instrumental activities of daily living

[11] Indeed, it has been estimated that marginal consumption of utility decreases as health deteriorates (Finkelstein, 2013).

[12] ADLs included were: walking across a room; dressing; bathing/having a shower; eating; getting in/out of bed; using the toilet.

(iADLs)[13] are strongly correlated with cognitive impairment (Jekel et al., 2015; Makizako et al., 2015) and so were included to capture mental disability[14]. The number of chronic diseases was also included (Lehnert et al., 2011).

4.4 Data preparation

In the 2011-wave, an important question for constructing the formal LTC dummy, asking whether respondents were using formal home care, was left out. For the regression analysis, it was assumed that those who indicated using formal LTC in the 2007-wave kept doing so in the 2011 one, whilst respondents indicating LTC use in 2013 were assumed not to have already started in 2011[15].

As the question at hand was the effect of LTC use on wealth *per wealth quantile*, the initial wealth quantile-classification had to be uncontaminated by the effects LTC use might have previously had on wealth. Therefore, all respondents who indicated that they or their spouses were already using LTC, or who had missing values for the LTC variable upon entering the data set, were excluded from the regression analysis. As the formal home care use of the 2011-resampling cohort was unknown, all respondents from this cohort were excluded. The 2013-cohort was also excluded. The real wealth of the 2004-cohort in 2004 and the 2007-cohort in 2007 were pooled together into an overall wealth distribution to enable splitting up the sample according to wealth quantiles.

4.5 Analysis

Fixed effects (FE) estimation was used to account for the panel nature of the data set. In panel data, serial correlation in the error terms often occurs, due to the observations not being independently distributed over time. FE models are better able to account for this than ordinary least squares (OLS) models. FE estimation was also favoured over random effects (RE) estimation, as the RE assumption of zero correlation between the individual fixed effects and the regressors was expected to be violated[16]. First-differencing was deemed inappropriate because of the small number of different time observations.

[13] iADLs included were: using a map; using a telephone; managing money; taking medications; grocery-shopping; preparing hot meals.

[14] Although some measures of cognitive performance (e.g. a word recall task) were included in the SHARE survey, these were insufficient to construct a variable in line with accepted instruments to test for cognitive impairment.

[15] Though it is impossible to identify which ones, some of the 2013-LTC users may have already been using formal LTC in 2011. These individuals are now classed as non-users in the 2011-wave. If they had already experienced negative wealth effects as a result of their care use at this point, they lower the mean wealth in the non-user group, which reduces the difference in wealth between users and non-users at the 2011 measurement. The analysis might therefore have underestimated the relative wealth changes for formal LTC users.

[16] The Breusch-Pagan Lagrange Multiplier test and Hausman test were applied and pointed in the direction of FE estimation indeed. See Appendix A.1.

Ln(wealth) was regressed on the independent variables described above, both for the full sample in each country and for the separate wealth tertiles. Tertiles were used because the sample size in each quantile would otherwise get too small[17]. A negative value for the regression coefficient for the LTC dummy means that users of formal LTC, on average, have lower wealth than non-users, even after controlling for relevant covariates. A more strongly negative value in a higher wealth tertile means that wealth is relatively more affected for richer people, implying progressivity.

[17] The first quartile in Austria would have just 312 respondents and 728 observations.

5. Results[18]

5.1 Descriptive statistics

The descriptive statistics for each country are displayed in Table 5A. Mean wealth is high in Flanders and the Netherlands but has a large standard deviation in both countries, meaning that there is great variation in wealth. The Austrians are poorest on average. The percentage of elderly living alone is relatively high in Austria. The percentage of females is also higher in the Austrian sample. Elderly in the Netherlands seem to be healthiest, with the lowest mean values for (i)ADL limitations and chronic diseases. The slightly lower mean age in the Dutch sample might play a role in this. Formal care use is relatively high in Flanders and the Netherlands, and low in Germany. These formal care use patterns are in line with previous findings (e.g. Kraus et al., 2013).

Table 5A – Descriptive statistics*

	AUSTRIA	FLANDERS	GERMANY	NETHERLANDS
Proportion using formal LTC	0.07	0.15	0.04	0.12
Age *standard deviation*	65.6 *9.47*	64.6 *9.99*	64.2 *9.54*	63.2 *9.69*
Proportion female	0.59	0.54	0.54	0.54
Years of education *standard deviation*	10.4 *3.92*	9.6 *3.54*	13.1 *3.26*	11.3 *3.49*
Income (€10,000s) *standard deviation*	2.72 *2.49*	2.45 *3.37*	3.01 *3.01*	3.10 *2.54*
Wealth (€10,000s) *standard deviation*	11.8 *21.9*	28.5 *69.9*	16.3 *36.1*	22.0 *61.2*
Household size *standard deviation*	1.86 *0.87*	2.10 *0.85*	2.06 *0.82*	2.08 *0.80*
Proportion living alone	0.34	0.20	0.19	0.17
# ADL limitations *standard deviation*	0.19 *0.68*	0.18 *0.65*	0.16 *0.63*	0.14 *0.62*
# iADL limitations *standard deviation*	0.07 *0.33*	0.07 *0.35*	0.05 *0.32*	0.05 *0.30*
# Chronic diseases *standard deviation*	1.34 *1.24*	1.59 *1.40*	1.49 *1.41*	1.33 *1.36*

* The descriptive statistics are based on the 2004- and 2007-cohorts upon their respective first data set entries, pooled together into a single sample.

	AUSTRIA	FLANDERS	GERMANY	NETHERLANDS
Sample size 2004-cohort	1475	2369	2847	2743
Sample size 2007-cohort	0	0	850	708

[18] A particular caveat deserves mentioning in advance: although sometimes the wealth 'effect' of using formal LTC is referred to, regression analysis is technically only equipped to detect association, not causation. The term 'effect' is used for ease of reading.

5.2 Full sample regression

Table 5B displays the regression results for the full sample in each country. As FE estimation does not allow for estimating the coefficients on time-constant variables, no coefficients are shown for the gender and 'years of education' variables. Using formal care and wealth are not significantly related in Germany and Austria. The relation is positive in Belgium, and negative in the Netherlands, and the effect of formal LTC use appears relatively large in both countries. On average, formal LTC use is associated with 22% higher wealth in Flanders and 23% lower wealth in the Netherlands[19]. In all countries, age and wealth are positively related, while age² and wealth are negatively related. This implies a parabolic function with a maximum, in line with the idea that people build op wealth throughout their lives but start dissaving after a point. Income and wealth are also positively related but with varying degrees of significance across the countries. The coefficients vary between 0.011 and 0.032, meaning that an increase in yearly standardised income of around €10,000 is associated with between 1.1% and 3.2% higher wealth. Changes in household size and wealth are positively related in Flanders and Germany, with relatively large coefficients. This may be caused by decreases in household size being more common than increases; total household wealth is then shared by less people, increasing the value for standardised wealth. Some of the (i)ADL indicators are significantly negatively related with wealth, indicating that an additional (i)ADL limitation is associated with a decrease in wealth.

