What are the costs of dementia in Europe?

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Abstract

This paper provides new evidence on the costs for individuals and society due to the onset of dementia in a population of individuals aged 50 and above. By exploiting the Survey of Ageing and Retirement in Europe (SHARE) and the English Longitudinal Survey of Ageing (ELSA), we assess how a dementia shock affects commodities purchases and other domains of individual's life, in the short-run. We find that individuals reduce food consumption and increase rent expenditures, housing-related expenditures and out-of-pocket expenditures. The total net effect is a 12.5% increase in expenditures on these items. We show that the demand for care is also affected, with an increase in both days spent in hospital (with an increase of 1.6 in the number of visits) and formal and informal care (17.4 and 18 percentage points, respectively). Results are robust to alternative definitions of the dementia shock and sensitivity analyses. Additionally, we show that there are important spill-over effects on the spousal well-being when the partner becomes sick. Finally, we compute the financial burden on individuals following a dementia diagnosis in terms of formal and informal care costs. Increase in formal care costs can reach up to € 29,200 per person, while the increase in individual's informal care costs are estimated of € 9,835 in terms of market value services or about € 15,700 as foregone wages.

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1. Introduction

Dementia is a condition that affects more than 21 million people in OECD countries, the current projections suggest a fifty percent increase by 2040, amounting to 32 million people (OECD, 2023). Despite the spectacular progress of the medical research in this area, leading to major improvements for the treatment of conditions such as the Alzheimer disease, which could delay the most damaging effects of the disease,[1] there is currently no cure for dementia, which almost invariably turns into a permanent state of disability and need of care. Hence it seems crucial to understand how the onset of dementia affects some basic domains of life and the related health and social care costs, in order to insure an adequate level of protection for the people who will be affected and their families.

This paper provides new evidence on the costs of onset of dementia[2], estimated on a panel of older people, which is representative of the population aged 50 and over in Europe. We show how the onset of cognitive impairments, affects different dimensions of life and in particular the basket of goods and services purchased by the individual, plus changes in other activities, which are a relevant part of life at older ages. We estimate these effects both by making use of observed changes in demand for goods and services and by imputing the extra costs emerging from changes in other activities, hence proving an overall estimate of the economic consequences and the overall wellbeing for an individual (a household) of experiencing such negative health shock. While we cannot estimate a complete demand system, we can account for some relevant items which are prominent in the consumption basket of older consumers, such as the demand for food, the housing costs, out-of-pocket health expenditures (OOP) the cost of care services and other health-related expenditures. We also explore the spill-over effects of the onset of dementia, occurring for one partner, on the wellbeing and the caregiving decision of her/his spouse. Thanks to the richness of the data (we make use of the SHARE study for Europe and the ELSA study for England), we estimate the socio-economic changes that older people and their families experience as a result of a dementia shock in a large number of European countries: we show that these changes are significant and the implied costs are sizeable.

Our work has relevant policy implications, considering that the current demographic projections for the European population predict that he number of individuals aged 80 and over will double by 2050 (OECD; 2019) so that the provision of long-term care should become a pillar of the European welfare

[1] Self, W.K., Holtzman, D.M (2023), Hafycz J.M., et al. (2023).

[2] Here we refer to dementia in a broad sense, but the precise definition we will use of the onset of dementia is: having a diagnosis of dementia, of the Alzheimer's disease, of an organic brain syndrome, of senility or a diagnosis of any severe memory impairment.

systems in the years to come. But the current evidence shows that there exists a concerning mismatch between need of care and supply of care, as the supply of both public long-term care and private insurance or private provisions in the different European countries is fragmented and very often inadequate. One possible key element of the emerging gap in care is the lack of information on the costs of the onset of limitations in activities of daily living and the loss of autonomy that older people will experience, due to the increase in the prevalence of individuals affected by cognitive impairments.

Some studies have attempted to quantify the individual's cost of ill-health based on one limitation (Wittenberg et al. 2019), or as a result of comorbidities (Smith,1999; Finkelstein et al. 2013, Trevisan and Zantomio, 2016, Banks et al. 2020). There is a growing literature on the costs of long-term care at the hospital level (Costa-Font et al 2018; Crowford et al 2021), at the level of healthcare services (Serrano-Alarcon et al., 2022) and institutional long-term care use (Guo et al, 2015). Since the demand for informal and formal care increases after the onset of dementia, there is evidence that hospital utilization also increases after a diagnosis of dementia (Phelan et al., 2012). Finally, spill-over effects on the well-being of family members, when an older individual becomes dependent, are also analysed: Bakx and Meijer 2013, show that women care for a dependent partner more than men and bear the cost of care. But, the challenge for this research question is to approach the problem of estimating the implied costs by adopting a rigorous methodology and good quality data, which capture the changes in the life of the individuals affected by dementia and the related outcomes in the various socio-economic domains, and, at the same time, to make use of tractable models in order to produce useful and comparable quantitative results.

The starting point are models based on state-dependent utility, which show the potential links between the health status and choices by consumers (Viscusi and Evans (1990), Finkelstein, Luttmer, and Notowidigdo (2009), Finkelstein, Luttmer, and Notowidigdo (2013)). This approach distinguishes a direct effect of the health status on the level of utility, i.e. a shift of the utility curve, and an indirect effect on the marginal utility of consumption, deriving also from the budget constraint, based on the idea that a health shock requires a re-composition of the basket of goods and services. Berloffa et al. (2006) and Blundell et al (2024), propose a model based on a health-conditional cost function, such that the demand for different commodities, including health goods, incorporates also these indirect effects. In particular, Blundell et al. (2024), using data from the Health and Retirement Survey (HRS) for the US, show that transitory health shocks have important consequences on the household budget constraint: they affect both non-durable consumption and out-of-pocket medical expenses.

Our paper follows a similar approach on European data, but the novelty is that we focus on how a dementia shock affects commodities purchases and other domains of individual's life. Our estimates are based on the most relevant items of the consumption basket, such as the demand for food, the housing costs and health-related expenditures, which are consumption items typically responsive to changes in the health status. We also provide estimates of out-of-pocket expenditures for older Europeans, which, to the best of our knowledge, is an investigation that had not been done before.
In fact, we are in a unique position to exploit a rich set of information based on the Survey of Health, Ageing and Retirement in Europe (SHARE) and the English Longitudinal Survey of Ageing (ELSA). We build a panel of individuals aged 50 and above spanning a period of more than 15 years, covering 11 countries with information on their health status, financial situation, consumption, social network, healthcare access and utilisation. We want to understand the short-run consequences of the onset of dementia, hence we select a sample of individuals who had not been diagnosed with dementia before the first interview and exclude individuals who have been living with the impairment for several years. Since the survey is conducted every other year, we select individuals who were diagnosed with dementia between interviews, and we evaluate the effect of the diagnosis on several outcomes in the following year. Thus, we look at short-term changes for individuals that appear in the sample at least twice.
The main results are that individuals adjust their consumption basket in the short term by reducing food-related expenditures (defined as consumption within and outside the home) while increasing rent and housing-related expenditures. In other words, older people, who are likely to need more care after the diagnosis, allocate a larger share of their budget to in-house expenditures (to adapt their home, for example) rather than to food (especially eating out). Secondly, out-of-pocket expenditures significantly increase after the diagnosis, but also the usage of health-related services, as measured by hospital visits and stays (nights) and doctor's visits. Also: the utilisation of domiciliary long-term care, of informal care and the demand for formal residential care all increase. Different groups are exposed to this type of shock in different ways: respondents characterized by lower income and/or lower wealth, report a sharper decrease in their food expenditure (and increase in their housing expenditure) compared to more affluent respondents . We find important gender differences: after being diagnosed with dementia, men resort to informal care more than women, very often such care is provided by the living partner.

Our results closely relate to estimates the effect of dementia in the US (Hurd et al. 2013 and Kelley et al. 2020) and one recent study for Europe based on SHARE data (Meijer et al. 2022). These papers try to estimate out-of-pocket payments and, to some extent, societal costs related to mental health

deterioration. Since the latter also makes use of the SHARE data, it is important to clarify upfront some basic differences: we look at people aged 50 and over, rather than restricting the sample to ages 65 and over. We fully exploit the panel nature of the data, rather than restricting the study to a cross-sectional analysis, so that we are in a better position to explicitly account for unobserved heterogeneity. Furthermore, we estimate changes in costs, including OOP expenditures, which occur after the health shock (the diagnosis) using the information that lines up with the calendar timing in relation to the event, rather than relying on exit interviews at the time of death of the respondent, which are a mixture of several cumulated expenditures.

Finally, our work on spill-over effects on the overall wellbeing within the family, is in line with and Bakx and Meijer 2013, showing that women care for a dependent partner more than men and also that the partner's health is affected (Choi et al 2021, Floridi et al. 2021). We also show that being in a couple serves as partial insurance for long-term informal care (Chiappori et al. 2018, Achou, 2021, OECD, 2017a)

2. Empirical strategy

The basic idea of this paper is that the onset of dementia has an impact on the needs of individuals and their families, which requires a re-allocation of their expenditures for goods and services, as well as causing changes in some relevant activities. These changes may translate into direct and indirect costs: some extra expenditures in actual care services or health goods may be needed, but also, individuals affected by dementia may have to changes their habits reducing the consumption of some goods in favour of other goods. Capturing the changes actually due to the onset of dementia is challenging, even more challenging is to map them onto monetary "costs".