[19] Flanders: $e^{0.197} - 1 = 0.217$
Netherlands: $e^{-0.267} - 1 = -0.234$

Table 5B – Full sample regression**

	AUSTRIA	FLANDERS	GERMANY	NETHERLANDS
respondents observations	1,329 3,397	1,942 5,462	3,411 6,933	2,909 7,093
intercept	2.977 (2.528)	7.538 (1.019)	6.035 (1.637)	8.320 (1.043)
LTC	-0.229 (0.174)	**0.197** (0.060)	0.015 (0.123)	**-0.267** (0.072)
Age	**0.268** (0.075)	**0.103** (0.031)	**0.180** (0.049)	**0.072** (0.032)
Age²	**-0.002** (0.001)	**-0.001** (0.000)	**-0.002** (0.000)	-0.000 (0.000)
Income	0.021 (0.022)	**0.012** (0.003)	**0.032** (0.010)	**0.011** (0.005)
Living alone	0.033 (0.150)	-0.069 (0.078)	0.066 (0.118)	-0.137 (0.080)
ΔHousehold size	0.139 (0.106)	**0.150** (0.047)	**0.169** (0.072)	0.006 (0.048)
ADL limitations	-0.060 (0.074)	**-0.082** (0.037)	**-0.108** (0.048)	-0.033 (0.044)
iADL limitations	**-0.416** (0.140)	-0.029 (0.061)	0.174 (0.089)	**-0.169** (0.079)
Chronic diseases	-0.031 (0.033)	-0.004 (0.015)	0.010 (0.022)	0.009 (0.016)

** **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

5.3 Tertiles regression

Although the full sample regression demonstrates how the regressors are related to ln(wealth) for each country, it does not show the progressivity patterns in the wealth effects of formal LTC use. For this purpose, the LTC-coefficients from the tertiles regression are shown in Table 5C. The full results are displayed in Appendix A.2. Note that directly comparing these coefficients neglects any differences in the intensity of care use between the tertiles.

In Austria, the LTC-coefficient for the first tertile is insignificant. The other two coefficients are increasingly large. It appears, then, that the Austrian policy of reducing LTC payments based on means has a progressive effect overall. Whilst richer LTC users face substantial decreases in wealth, the wealth of poorer people is not significantly affected by LTC use. Nonetheless, there may be regional variation, as co-payment arrangements are not regulated nationally. The insignificant coefficient for the full sample regression seems to have been the result of heterogeneity in the LTC effect along the wealth distribution.

Flanders' results are as hypothesised for the upper two tertiles: LTC use is not significantly associated with any changes in wealth. For the first tertile, a large positive correlation appears between LTC use and

wealth, which seems to have driven the positive coefficient in the full sample regression. This result is surprising and will be analysed in the next section.

Table 5C – Tertiles regression***

	1ST TERT	2ND TERT	3RD TERT
AUSTRIA			
respondents observations # observations/respondent	426 1,039 2.4	450 1,172 2.6	451 1,182 2.6
LTC coefficient	0.214 (0.399)	***-0.520*** (0.292)	**-0.561** (0.194)
FLANDERS			
respondents observations # observations/respondent	643 1,714 2.7	646 1,857 2.9	645 1,881 2.9
LTC coefficient	**0.628** (0.154)	-0.072 (0.063)	0.012 (0.072)
GERMANY			
respondents observations # observations/respondent	1,088 2,036 1.9	1,161 2,419 2.1	1,160 2,475 2.1
LTC coefficient	0.177 (0.326)	-0.046 (0.171)	-0.032 (0.120)
NETHERLANDS			
respondents observations # observations/respondent	947 2,127 2.2	981 2,446 2.5	980 2,519 2.6
LTC coefficient	**-0.451** (0.157)	**-0.242** (0.103)	**-0.206** (0.101)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01.
Standard errors are displayed in brackets.

Contrary to the hypothesis of regressivity, users of formal LTC experience no significant wealth effects in Germany. Further analysis follows below. For the Netherlands, the tertiles regression shows decreasing LTC-coefficients, which was expected because of the income-dependent minima and maxima to co-payments.

The average number of observations per respondent is reported as well, which gives an indication of how long individuals stay in the data set. In all countries the value is lowest in the first tertile, implying there is relatively more attrition among poorer people. How this might bias the analysis is discussed in Section

6.1. Flanders has the highest values for all tertiles, meaning that respondents in the Flanders sample, on average, continue taking part in the SHARE project for longest.

Table 5D – Disability LTC users

	AUSTRIA	FLANDERS	GERMANY	NETHERLANDS
Severity of disability among LTC users[×]	6.5	4.7	7.9	6.0

[×] Defined as 'mean number of ADL limitations among LTC users' / 'mean number of ADL limitations among full sample'.

Table 5D shows that the average disability among LTC users is highest in Germany. This is in line with the strict, disability-focused eligibility requirements to receive public LTC. It might be the case that most of the elderly who are not eligible for public LTC, or only for limited public LTC coverage, anticipate the financial consequences they would face if they were to use formal care, and opt for informal care instead (which is indeed encouraged by the German government). Only the cases who will receive sufficient coverage (due to their severe disabilities, and perhaps also because of the means-tested social assistance) may be choosing formal care. This could explain the absence of any wealth effects for users of formal LTC in Germany (despite the regressive policy of residual cost-sharing).

5.4 Quintiles regression Flanders

To further investigate the large positive coefficient for Flanders' bottom tertile, the sample was split into quintiles[20]. The results displayed in Table 5E show that the positive effect is strongly driven by the very poorest. As the wealth measure is partly constructed from the self-reported value of the primary residency, it was hypothesised that the positive coefficient might be caused by poor LTC users having to sell their homes but receiving more than they thought it was worth (and so more than they reported in the wave prior to the onset of LTC use). However, a regression excluding those who had sold their homes over the study frame provided no evidence for this. See Appendix A.3.1. Excluding all individuals who had had negative wealth or income at some point during the study frame did not make the positive wealth effect for poorer LTC users disappear either (Appendix A.3.2).

[20] Making smaller quantiles was not deemed appropriate, due to the increasingly small sample size per quantile.

Table 5E – Quintiles regression Flanders****

	1ST QUINT	2ND QUINT	3RD QUINT	4TH QUINT	5TH QUINT
respondents observations	383 969	387 1,095	388 1,114	389 1,131	386 1,140
LTC coefficient	**1.075** (0.256)	-0.049 (0.100)	-0.095 (0.079)	0.041 (0.073)	-0.009 (0.096)

**** **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

Table 5F shows for each wealth quintile in Flanders: severity of disability and mean and median income for LTC users, as well as mean and median income for non-users. Mean income for LTC users in the first quintile is higher than mean income in any other quintile, and also seemingly much higher than mean income for non-users within the same quintile. Median income for LTC users in the first quintile is second-lowest, implying that the high mean value for this quintile is caused by a small group with relatively large income. Note that the LTC users in the lowest quintile receive this highest average income despite not having the highest care needs, as judged by their average level of disability. Also, when compared to LTC users of similar disability, LTC users with low means are entitled to a considerably higher level of cash benefits than other, richer, LTC users (see Section 3.2). Poorer LTC users may, however, be used to a lower standard of living than LTC users in the other wealth quintiles and simply save up part of the cash benefits received.

Table 5F – Comparison income per quintile Flanders[!]