There are several issues that we need to address in the empirical work: first, the identification of the domain, which is relevant for the individual and the household, and the outcomes affected by the onset of dementia leading to changes in monetary costs or welfare costs. Second, the definition of the outcomes of interest, but also the definition of the state of dementia. Third, the identification of the causal impact of the onset of dementia on these outcomes. For the latter, we need to control for potential confounders that might play a role: for example, if the individual suffers from other health conditions, which might partly explain the observed changes in consumption expenditures. Since both the SHARE and the ELSA studies are panel data, we adopt a fixed-effect estimator methodology, however some characteristics even if time-invariant, such

as gender and socioeconomic status, could play an explicit role and should therefore be included in the econometric specification, rather than be treated as a nuisance variable, for this reason we make use of interaction terms in the specification.

As anticipated we have two sets of outcomes: a first set of outcomes contains the observed expenditures such as demand for food, demand for housing services or OOP expenditures, which are recorded in 2018 Euros, while a second set of outcomes records changes in activities, such as number of days spent in hospital: to the latter group of variables we attach monetary values at a second stage of the analysis. As for OOP expenditures we have to resort to an auxiliary regression in order to have a complete account of these expenditures, as specified in the next section.

We specify a model that captures these aspects and carry out estimates by using an OLS estimation methodology with individual fixed-effects and time fixed-effects.

The dependent variable is the change in the outcome variable (level of consumption, OOP expenditures, formal or informal care etc..) as a function of the onset of dementia and other covariates, including demographic characteristics, as represented in equation (1).

$$Y_{it} = \alpha + \beta_1 Dementia_{it} + \theta_1 Age_{it} + \theta_2 Comorbidities_{it} + \theta_3 Income_Level_{it} + \gamma_i + \eta_1 wave_dummy_{it} + \varepsilon_{it} \quad (1)$$

where i denotes the individual and t the time, Y_{it} represents for example, the change in food consumption (or rent) or OOP expenditures.

As we shall see, the covariates included in the regression have been used by several authors. As stressed by Smith et al. 1999, an important role may be played by "comorbidities", which may be related or not related to the status of dementia. Income may play an important role, as in any demand system, but in an alternative specification we control for household wealth instead, which includes net financial assets, the home value if home-owner, the value of cars and businesses, because wealth is a proxy for lifetime resources.

Definition of the outcomes of interest

Housing-related expenditure and food consumption and are particularly relevant for older people: household expenditures are 22% of the total basket and represent the single-highest item of spending, followed by food which is at 13.8% (OECD, 2020). Expenditures due to the accommodation interact with health-related risks in several ways, for example they are a form of long-term care insurance (WHO, 2020; Achou, 2021).

Expenditure on food consumed at home and outside the home, has been consistently collected in the SHARE-survey since the first wave. For housing expenditures we distinguish three possible main expenditures that we name "housing" expenditures. A first case is the actual rent, as directly recorded in the survey, for those who pay this outright; the second possibility is the imputed rent for owner-occupied houses[3]. In both these cases housing costs include also housing-related expenditures. The data provide information on nursing-home expenditures, which includes medical services and accommodation services: the latter is included in the housing expenditures[4].

We are particularly interested in out-of-pocket expenditures, which include spending for in-hospital and outside-hospital services, drugs and nursing home or payments for personal care, domestic tasks, meals on wheels and other help. However, this outcome is very hard to measure in general household surveys, to the extent that several missing values are reported on the level of OOP expenditures in SHARE, even when the respondent reports - in a binary answer- having incurred in such expenditures. In ELSA OOP expenditures are not collected at all, hence our estimates will be presented in a case without OOP expenditures both for SHARE and ELSA and in a case with OOP expenditures only for the SHARE data. Since we are interested in the changes in OOP expenditures, we propose an auxiliary regression for out-of-pocket expenditures which imputes the missing values of the level of OOP expenditures on the basis of the observed complete records: the results are reported in Table A 6.5 of the Appendix. The estimates for OOP expenditures are interesting *per se*: the regression analysis is based on a large number of individuals characteristics such as age, gender, marital status, number of children, income, presence of out-of-pocket expenditures (dummy variable), chronic diseases (not including dementia), the number of ADL and IADL. We also include the average OOP spending per person, in the country per year, drawn from the OECD statistics (OECD, 2017b). A comparison of the raw measure with our predictions for the subsample where the information on the OOP expenditure is available, is reported in Figure A.1 of the Appendix. The distributions are very close, except – obviously - for the cases of very small OOP expenditures. The

[3] Even if the individual does not have a direct rent expenditure, if she/he is a home owner, the opportunity cost of holding the illiquid asset has to be accounted for. Obviously on the "income side" a corresponding income amount is to be counted, as if the rent was paid to herself by the respondent.