		1ST	2ND	3RD	4TH	5TH
LTC users	severity disability (rank)	**5.3 (3)**	6.4 (1)	5.6 (2)	2.8 (4)	2.6 (5)
	mean income[xx] (rank)	**4.81 (1)**	3.21 (5)	4.60 (3)	4.66 (2)	3.98 (4)
	median income (rank)	**1.99 (4)**	1.62 (5)	2.30 (2)	2.04 (3)	2.75 (1)
	standard deviation	*6.26*	*4.71*	*5.55*	*5.83*	*4.86*
Non-LTC users	mean income (rank)	**2.78 (5)**	3.29 (2)	3.21 (3)	3.17 (4)	4.12 (1)
	median income (rank)	**1.50 (5)**	1.68 (4)	2.02 (3)	2.19 (2)	2.65 (1)
	standard deviation	*4.22*	*5.08*	*3.99*	*4.07*	*5.53*

[!] Income in €10,000s.

5.5 Expressing in euros per year

Table 5G – Mean wealth per tertile[!!]

	1ST TERT	2ND TERT	3RD TERT
AUSTRIA	0.76	6.16	15.8
FLANDERS	4.99	21.1	41.5
GERMANY	0.83	8.67	25.9
NETHERLANDS	1.06	13.2	34.1

[!!] Wealth in €10,000s.

Table 5G displays the wealth per tertile. The mean wealth was calculated by taking the exponential of mean ln(wealth). This procedure renders the geometric (as opposed to the arithmetic) mean of wealth, which is a measure of central tendency and so comparable to the median. Older people in Flanders appear richest, with an especially striking difference with the other countries in the first tertile. Table 5H expresses the changes in wealth that users of formal LTC experience in euros per year. Several assumptions had to be made, so the numbers are best interpreted as approximations. See Appendix A.4 for more detail about the computation methods and the assumptions made.

Table 5H – Change in wealth[!!!] experienced by LTC users, in euros/year***

	1ST TERT	2ND TERT	3RD TERT
AUSTRIA	0.07	***-0.95***	**-2.67**
FLANDERS	**1.65**	-0.54	0.18
GERMANY	0.06	-0.14	-0.32
NETHERLAND S	**-0.15**	**-1.08**	**-2.47**

[!!!] Wealth in €10,000s/year.
*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01.

The wealth effects of LTC use in euros per year are similar for the second and third tertile in Austria and the Netherlands. The greater relative effects for Austria seen in Table 5C, are explained by the lower average values for initial wealth in Austria. The large relative effect for LTC users in the bottom tertile in the Netherlands appears more modest in absolute euros. The large relative wealth effect for poor LTC users in Flanders, on the other hand, seems large in absolute euros too.

Table 5J shows that the relative difference in mean wealth between the first and second quintile in Flanders is much greater than that between the other quintiles, indicating there is a small group of relatively much poorer people. Given the plethora of Flemish LTC policies targeting just the very poorest

(Table 3B), this finding, too, suggests that there is a group of poor LTC users accumulating wealth as a result of the generous benefits received.

Table 5J – Details wealth in quintiles Flanders****

	1ST QUINT	2ND QUINT	3RD QUINT	4TH QUINT	5TH QUINT
Mean wealth (€10,000s)	2.42	13.9	21.1	30.1	48.9
ΔWealth for LTC users (€10,000s/year)	**1.89**	-0.25	-0.73	0.49	-0.17

**** **Bold underlined**: p-value ≤ 0.01.

5.6 Validity checks

5.6.1 Income

One might worry about biased estimation due to reverse causality between dependent variable ln(wealth) and independent variable income. Higher income might not only increase wealth, wealth can also generate income, for example through interest or dividend payments. Two alternative regressions were run. One replaced income with a dummy variable indicating whether the respondent had retired. Retirement also reflects socioeconomic status (when interpreted as 'the life one lives/can live') but there was not expected to be reverse causality between wealth and retirement status. A second regression simply left the income variable out. As shown in Table 5K, neither of the alternatives considerably affected the main results, suggesting that the income variable was not biasing the original analysis. The full regression results for this validity check as well as the additional ones below, can be found in Appendix A.5.

5.6.2 Nursing homes

Living in a nursing home often comes with high 'board and lodging' costs, with a potentially sizeable effect on wealth. To see if the nursing home residents in the sample were driving the results (whilst home care users, for instance, experienced little changes in wealth), all permanent nursing home residents were dropped from the analysis. Note that a separate dummy variable for permanent nursing home residents was not possible due to their limited appearance in the sample. As can be seen in Table 5L, excluding these observations had little effect on the main results, implying that home care use (as well as brief stays at nursing homes) also has considerable effects on wealth.

5.6.3 LTC use spouse

The wealth variable was standardised to enable individual-level analysis. Yet this measure was derived from total household worth, which is affected by other household members. Failing to control for characteristics of the other household members may have biased the analysis. Formal LTC use by spouses is a particularly important variable. It may affect household wealth as well as whether formal LTC has to be used by the first person, for it could mean informal care cannot be given by the spouse. Not having included formal LTC use by the spouse could therefore have led to the biased estimation of the wealth effects of LTC use. A separate regression with total household wealth as the dependent variable and 'formal LTC use by the spouse' as an additional regressor was not possible, due to the limited number of couples where both partners were using formal LTC in some tertiles[21]. Instead, all couples where both partners were using LTC (or where the partner's LTC use was unknown) were excluded from the analysis. As shown in Table 5M, this changed the size and significance levels of some of the coefficients, but the progressivity patterns remained largely unchanged.

[21] Note that it would only be known that the spouse was using LTC if the spouse had also answered the survey. This means that if only one person in the couple was using LTC, a separate spouse LTC dummy would not be necessary, for the care use would already be captured with the regular LTC dummy.

Table 5K – Validity check Income***

	1ST TERTILE			2ND TERTILE			3RD TERTILE		
	Original model	*Income variable replaced*	*Without Income*	*Original model*	*Income variable replaced*	*Without Income*	*Original model*	*Income variable replaced*	*Without Income*
AUSTRIA									
respondents observations	426 1,039	426 1,039	426 1,039	450 1,172	450 1,172	450 1,172	451 1,182	451 1,182	451 1,182
LTC coefficient	0.214 (0.399)	0.225 (0.398)	0.233 (0.398)	***-0.520*** (0.292)	***-0.523*** (0.291)	***-0.521*** (0.291)	**-0.561** (0.194)	**-0.554** (0.194)	**-0.565** (0.194)
FLANDERS									
respondents observations	643 1,714	643 1,714	643 1,714	646 1,857	646 1,857	646 1,857	645 1,881	645 1,881	645 1,881
LTC coefficient	**0.628** (0.154)	**0.629** (0.155)	**0.631** (0.155)	-0.072 (0.063)	-0.073 (0.063)	-0.073 (0.063)	0.012 (0.072)	0.012 (0.072)	0.011 (0.072)
GERMANY									
respondents observations	1,088 2,036	1,088 2,036	1,088 2,036	1,161 2,419	1,161 2,419	1,161 2,419	1,160 2,475	1,160 2,475	1,160 2,475
LTC coefficient	0.177 (0.326)	0.159 (0.326)	0.159 (0.325)	-0.046 (0.171)	-0.046 (0.171)	-0.045 (0.171)	-0.032 (0.120)	-0.057 (0.121)	-0.056 (0.121)
NETHERLANDS									
respondents observations	947 2,127	947 2,127	947 2,127	981 2,446	981 2,446	981 2,446	980 2,519	980 2,519	980 2,519
LTC coefficient	**-0.451** (0.157)	**-0.449** (0.157)	**-0.451** (0.157)	**-0.242** (0.103)	**-0.242** (0.103)	**-0.241** (0.103)	**-0.206** (0.101)	**-0.210** (0.100)	**-0.208** (0.100)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