[4] In order to distinguish the two components we have to make some assumptions, as we shall explain.

only drawback is that, even after performing the imputation procedure, we lose some SHARE respondents. Taking account of the fact that we cannot use the ELSA study and that some observations have to be discarded, the estimation sample for OOP expenditure is of 126,645 observations, as opposed to 149,810 observations.

Our approach differs from that of Meijer et al. (2022), who also have to impute OOP expenditures in the SHARE data. They make use of out-of-pocket expenditures at the end of life, largely obtained from the "exit interviews" while we rather focus on expenditures that occur soon after the onset of the dementia diagnosis . On the one hand, our estimates are more conservative as they do not account for expenditures which take place at the time close to the individual's death, on the other hand exit interviews might report expenditures which are not strictly related to dementia.

As we argued, part of the "costs" of the onset of dementia attain to changes in activities and time use, while our survey data do not provide a direct cost measure of these activities, we think that these are relevant and can be estimated. The importance of changes in healthcare usage, such as number of doctor's visits, times in hospital have been documented by Smith,1999; Finkelstein et al. 2013; Banks et al. 2020. We expect that individuals affected by dementia exhibit a more intense healthcare utilisation, which we measure in the following domains: (i) the number of doctor visits (GP and specialist visits), (ii) whether the respondent spent time in hospital, (iii) the number of periods spent in hospital and for how long (how many nights).

Finally, a dimension that is of particular relevance is the increasing need for care, hence, we exploit information on both formal and informal care usage available in the data. We know whether the individual has used professional home care[5] and formal residential care, plus usage of informal care and its frequency.

We have defined the consumption expenditures and health-related activities, which provide a comprehensive account of the effect that a cognitive impairments have on the life of individuals, but a crucial issue is the definition and measure of dementia.

[5] We restrict the attention to personal care and do not consider help with domestic tasks which may be largely unaffected by the dementia shock.

Measuring cognitive impairment in the sample

A vast and increasing literature is investigating how to assess and measure cognitive health at the individual level and in a population, different approaches have been proposed to carry out studies in large samples: a well-known example is the Langa-Weir classification carried out on the Health and Retirement Study for the US (Langa et al. 2005 and Crimmins et al. 2011). The Langa-Weir "probable dementia score" classifies individuals based on a score from a series of cognitive tests: it allocates individuals into categories of demented, cognitively impaired without dementia, or having normal cognitive functioning, according to the position on a the scale where the higher the value the better is cognitive functioning. The most widely used scale ranges from 0 to 29, the "demented" status is usually below a score of 9. Along these lines, we first considered several alternative measures of cognitive decline (i.e. a change), using for example the cognitive tests included in the SHARE and ELSA surveys, such as the memory test and the verbal fluency test[6]. As in Celidoni et al. (2017), newly cognitive impaired individuals could be the ones who score at least a 20% decline in the total test score from one wave to the other. However, while the Langa-Weir approach and the work by Celidoni et al. (2017) are extremely useful in cross countries comparisons, to have a broader view on the dynamics of mental health and in particular for estimating the likelihood of potentially develop dementia in the near future, we need a well-defined point in time, where a change of regime takes place from the non-demented state to the demented state. This choice is in order to avoid possible distortions due to the adoption of a specific scale and the choice of thresholds (see Arapakis et al. 2021 for a discussion), for this reason we focus on diagnosed dementia. Both SHARE and ELSA ask if a diagnosis has been made by a doctor for: Alzheimer's disease, dementia, organic brain syndrome, senility or any other serious memory impairment. In this sense our estimates of the prevalence of people affected by cognitive decline is more conservative than in the other studies.

Sample selection and estimation data

[6] The memory test consists in recalling a list of 10 words in one minute, while the verbal fluency involves naming as many animals' names as possible in one minute

Our study includes respondents interviewed in ELSA survey between 2002 and 2017, and in the SHARE survey between 2004 and 2017. We include the following set of countries, for which we have information on multiple subsequent waves: Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium and England.

Table 1 reports descriptive statistics for original dataset. The prevalence of dementia is about 1.7%. The average age is 66, there is a slight prevalence of women (54.7%), a few respondents attained higher education (22%), an outcome which is quite common in these cohorts, and the average yearly income is about 35,000 €. The average yearly expenditure on rent and food amounts to €1,640 and €4,700 respectively. Out-of-pocket use is 46% in the SHARE data, with an average spending of €365.

Around 35% of the individuals report having more than one morbidity (comorbidities), and seeing a doctor almost 7 times a year on average, while 15% of the sample has been in the hospital during the last year. Around 10% reports using formal Long-Term Care, a larger percentage (18.2%) receives informal care from non-cohabiting family members and friends, 10.5% reports that such informal support is received at least weekly.

The focus of this paper is to estimate the effects of the onset of dementia by comparing individual's outcomes in the waves immediately before the event and after the event, so that we do not measure cumulative effects, but only changes due to the specific event. Hence, we only include respondents who have not been diagnosed with dementia at baseline: this choice allows us to estimate the effect of the onset of dementia without the potentially confounding effects regarding respondents who had a previous diagnosis (e.g., to avoid considering disease relapses). Furthermore, for individuals who report an onset of dementia, we drop all the observations pertaining to later waves. It should be recalled that the maximum time-span between the "pre event" data and the "post event" data, is two years, which is the frequency of the different waves both in the SHARE study and the ELSA study. However, some individuals "skip" waves, so that the pre event versus post event comparison would potentially entail a time-frame of 4 years in these cases. We deem this interval too long for a meaningful identification of the short-term effects of the dementia onset. Hence, we retain only respondents who have completed at least three consecutive waves and drop any individual-observation point which is not associated to another interview in the preceding or following wave.

We further restrict the analysis to respondents aged between 50 and 90 at the time of the interview, the respondents aged 91 and over are excluded in order to avoid the possible panel attrition due to deaths. The following paragraph describes the sample characteristics.

Preliminary evidence on the prevalence of dementia and dementia onset across waves

Table 2 outlines some basic statistics for the population with or without dementia, respectively, in our sample. This tables contains individuals who became demented along the survey, so they are not demented at their first appearance. Dementia cases are slightly more frequent among females, and among respondent with lower education and lower-income. Descriptive evidence also suggests that people who reported the onset of dementia exhibit a relevant short term increase in expenditure on rent and out-of-pocket and a decline in spending on food, compared with healthy respondents. Individuals with dementia are also substantially more likely to visit a doctor, that could be a GP or a specialist, spend days and nights at the hospital, receive formal and informal care, including weekly or more frequent informal care. The prevalence of dementia also varies across countries, possibly due to differences in the average age. As shown in Table A-4, in the Appendix, the prevalence of dementia ranges from 2.0% of the sample in Spain to 0.5% in England[7].

Table 3 provides further details on transitions to dementia (dementia-onset). Out of a total 134,852 wave-to-wave transitions (that is, the number of times the same individuals are observed in adjacent waves), we observe 1,657 instances in which dementia was reported in the subsequent wave. Note that, by virtue of our sample selection, we exclude both the possibility of capturing dementia-cessation (someone reporting dementia in one wave and then reporting no dementia in the subsequent wave) and of dementia-continuation (someone reporting having dementia in two subsequent waves). In the remaining 133,195 wave-to-wave transitions, respondents confirmed having no diagnosis of dementia. Table 3 also report the number of transitions for specific socio-demographic groups. In particular, we note that transitions are more relevant for

[7] As part of the sensitivity analysis which we will carry out, in the estimates we will group countries based on the geographical areas as follows: we keep England separate (the ELSA survey), and then group the SHARE countries into "Northern" (Sweden and Denmark), "Centre" (Austria, Germany, France, the Netherlands, Switzerland and Belgium), and "Southern" (Italy and Spain).

people aged 65 and over, they are similarly prevalent for male and female, while they are more frequent among low- and medium- socioeconomic groups (SES) than for higher-SES respondents, as measured by income levels; consistently, transitions are more frequent among lower-educated than among higher educated respondents. These results are well-known: age is a prominent risk factor for dementia, as are other individual characteristics such as socioeconomic status and access to healthcare (Resende et al, 2019).

Table A4 in Appendix includes details on dementia transitions for separate geographic locations.

3. Econometric results

This section shows three sets of results: the effect of the onset of dementia on 1) changes in the consumption basket, 2) healthcare utilisation, and 3) long-term care utilisation.

We first discuss (3.1) the main average effect of dementia on the dashboard of outcomes, and then (3.2) study whether such effects vary across genders, educational attainments and income levels.