Table 5L – Validity check Nursing homes***

	1ST TERTILE		2ND TERTILE		3RD TERTILE	
	Original model	*Without permanent nursing home residents*	*Original model*	*Without permanent nursing home residents*	*Original model*	*Without permanent nursing home residents*
AUSTRIA						
respondents observations	426 1,039	426 1,039	450 1,172	450 1,172	451 1,182	451 1,181
LTC coefficient	0.214 (0.399)	0.214 (0.389)	***-0.520*** (0.292)	***-0.520*** (0.292)	**-0.561** (0.194)	**-0.552** (0.194)
FLANDERS						
respondents observations	643 1,714	642 1,709	646 1,857	646 1,857	645 1,881	645 1,881
LTC coefficient	**0.628** (0.154)	**0.633** (0.156)	-0.072 (0.063)	-0.072 (0.063)	0.012 (0.072)	0.012 (0.072)
GERMANY						
respondents observations	1,088 2,036	1,088 2,036	1,161 2,419	1,161 2,419	1,160 2,475	1,160 2,474
LTC coefficient	0.177 (0.326)	0.177 (0.326)	-0.046 (0.171)	-0.046 (0.171)	-0.032 (0.120)	-0.020 (0.121)
NETHERLANDS						
respondents observations	947 2,127	947 2,127	981 2,446	981 2,446	980 2,519	980 2,516
LTC coefficient	**-0.451** (0.157)	**-0.451** (0.157)	**-0.242** (0.103)	**-0.242** (0.103)	**-0.206** (0.101)	***-0.179*** (0.101)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

Table 5M – Validity check LTC use spouse***

	1ST TERTILE		2ND TERTILE		3RD TERTILE	
	Original model	*Without LTC couples*	*Original model*	*Without LTC couples*	*Original model*	*Without LTC couples*
AUSTRIA						
respondents	426	426	450	450	451	451
observations	1,039	1,037	1,172	1,171	1,182	1,181
LTC coefficient	0.214	0.254	***-0.520***	***-0.479***	**-0.561**	**-0.909**
	(0.399)	(0.411)	(0.292)	(0.294)	(0.194)	(0.222)
FLANDERS						
respondents	643	642	646	646	645	645
observations	1,714	1,658	1,857	1,819	1,881	1,836
LTC coefficient	**0.628**	**0.471**	-0.072	-0.035	0.012	0.046
	(0.154)	(0.181)	(0.063)	(0.075)	(0.072)	(0.086)
GERMANY						
respondents	1,088	1,086	1,161	1,161	1,160	1,160
observations	2,036	2,012	2,419	2,410	2,475	2,453
LTC coefficient	0.177	0.518	-0.046	-0.020	-0.032	-0.110
	(0.326)	(0.359)	(0.171)	(0.188)	(0.120)	(0.139)
NETHERLANDS						
respondents	947	946	981	981	980	980
observations	2,127	2,110	2,446	2,434	2,519	2,482
LTC coefficient	**-0.451**	**-0.420**	**-0.242**	***-0.193***	**-0.206**	**-0.229**
	(0.157)	(0.166)	(0.103)	(0.109)	(0.101)	(0.117)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

6. Discussion

6.1 Summary

The ageing of many Western populations has increased public attention for the sizeable costs of long-term care. There are concerns around the equitable financial protection of elderly against the LTC risk they face. This study seeks to inform the debate by offering evidence on vertical equity in formal LTC financing.

The study has shown that the wealth changes that formal LTC users (as opposed to non-users) experience vary considerably across the examined countries. The poorest group of formal LTC users is protected from negative wealth changes in all countries other than the Netherlands, where the lowest tertile faces a relatively large decrease in wealth. In Flanders, the poorest group of formal LTC users experiences a great increase in wealth. The significant wealth changes in the second and third tertiles are all negative: they are relatively large and slow a slightly progressive pattern in Austria. They are more modest in relative terms in the Netherlands and slightly regressive. Before turning to the policy implications of these findings, a number of limitations to the study will be discussed and suggestions for future research will be made.

6.2 Limitations

An important drawback to the study is the crude measure for formal LTC use. The data contains solely binary information on formal LTC[22], which is why a dummy variable was used. Yet the analysis with the dummy variable only allows for specifying the wealth effects of formal LTC *per se* and ignores intensity of care use (e.g., hours per week). As mentioned previously, directly comparing the coefficients for the LTC dummy from different quantiles, neglects any differences in intensity of care use across the quantiles. Nevertheless, this might in fact be desirable when discussing vertical equity in wealth effects. Individuals from lower socioeconomic groups are generally found to be less healthy and in need of more care. A measure taking into account intensity of care use may therefore provide a different picture on the progressivity in the wealth consequences of LTC use. While the relative wealth effects per hour of care used might be smaller for poorer people, they may still end up with relatively more severely affected wealth overall, due to their high care needs. Depending on the philosophical stance one takes on this, a measure describing the wealth effects of LTC *per se* might be more appropriate.

[22]The 2004- and 2007-waves also asked about intensity of care use ('weeks per year' and 'hours per week') but these questions were subsequently left out. The Harmonised SHARE data set does therefore not contain any information on intensity of care use.

The long lags between the different waves of the SHARE survey (3 years on average) present another issue. Each wave only asks about formal LTC use over the past 12 months. As a result, when trying to express the wealth effects of formal LTC use in euros per year, several assumptions had to be made about LTC use in the period between waves for which no data was available.

Another issue concerns the representativeness of the sample, which may have been jeopardised in 2 ways. Firstly, not all of the individuals who are invited to participate in the survey decide to cooperate. This kind of unit non-response may be non-random (Kalwij, 2010)[23]. Secondly, attrition from the sample may be non-random. The finding that the average number of observations per respondent is lowest for the first wealth tertile in all countries (Table 5C), implies that attrition is related to wealth. People might also become more likely to discontinue participating in the SHARE project after the onset of formal LTC use, for example because they feel too weak. Non-response and attrition effects could have resulted in the sample being wealthier and less disabled than the general 50+ population, which may have led to a biased estimation of the wealth effects of formal LTC use.

6.3 Suggestions for future research

Previous research on the subject of equity in LTC has focused on horizontal equity in care use; the extent to which individuals with equal needs have access to the same care. Vertical equity in financing is intimately related to this topic, for restricted access is often caused by payments being too high relative to ability-to-pay. This study is the first to offer a quantitative analysis specifically investigating vertical equity in LTC financing. The conduct of further studies is encouraged and a number of propositions follow below.

Firstly, it is recommended that future surveys collect information on intensity and duration of care use. This would allow more detailed analysis regarding the (progressivity in the) wealth effects of using LTC.

Additional detail on care use might also enable a simultaneous assessment of vertical and horizontal equity; while two separate LTC policies may have the same effect on progressivity, they can affect equity in access to care differentially. The conduct of studies investigating the interplay between vertical and horizontal equity is encouraged.

[23] Kalwij (2010), considering the 2004 SHARE wave for the Netherlands, finds that unit non-response is relatively lower among people living in houses, when compared to people living in apartments, and higher in people living in old-age institutions. Moreover, unit non-response is approximately 25 per cent lower among people in the top than among people in the bottom decile of the distribution of neighbourhood average income.

In SHARE, income and wealth are self-reported. Consequently, the values in the data set are estimations (and sometimes even imputations), which increases uncertainty around the results. In further studies, this issue could be circumvented by using administrative data instead of household surveys.

Administrative data could also be used to identify a more representative sample of elderly. Ideally, sufficient information would be contained in the administrative database to conduct a similar analysis to the one undertaken here. This would enable an assessment of the extent of the bias in the presented results. Nonetheless, additional information on, for example, (i)ADL limitations may have to be collected through surveying methods.

Public policies on (i) private payments for formal LTC, (ii) available care benefits and (iii) the extent of complementary informal care-giving, have been used to explain the observed progressivity patterns in the wealth effects of formal LTC use. It could be valuable to cross-check these explanations with data on the actual private (co-)payments made by LTC users, the care benefits received, and the informal care used.

6.4 Policy implications

Despite the study's limitations and the need for further research, the reader is encouraged to view the results as initial insights on the topic of equity in formal LTC financing, from which a number of policy inferences can be drawn.

(1) Encourage the use of informal care

Belgium and Germany have more extensive informal care arrangements than Austria and the Netherlands. They are also the countries in which no negative wealth effects due to LTC use are found. It appears to be the case that comprehensive provisions for informal care-giving allow elderly people to choose for informal care when they anticipate their wealth will be affected by opting for formal care. When informal care policies are less extensive, elderly individuals may sometimes have no other option than choosing formal care and facing large wealth shocks (like in Austria and the Netherlands).

Although the encouragement of informal care does not necessarily increase vertical equity (unless poorer households are more likely to respond to the encouragement), it improves financial protection for all elderly. The introduction/expansion of policies aimed at making it easier to opt for informal care is therefore welcomed. For example, training or allowances for informal care-givers could be made available. In countries like the Netherlands, where informal care is not the cultural standard,

advertisement campaigns could be designed to make general attitudes more favourable toward informal care-giving[24].

(2) Make (co-)payments for formal LTC means-tested, without setting minima

For Austria and the Netherlands, Table 5H shows large differences between the wealth tertiles in the average change in wealth experienced by users of formal LTC. Wealthier LTC users undergo larger wealth shocks, which appears to be the result of the means-testing of (co-)payments for formal LTC. The use of means-tested (co-)payments to create vertical equity in LTC financing is therefore encouraged. Though wealth changes in the Netherlands are progressive in absolute terms, the relative wealth effects show a regressive pattern. Especially LTC users in the first wealth tertile seem relatively severely affected, which has been conjectured to be caused by the minima that are set to LTC co-payments. The use of such minima is dissuaded because of the adverse effects on vertical equity.

(3) Coordinate the various LTC policies and investigate their cumulative result

The positive wealth effect for Flanders' poorest LTC users has been speculated to be the result of the sum of cash benefits available to LTC users being higher than their LTC expenses. If this is indeed the case (further analysis investigating the benefits received by LTC users, as suggested above, might provide evidence), some of the benefits could be reduced without mitigating financial protection. A more general lesson to take from this finding seems to be that the various LTC policies that might be in place in a country ought to be coordinated, and their cumulative result investigated.

[24] As a caveat, it should be noted that 50 per cent of informal carers in Europe have been estimated to be children of the dependent (Glendinning et al., 2009), whilst the households in the SHARE sample are mainly elderly couples. That is, although elderly parents receiving informal care from their children are safeguarded from wealth shocks, the children might in fact experience wealth effects due to, for instance, forgone employment.

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APPENDIX

A.1 – Tests to inform model specification

Description tests

An important issue to consider with panel data is serial correlation because observations are often not independently distributed over time. Standard OLS regression does not take this into account (although robust standard errors can be computed), whilst FE and RE regressions do. In the case of one regressor:

- OLS: $y_{it} = \beta_0 + \beta_1 x_{it} + v_{it}$, with $v_{it} = \alpha_i + u_{it}$; α_i= individual fixed effect
- FE: $(y_{it} - \bar{y_i}) = \beta_0 + \beta_1 (x_{it} - \bar{x_i}) + (u_{it} - \bar{u_i})$, with $\bar{y_i} = (\sum_{t=1}^{T} y_{it}) /T$
- RE: $y_{it} = \beta_0 + \beta_1 x_{it} + \alpha_i + u_{it}$

Breusch-Pagan Lagrange Multiplier (LM) Test

The Breusch-Pagan Lagrange Multiplier Test looks for serial correlation due to individual fixed effects.

H_0: $\sigma_\alpha = 0$

H_1: $\sigma_\alpha \neq 0$

Under the null hypothesis, OLS regression can be used.

Hausman test (1978)

The RE model assumes that $cov(x_{it}, \alpha_i) = 0$, which is what the Hausman test examines.

H_0: $\alpha_i \; and \; x_{it} \; are \; uncorrelated \; for \; all \; i$

H_1: $\alpha_i \; and \; x_{it} \; are \; correlated \; for \; some \; i$

Whilst the FE estimators are consistent under both hypotheses, RE estimators are inconsistent under H_1.

Results per country

	p-value Breusch-Pagan LM	p-value Hausman
AUSTRIA	0.000	0.000
FLANDERS	0.000	0.000
GERMANY	0.000	0.000
NETHERLANDS	0.000	0.000

A.2 – Full regression results tertiles***

	AUSTRIA			FLANDERS			GERMANY			NETHERLANDS		
TERTILES	1	2	3	1	2	3	1	2	3	1	2	3
respondents observations	426 1,039	450 1,172	451 1,182	643 1,714	646 1,857	645 1,881	1,088 2,036	1,161 2,419	1,160 2,475	947 2,127	981 2,446	980 2,519
intercept	-4.359 (6.137)	-0.461 (3.757)	**11.82** (2.906)	3.491 (2.686)	**5.700** (1.022)	10.84 (1.258)	-0.415 (4.937)	**8.812** (1.968)	**8.650** (1.628)	0.088 (2.751)	**7.210** (1.277)	**12.58** (1.415)
LTC	0.214 (0.399)	***-0.520*** (0.292)	**-0.561** (0.194)	**0.628** (0.154)	-0.072 (0.063)	0.012 (0.072)	0.177 (0.326)	-0.046 (0.171)	-0.032 (0.120)	**-0.451** (0.157)	**-0.242** (0.103)	**-0.206** (0.101)
Age	***0.350*** ***(0.179)***	**0.405** (0.112)	0.087 (0.086)	**0.167** (0.081)	**0.135** (0.031)	0.073 (0.039)	**0.308** (0.146)	0.098 (0.060)	**0.155** (0.049)	**0.191** (0.082)	**0.120** (0.040)	0.028 (0.044)
Age²	-0.002 (0.001)	**-0.003** (0.000)	**-0.001** (0.001)	-0.001 (0.001)	**-0.001** (0.000)	**-0.001** (0.000)	**-0.002** (0.001)	***-0.001*** (0.000)	**-0.001** (0.000)	-0.001 (0.001)	**-0.001** (0.000)	-0.000 (0.000)
Income	-0.048 (0.079)	0.003 (0.037)	***0.034*** (0.020)	0.012 (0.008)	0.002 (0.003)	**0.014** (0.003)	0.043 (0.052)	0.026 (0.016)	**0.030** (0.007)	**0.053** (0.020)	0.003 (0.009)	0.001 (0.005)
Living alone	-0.216 (0.361)	-0.124 (0.228)	**0.359** (0.170)	**-0.409** (0.190)	***-0.146*** (0.081)	***0.174*** (0.100)	-0.530 (0.360)	0.131 (0.145)	**0.453** (0.113)	-0.303 (0.195)	-0.104 (0.100)	-0.021 (0.111)
ΔHousehold size	***0.551*** ***(0.291)***	0.093 (0.147)	-0.120 (0.118)	**0.388** (0.133)	**0.148** (0.045)	-0.029 (0.056)	**0.505** (0.250)	**0.219** (0.083)	-0.100 (0.067)	0.060 (0.131)	0.040 (0.055)	-0.097 (0.067)
ADL limitations	-0.160 (0.160)	0.126 (0.112)	**-0.231** (0.101)	-0.129 (0.087)	0.001 (0.036)	**-0.153** (0.053)	***-0.222*** (0.121)	0.015 (0.068)	-0.078 (0.048)	0.088 (0.103)	**-0.119** (0.053)	-0.067 (0.065)
iADL limitations	**-0.766** (0.335)	***-0.404*** (0.208)	-0.014 (0.164)	0.031 (0.132)	-0.167 (0.067)	***-0.166*** (0.091)	**0.511** (0.230)	-0.082 (0.131)	-0.007 (0.085)	-0.109 (0.173)	-0.078 (0.116)	**-0.237** (0.110)
Chronic diseases	***-0.138*** (0.082)	0.047 (0.046)	-0.045 (0.042)	-0.032 (0.037)	0.022 (0.016)	0.008 (0.020)	0.063 (0.066)	-0.043 (0.028)	0.020 (0.022)	0.036 (0.037)	0.004 (0.019)	-0.016 (0.022)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