3.1 Baseline results – average effects

Table 5.1 summarises the results of OLS fixed-effects regressions, which estimate the short-term effect of dementia onset on consumption expenditures (columns i-iii) and healthcare use (iv-vii). Our results suggest that the onset of dementia is associated to substantial changes in consumption expenditures housing-related expenditures, OOP expenditure (for SHARE countries only) and healthcare use[8].

We estimate a drop in food expenditure by € 406, i.e. a reduction of around 5.9% with respect to the sample average among respondents without dementia; we also estimate an increase in rent spending by €1,126, which corresponds to a 62% increase with respect to the average. If we focus on these two expenditures only, several explanations are possible: an obvious reason is that the expenditures for eating outside the home is automatically reduced, while more spacious or more equipped homes are necessary. A direct substitution mechanism, mostly operating for individuals

[8] It should be recalled that out-of-pocket expenditures are available for a sub-sample only, which is why we discuss them at the end of the section.

who are retired when the shock occurs, is the existence of liquidity constrains,[9] which may require a reduction in food consumption (both inside and outside the home) to finance higher rent/housing spending. Of course, we have to be careful with these interpretations, because we are not controlling for the other items of a typical consumption basket, such as clothing, but our results are suggestive of the important rebalancing taking place for older people after the shock.

As for out-of-pocket expenditures (column iii), which we can estimate for SHARE countries only, the results suggest that dementia increases the spending of almost €100, which represent an increase of about 26% if compared to individuals with no dementia.

The other explanatory variables have the expected sign , and the estimate of the coefficient of interest is comparable to Meijer et al (2022) which found an increase in OOP of € 253 (a lower bound, but not statistically significant). We should stress that this could be an under-estimate of the actual short-run changes, because the imputed level of OOP expenditures only refer to a limited number of items.[10]

According to our estimates, the average net increase in the yearly expenditures per individual amounts to €820.85, which corresponds to a 12.5% increase in the consumption basket for an individual without dementia.

For the second group of outcomes, we estimate an average increase in the number of visits to a doctor by 2.6. This amounts to a large effect, considering that the average number of doctor visits in the whole sample is 6.7 per year. Moreover, we estimate an increase in hospital stay of 5.8 percentage points (a large effect given that the share of staying in hospital is 15%). In particular, we estimate an average increase in the number of hospital-stays a year by 0.135 (sample average, 0.25), and an increase in the number of nights spent at the hospital by 1.7 (sample average, 1.6).

All in all, the onset of dementia leads to a significant increase in housing expenditures, OOP expenditures and health-related expenditures, and a large increase in the need of inpatient care, including nights spent in hospital.

Finally, Table 5.1, Panel B, reports the results relative to the use of long-term care. Consistently with the effects on healthcare use, the onset of dementia is estimated to substantially increase the

[9] Only 10% of the respondents in the sample are still working.

[10] We also conduct the analysis using the raw measure of out-of-pocket spending available in the original data and report the results in Table A6.6. Comparing the findings obtained from the original and the imputed OOP measures, the estimates are similar and the raw measure findings confirm an increase in OOP of about 29%.

short-term need for long-term care. We predict that dementia is associated with higher probability of needing informal home-based care by 18 percentage points. Such an increase in the demand for informal care is likely to be characterised by high intensity care provision, since we estimate an increase by around 19 percentage points for the utilisation of weekly (or or even more frequent) support by family or friends (column ii). The increase in demand for informal care does not displace demand for more formal types of support (Callegaro and Pasini 2007, Bonsang 2009, Banks et al. 2023, Brugiavini et al. 2023, Gruber and McGarry, 2023), a finding which is in line with previous work on this topic. We estimate that receiving any type of nursing or personal care at home increases by 17.4 percentage points after the onset of dementia (column iii): a very large effect considering that the percentage of formal home-based care use in the whole sample is 3.7. We also find that dementia is associated with a significant increase of 3.72 percentage points for time spent in a residential facility (column iv).

4. The overall monetary costs

In this section we report the individual monetary costs attributed to the dementia diagnosis on the basis of our estimates for the second group of variables, where expenditures are not directly observed. It should be stressed that we do not distinguish if these costs are private costs, i.e. paid directly OOP or through a private insurance, or costs paid by the healthcare system in those countries where they are covered.

To do this, first we compute the baseline costs for doctor visits, nights at the hospital, formal and informal care and then infer the additional costs emerging for people with dementia, by using the estimated coefficient of dementia of each econometric specification. The measure of the average (baseline) costs for the number of visits to the doctor or nights at the hospital for someone without dementia are available in the current waves of the data. For the costs of informal and formal care, we have to follow a two-step procedure: first derive the number of hours of care and then attach to this number the hourly cost. The average number of hours for informal/formal care are observed in waves 1 and 2 in the SHARE data, but not in subsequent waves, so we have to extrapolate the observed hours to the years after 2006, for individuals who report having used care (a 0/1 indicator variable).