A.3 – Investigating positive coefficient first tertile Flanders

*A.3.1 – Regression without house-sellers****

	FLANDERS		
TERTILES	1	2	3
respondents observations	643 1,660	646 1,804	645 1,843
intercept	2.813 (2.729)	**<u>5.447</u>** (0.827)	**<u>10.83</u>** (1.204)
LTC	**<u>0.758</u>** (0.157)	-0.077 (0.050)	0.013 (0.069)
Age	**0.178** (0.082)	**<u>0.131</u>** (0.025)	***0.069*** (0.037)
Age²	-0.001 (0.001)	**-0.000** (0.000)	**-0.001** (0.000)
Income	0.007 (0.008)	-0.003 (0.002)	**<u>0.013</u>** (0.003)
Living alone	-0.181 (0.207)	**<u>0.181</u>** (0.068)	**<u>0.361</u>** (0.101)
ΔHousehold size	**0.342** (0.136)	**0.079** (0.036)	-0.008 (0.054)
ADL limitations	0.019 (0.096)	0.015 (0.028)	**-0.109** (0.053)
iADL limitations	0.171 (0.142)	***-0.100*** (0.054)	**-0.194** (0.089)
Chronic diseases	-0.041 (0.037)	0.018 (0.013)	0.003 (0.019)

*A.3.2 – Regression without debt-holders****

	FLANDERS		
TERTILES	1	2	3
respondents observations	602 1,628	642 1,848	643 1,876
intercept	***4.305*** (2.264)	**<u>5.519</u>** (1.007)	**<u>10.86</u>** (1.262)
LTC	**<u>0.483</u>** (0.129)	-0.077 (0.061)	0.010 (0.072)
Age	**0.140** (0.068)	**<u>0.138</u>** (0.031)	***0.073*** (0.039)
Age²	-0.001 (0.001)	**-0.001** (0.000)	**-0.001** (0.000)
Income	0.010 (0.007)	0.001 (0.003)	0.014 (0.003)
Living alone	-0.184 (0.158)	***-0.150*** (0.079)	***0.170*** (0.101)
ΔHousehold size	**0.340** (0.110)	**<u>0.144</u>** (0.045)	-0.031 (0.056)
ADL limitations	-0.047 (0.074)	0.001 (0.035)	**<u>-0.152</u>** (0.053)
iADL limitations	-0.053 (0.112)	**-0.167** (0.066)	-0.167 (0.092)
Chronic diseases	-0.018 (0.032)	0.021 (0.016)	0.008 (0.020)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **<u>Bold underlined</u>**: p-value ≤ 0.01. Standard errors are displayed in brackets.

A.4 Calculation methods to obtain average wealth effect in euros/year

To calculate the average change in wealth for LTC users in euros/year, a number of steps were involved.

Predicted mean value wealth

Firstly, the exponential of the predicted mean value of ln(wealth) was taken to get the predicted mean value of wealth itself:

(1) $\ln(y) = x\beta + \varepsilon$, with y = wealth

(2) $E[\ln(y)] = x\beta$, assuming $E[\varepsilon] = 0$

(3) $E[y|x] = e^{x\beta}$, assuming $E[\varepsilon^2|x] = E[\varepsilon^2]$ (Manning, 1998)

Percentage change wealth

Second, the percentage change in ln(wealth) for LTC users was calculated from the LTC regression coefficient:

(4) $\Delta\% = e^{\beta_i} - 1$, with β_i = LTC coefficient

Absolute change in wealth

Subsequently, the absolute change in wealth, at the mean, was calculated by multiplying (3) and (4):

(5) $\Delta€ = E[y|x] * \Delta\%$

Average number of years of LTC use

There are lags of around 3 years between the SHARE waves, whilst each wave only asks about LTC use in the previous 12 months. To arrive at an estimation of the LTC use over the periods over which no data on LTC use was available, 2 main assumptions were made:

(i) If people are recorded as LTC users at 2 consecutive waves, they have used LTC for the whole period in between

(ii) The onset of LTC use is uniformly distributed over time

In 2007 there was only 1 type of LTC users: (a) those who were first-time users (because all people using LTC in 2004 were removed from the data set, see Section 4.4). The period over which they could have been using care was 3 years (2004-2007) and, because of Assumption (ii), they were assumed to have started 1.5 years ago on average.

In 2011 and 2013 there were 2 types of LTC users: (a), and (b) those who were continuing users. Because of Assumption (i), continuing LTC users in 2011, for example, were assumed to have used LTC for 4 years (2007-2011) since the last wave.

By taking into account the ratio of types (a) and (b) at each wave, the average number of years of LTC use (between waves) was calculated.

Change in wealth, euros/year

Finally, the change in wealth in euros/year was calculated:

(6) $\Delta€/t$, where t = average number of years of LTC use between waves

The same procedure was repeated for each quantile.

A.5 Full regression results validity checks

A.5.1 Income

*A.5.1.1 With Retirement instead of Income****

	AUSTRIA			FLANDERS			GERMANY			NETHERLANDS		
TERTILES	1	2	3	1	2	3	1	2	3	1	2	3
respondents observations	426 1,039	450 1,172	451 1,182	643 1,714	646 1,857	645 1,881	1,088 2,036	1,161 2,419	1,160 2,475	947 2,127	981 2,446	980 2,519
intercept	-5.858 (6.424)	0.015 (3.868)	**13.27** (3.091)	3.176 (2.793)	**5.761** (1.078)	**10.96** (1.349)	0.360 (4.948)	**9.041** (2.009)	**9.705** (1.662)	0.258 (2.799)	**7.090** (1.287)	**12.30** (1.435)
LTC	0.225 (0.398)	***-0.523*** (0.291)	**-0.554** (0.194)	**0.629** (0.155)	-0.073 (0.063)	0.012 (0.072)	0.159 (0.326)	-0.046 (0.171)	-0.057 (0.121)	**-0.449** (0.157)	**-0.242** (0.103)	**-0.210** (0.100)
Age	**0.394** (0.188)	**0.391** (0.115)	0.049 (0.092)	**0.173** (0.084)	**0.132** (0.033)	***0.068*** (0.041)	**0.288** (0.147)	0.093 (0.061)	**0.130** (0.050)	**0.191** (0.083)	**0.123** (0.040)	0.035 (0.044)
Age^2	***-0.002*** (0.001)	**-0.003** (0.001)	-0.001 (0.001)	-0.001 (0.001)	**-0.001** (0.000)	***-0.001*** (0.000)	**-0.002** (0.001)	***-0.001*** (0.000)	**-0.001** (0.001)	-0.001 (0.001)	**-0.001** (0.000)	-0.000 (0.000)
Retirement	-0.203 (0.277)	0.077 (0.170)	0.128 (0.133)	-0.038 (0.124)	0.013 (0.044)	-0.009 (0.053)	0.018 (0.239)	-0.051 (0.090)	-0.008 (0.063)	0.042 (0.111)	-0.038 (0.051)	-0.061 (0.054)
Living alone	-0.231 (0.362)	-0.128 (0.228)	**0.338** (0.170)	**-0.397** (0.190)	***-0.145*** (0.081)	***0.166*** (0.100)	-0.529 (0.360)	0.130 (0.146)	**0.445** (0.114)	***-0.337*** (0.195)	-0.102 (0.100)	-0.012 (0.111)
ΔHousehold size	***0.545*** (0.291)	0.097 (0.148)	-0.118 (0.118)	**0.395** (0.133)	**0.147** (0.045)	-0.039 (0.056)	**0.507** (0.250)	**0.208** (0.083)	-0.104 (0.067)	0.082 (0.132)	0.040 (0.055)	-0.101 (0.068)
ADL limitations	-0.170 (0.160)	0.125 (0.112)	**-0.225** (0.102)	-0.126 (0.087)	0.001 (0.036)	**-0.158** (0.054)	***-0.217*** (0.122)	0.014 (0.068)	-0.073 (0.049)	0.098 (0.103)	**-0.119** (0.053)	-0.064 (0.065)
iADL limitations	**-0.762** (0.335)	***-0.403*** (0.208)	-0.014 (0.165)	0.018 (0.132)	**-0.166** (0.067)	***-0.169*** (0.092)	**0.505** (0.230)	-0.083 (0.132)	-0.018 (0.086)	-0.155 (0.173)	-0.081 (0.116)	**-0.241** (0.110)
Chronic diseases	***-0.143*** (0.082)	0.048 (0.046)	-0.045 (0.042)	-0.033 (0.037)	0.022 (0.016)	0.011 (0.020)	0.063 (0.066)	-0.041 (0.028)	0.018 (0.022)	0.041 (0.037)	0.006 (0.019)	-0.017 (0.022)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

*A.5.1.2 Without Income****

	AUSTRIA			FLANDERS			GERMANY			NETHERLANDS		
TERTILES	1	2	3	1	2	3	1	2	3	1	2	3
respondents observations	426 1,039	450 1,172	451 1,182	643 1,714	646 1,857	645 1,881	1,088 2,036	1,161 2,419	1,160 2,475	947 2,127	981 2,446	980 2,519
intercept	-4.464 (6.132)	-0.432 (3.739)	**12.24** (2.899)	3.409 (2.687)	**5.658** (1.019)	**11.04** (1.267)	0.293 (4.864)	**9.337** (1.940)	**9.751** (1.616)	0.080 (2.758)	**7.211** (1.276)	**12.62** (1.407)
LTC	0.233 (0.398)	***-0.521*** (0.291)	**-0.565** (0.194)	**0.631** (0.155)	-0.073 (0.063)	0.011 (0.072)	0.159 (0.325)	-0.045 (0.171)	-0.056 (0.121)	**-0.451** (0.157)	**-0.241** (0.103)	**-0.208** (0.100)
Age	**0.351** (0.179)	**0.404** (0.111)	0.080 (0.086)	**0.167** (0.081)	**0.135** (0.031)	***0.066*** (0.039)	**0.290** (0.145)	0.085 (0.060)	**0.128** (0.049)	**0.195** (0.082)	**0.120** (0.040)	0.027 (0.043)
Age²	-0.002 (0.001)	**-0.003** (0.001)	***-0.001*** (0.001)	-0.001 (0.001)	**-0.001** (0.000)	***-0.001*** (0.000)	**-0.002** (0.001)	***-0.001*** (0.000)	**-0.001** (0.000)	-0.001 (0.001)	**-0.001** (0.000)	-0.000 (0.000)
Living alone	-0.214 (0.361)	-0.125 (0.227)	**0.346** (0.170)	**-0.397** (0.189)	***-0.145*** (0.081)	***0.166*** (0.100)	-0.528 (0.360)	0.132 (0.146)	**0.445** (0.114)	***-0.334*** (0.195)	-0.103 (0.100)	-0.021 (0.111)
ΔHousehold size	***0.555*** (0.291)	0.093 (0.147)	-0.117 (0.118)	**0.395** (0.133)	**0.147** (0.045)	-0.039 (0.056)	**0.506** (0.250)	**0.211** (0.082)	-0.104 (0.067)	0.078 (0.131)	0.040 (0.055)	-0.096 (0.067)
ADL limitations	-0.164 (0.160)	0.126 (0.112)	**-0.230** (0.101)	-0.126 (0.087)	0.001 (0.036)	**-0.157** (0.054)	***-0.217*** (0.121)	0.014 (0.068)	-0.073 (0.049)	0.100 (0.103)	**-0.119** (0.053)	-0.067 (0.065)
iADL limitations	**-0.763** (0.335)	***-0.403*** (0.208)	-0.014 (0.165)	0.021 (0.132)	**-0.166** (0.067)	***-0.169*** (0.092)	**0.505** (0.230)	-0.081 (0.131)	-0.018 (0.086)	-0.161 (0.172)	-0.078 (0.116)	**-0.236** (0.110)
Chronic diseases	***-0.141*** (0.082)	0.047 (0.046)	-0.042 (0.042)	-0.033 (0.037)	0.023 (0.016)	0.011 (0.020)	0.063 (0.066)	-0.042 (0.028)	0.018 (0.022)	0.041 (0.037)	0.004 (0.019)	-0.017 (0.022)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