In the following subsection we present the costs supported either by the individual or the public healthcare system.

Doctor visits, inpatient costs, informal and formal care costs

We compute the costs for doctor visits (GP or specialists) and nights at the hospital. We start by using the doctor unit cost measured by Mayer et al. (2022) at price 2019. We select the price of a doctor visit in Austria to compute the additional costs based on our dementia estimates. Austria is chosen as a role model for its long term care system in healthcare. The cost is in price for a state funded service. Table 7.1 reports the figures. The average costs for visits to a doctor for an individual without dementia is € 213.06 per year. Based on our estimates, a dementia diagnosis increases the number of doctor visit by 2.6, which translates into an additional costs of € 82.68, and a total costs of € 295.74 per year.

We also compute the total inpatient costs. The unitary costs are taken from the Cygańska et al. (2023) for hospital stays and are estimated using the SHARE data. It is measured using patient socio-demographic and health characteristics. Based on the SHARE sample we use, the annual costs for nights at the hospital is of €1,483.10 per person. When a dementia diagnosis occurred, the incremental costs is of 1.7 additional nights in the hospital. This effect implies an additional costs of € 1,575, and a total annual costs of €3,058. The total variation in hospital costs, including doctor visits, is equivalent to a remarkable 97.7% increase compared to the costs for an individual without dementia.

Finally, we estimate the extra costs for informal and formal care in relation to the onset of dementia. For informal care costs, we provide both the opportunity cost approach and market value approach: while the first approach estimates the foregone wage that an individual would have earned if they had spent the time working instead of providing care, the second approach evaluate the cost of buying the service in the market (see also Brugiavini, Carrino and Pasini, 2023).

Results are shown in Table 7.2. We start with the opportunity cost approach for informal care. We use the select the average wage for all workers in Austria as the reference wage and compute the wage per hour based on the OECD statistics (€ 24.22 per hour). Based on the sample, the annual costs for the average informal care provided is of € 11,335 per year, for an average of 9 hours per week (this includes informal care for any individuals, with no specific focus on any disease).

When a dementia diagnosis arrives, the incremental costs is of 18 percentage point, which means 12.5 hours more per week. This implies an increase in costs of € 15,743 additional foregone wages to provide informal care. Summing this cost to the initial informal care costs, we get a total annual costs of €27,078.

As a second approach, we compute the market value costs for both informal and formal care. We provide three different scenarios: the first one includes the sum of both informal and formal care costs, the second considers the partial substitutability between formal and informal care (Bonsang, 2009), finally the third considers the costs separately.

Starting from the first scenario, we take the annual salary of a care worker based on the Eurofound (2018) reports, following Meijer et al. (2022). We consider the average cost for Austria of a annual salary for care worker (€ 15.13 per hour) and estimate a baseline costs of € 7,081 per year for informal care. Then, we add the incremental hours for informal care following the diagnosis dementia, which amounts to a total of 12.5 hours per week (as above) and a total increment of € 9,835. This leads to a total cost of € 16,915 per year.

Then, we compute the total cost for formal home care after the diagnosis, again using the average wage/hour for a care worker at home. The baseline cost for any individual receiving formal care at home was of € 9,323 per year, given the 7.9 hours of care per week. The incremental hours following the diagnosis is of 37 hours per week and leads to an additional costs of € 29,212 The total cost for formal long term care at home is of € 38,536. This result aligns with the of on Banks et al. (2023, NBER) which found an annual cost per individual for formal home care of Euro 30,200 (GBP 27,000), and with the one of Gruber and McGarry (2023, NBER) which estimates annual home care costs above Euro 26,200 ($30,000) per person.

Based on our estimates, the first scenario suggests a total annual cost for home long-term care of €55,450.

The second scenario rests on the assumption that formal care at home can substitute for informal care at least partially (Bonsang, 2009). For example, care workers can not only provide personal care for bathing, showering, dressing; but also cleaning and making the grocery shopping. Thus, if we were to substitute 2 hours of formal care for every hour of informal care, this would half our estimates of informal care costs (€ 8,457). The final costs for long term care at home would then be of € 46,993.

Finally, the third scenario considers the formal and informal costs at home as separate and suggests a costs of either € 16,915 per year or € 38,536, depending on the household choice.