*A.5.2 Nursing homes****

	AUSTRIA			FLANDERS			GERMANY			NETHERLANDS		
TERTILES	1	2	3	1	2	3	1	2	3	1	2	3
respondents observations	426 1,039	450 1,172	451 1,181	642 1,709	646 1,857	645 1,881	1,088 2,036	1,161 2,419	1,160 2,474	947 2,127	981 2,446	980 2,516
intercept	-4.359 (6.137)	-0.461 (3.757)	**11.82** (2.907)	3.665 (2.697)	**5.700** (1.022)	10.84 (1.258)	-0.415 (4.937)	**8.812** (1.968)	**8.678** (1.627)	0.088 (2.751)	**7.210** (1.277)	**12.35** (1.411)
LTC	0.214 (0.399)	***-0.520*** (0.292)	**-0.552** (0.194)	**0.633** (0.156)	-0.072 (0.063)	0.012 (0.072)	0.177 (0.326)	-0.046 (0.171)	-0.020 (0.121)	**-0.451** (0.157)	**-0.242** (0.103)	***-0.179*** (0.101)
Age	***0.350*** ***(0.179)***	**0.405** (0.112)	0.087 (0.086)	**0.162** (0.081)	**0.135** (0.031)	0.073 (0.039)	**0.308** (0.146)	0.098 (0.060)	**0.155** (0.049)	**0.191** (0.082)	**0.120** (0.040)	0.036 (0.043)
Age²	-0.002 (0.001)	**-0.003** (0.000)	**-0.001** (0.001)	-0.001 (0.001)	**-0.001** (0.000)	**-0.001** (0.000)	**-0.002** (0.001)	***-0.001*** (0.000)	**-0.001** (0.000)	-0.001 (0.001)	**-0.001** (0.000)	-0.000 (0.000)
Income	-0.048 (0.079)	0.003 (0.037)	0.033 (0.020)	0.011 (0.008)	0.002 (0.003)	**0.014** (0.003)	0.043 (0.052)	0.026 (0.016)	**0.029** (0.007)	**0.053** (0.020)	0.003 (0.009)	0.001 (0.005)
Living alone	-0.216 (0.361)	-0.124 (0.228)	**0.368** (0.170)	**-0.423** (0.194)	***-0.146*** (0.081)	***0.174*** (0.100)	-0.530 (0.360)	0.131 (0.145)	**0.469** (0.113)	-0.303 (0.195)	-0.104 (0.100)	-0.009 (0.111)
ΔHousehold size	***0.551*** ***(0.291)***	0.093 (0.147)	-0.116 (0.118)	**0.386** (0.134)	**0.148** (0.045)	-0.029 (0.056)	**0.505** (0.250)	**0.219** (0.083)	-0.095 (0.067)	0.060 (0.131)	0.040 (0.055)	-0.090 (0.067)
ADL limitations	-0.160 (0.160)	0.126 (0.112)	**-0.221** (0.103)	-0.121 (0.089)	0.001 (0.036)	**-0.153** (0.053)	***-0.222*** (0.121)	0.015 (0.068)	***-0.080*** (0.048)	0.088 (0.103)	**-0.119** (0.053)	-0.072 (0.067)
iADL limitations	**-0.766** (0.335)	***-0.404*** (0.208)	-0.022 (0.165)	0.034 (0.135)	-0.167 (0.067)	***-0.166*** (0.091)	**0.511** (0.230)	-0.082 (0.131)	0.017 (0.086)	-0.109 (0.173)	-0.078 (0.116)	-0.144 (0.113)
Chronic diseases	***-0.138*** (0.082)	0.047 (0.046)	-0.048 (0.042)	-0.034 (0.037)	0.022 (0.016)	0.008 (0.020)	0.063 (0.066)	-0.043 (0.028)	0.021 (0.022)	0.036 (0.037)	0.004 (0.019)	-0.009 (0.022)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **Bold underlined**: p-value ≤ 0.01. Standard errors are displayed in brackets.

*A.5.3 LTC use spouse****

	AUSTRIA			FLANDERS			GERMANY			NETHERLANDS		
TERTILES	1	2	3	1	2	3	1	2	3	1	2	3
respondents observations	426 1,037	450 1,171	451 1,168	642 1,658	646 1,819	645 1,836	1,086 2,012	1,161 2,410	1,160 2,453	946 2,110	981 2,434	980 2,482
intercept	-4.597 (6.172)	-0.324 (3.758)	**<u>11.91</u>** (2.917)	4.112 (2.825)	**<u>6.147</u>** (1.022)	10.82 (1.296)	-2.725 (4.835)	**<u>8.665</u>** (1.981)	**<u>8.373</u>** (1.662)	0.041 (2.790)	**<u>7.048</u>** (1.275)	**<u>13.85</u>** (1.440)
LTC	0.254 (0.411)	***-0.479*** (0.294)	**<u>-0.909</u>** (0.222)	**<u>0.471</u>** (0.181)	-0.035 (0.075)	0.046 (0.086)	0.518 (0.359)	-0.020 (0.188)	-0.110 (0.139)	**<u>-0.420</u>** (0.166)	***-0.193*** (0.109)	**-0.229** (0.117)
Age	**0.357** (0.180)	**<u>0.401</u>** (0.112)	0.085 (0.086)	***0.149*** (0.085)	**<u>0.121</u>** (0.032)	***0.073*** (0.040)	**<u>0.373</u>** (0.143)	***0.102*** (0.061)	**<u>0.164</u>** (0.050)	**0.193** (0.083)	**<u>0.125</u>** (0.040)	-0.012 (0.044)
Age²	***-0.002*** (0.001)	**<u>-0.003</u>** (0.001)	***-0.001*** (0.001)	-0.001 (0.001)	***-0.000*** (0.000)	**-0.001** (0.000)	**<u>-0.003</u>** (0.001)	**-0.001** (0.000)	**<u>-0.002</u>** (0.000)	-0.001 (0.001)	**-0.001** (0.000)	-0.000 (0.000)
Income	-0.047 (0.079)	0.002 (0.037)	0.032 (0.020)	0.011 (0.008)	0.003 (0.003)	**<u>0.013</u>** (0.003)	0.054 (0.051)	0.027 (0.017)	**<u>0.030</u>** (0.007)	**0.051** (0.021)	0.004 (0.009)	0.001 (0.005)
Living alone	-0.221 (0.362)	-0.122 (0.228)	**0.386** (0.169)	***-0.372*** (0.202)	**-0.162** (0.083)	**0.218** (0.102)	**-0.733** (0.355)	0.112 (0.147)	**<u>0.461</u>** (0.114)	-0.318 (0.196)	-0.117 (0.101)	-0.005 (0.111)
ΔHousehold size	***0.548*** (0.291)	0.091 (0.147)	-0.115 (0.118)	**<u>0.404</u>** (0.138)	**<u>0.151</u>** (0.047)	-0.039 (0.057)	***0.452*** (0.243)	**<u>0.224</u>** (0.083)	-0.098 (0.067)	0.075 (0.132)	0.035 (0.055)	-0.096 (0.067)
ADL limitations	-0.158 (0.161)	0.142 (0.113)	**-0.147** (0.104)	-0.124 (0.099)	0.004 (0.040)	**-0.124** (0.057)	-0.139 (0.121)	0.014 (0.068)	-0.084 (0.051)	0.077 (0.103)	**-0.126** (0.053)	-0.057 (0.066)
iADL limitations	**-0.780** (0.337)	***-0.408*** (0.208)	-0.078 (0.172)	0.062 (0.146)	-0.194 (0.071)	**-0.223** (0.103)	***0.408*** (0.233)	-0.089 (0.136)	-0.008 (0.092)	-0.083 (0.175)	-0.077 (0.115)	**-0.243** (0.111)
Chronic diseases	***-0.139*** (0.082)	0.046 (0.046)	***-0.072*** (0.043)	-0.019 (0.039)	0.023 (0.016)	0.004 (0.021)	0.061 (0.065)	-0.042 (0.028)	0.019 (0.022)	0.037 (0.038)	0.004 (0.019)	-0.028 (0.022)

*** ***Bold italics***: p-value ≤ 0.10. **Bold**: p-value ≤ 0.05. **<u>Bold underlined</u>**: p-value ≤ 0.01. Standard errors are displayed in brackets.