In conclusion, according to our estimates, the average net increase in expenditures per individual in a SHARE country amounts to € 820.85, excluding costs emerging from health-related activities and to Long-term Care. If we consider the costs for hospital stays and doctor visits, the net increase is in the range of € 1658 per individual. When looking at the cost related to formal and informal care, the burden is significant, going from a net increase of € 9,835 for informal care at market value costs to an increase of € 15,700 for informal care as foregone wages. Finally, a net increase of € 29,200 for formal care costs at home per year is estimated.

The total increase in expenditure due to a dementia shock spans from a minimum of € 820.85 for the consumption basket, to a maximum of € 31,680 including formal care and hospital costs.

Our results are comparable to previous studies: they are in line with the work of Hurd et al. (2013) for the U.S., which reports a minimum cost of about € 39,300 ($41,680) per year per person due to dementia[11]. The analysis for the U.S. accounts for payments for nursing home stays, hospital stays, doctor visits, dental visits, outpatient surgery, home health care, other special services, prescription drugs and dental services. A similar comparison can be drawn with Kelley et al. 2020, who looked at long-term spending after a dementia diagnosis, and found that out-of-pocket expenditure for healthcare and informal care increase dramatically for community residents with dementia compared to nursing home residents. They estimated a minimum increase in individual costs of €50,740 ($55,500) for out-of-pocket for someone cared in community residences.

A more direct comparison could be made with Meijer et al. (2022), even if they measure cumulative expenditures over several years, while we look at short-term between waves changes. In their paper out-of-pocket expenditures have a negligible role (the results are not statistically significant) and also their result are significantly smaller than ours when looking at informal care costs (between € 2690 and €15,470 per year/person, depending on the country considered). As we argued, because they neglect the reallocation of the family basket, some other changes are not included in their analysis.

[11] US Dollars are converted in 2018 euros by applying the prevailing inflation correction and exchange rate convertion

5. Heterogeneous effects by sex and education

It is important to establish in a more robust way if the negative economic impact of the dementia onset are heterogeneous across sexes, and across socioeconomic status, measured through educational attainment and income. In this section we separately discuss outcomes related to consumption, healthcare and long-term care utilisation. The full results for the heterogeneity analysis are reported in Appendix Tables A.5.2a and A.5.2b.

Effects on consumption and healthcare utilisation

Table 5.2, Panel A, displays the consumption outcomes in columns i-iv. We find that the onset of dementia reduces the average spending on food items and increases housing costs and out-of-pocket spending in the same way across genders

We also find no statistically different effect of dementia on food spending or housing spending in terms of education (and in general on the basis of the SES), but significant differences for out-of-pocket spending by education level, with higher OOP spending being associated to low and medium education individuals.

Columns v-viii in Table 5.2- focus on changes in healthcare demand. The increase in the number of doctor visits is significantly higher for men than for women, while hospital care (number of hospital stays and number of nights spent in hospital), displays no significant difference between genders.

When looking at differences by education, we find that respondents in the low education group increase their healthcare utilisation after the onset of dementia, while respondents in the intermediate education group report an increase in the number of doctor's visits and the likelihood of spending any time at the hospital, and higher education group only report a statistically significant increase in the number of hospital nights stays. The size effect of the increase in healthcare use is large: for example, lower educated respondents report an increase of 2 units in the number of doctor visits, compared to a sample average of 6.7, and an increase in the likelihood of hospital stay by 6.6 percentage points against an average rate of hospital stay of 15%.

Effects on Long-Term Care utilisation

In Table 5.2, Panel B, columns i-iv, we estimate whether the effect of dementia onset on Long-Term Care (LTC) use is heterogeneous by sex, or socioeconomic characteristics.

Overall, we find that both men and women are much more likely to start receiving Long-Term Care after a diagnosis of dementia, and that there are no substantial heterogeneous effects by sex. We estimate that men are slightly more likely to rely on informal care than women (1), while women report a larger increase than men in the probability to start receiving home-based formal care as well as residential care but the difference across sexes is not statistically significant due to low precision in the estimated effects.

When investigating differences in education levels, we find that all groups increase their use of informal and formal care, yet with a statistically significant gradient. For outcomes such as the probability of receiving any home-based informal care (1) and the probability of accessing residential care (4), we find an inverse U-shaped heterogeneity effect, such that respondents in the middle education group report the largest increase after the onset of dementia, followed by those in the high education group and by those in the lowest education category. The same gradient is visible also for the remaining outcomes (informal care intensity and home-based formal care take-up), but not statistically significant.

6. Further analyses and robustness tests

This section investigates the effect of dementia of one member of a couple on the wellbeing of the partner, it then provides some tests of robustness of our main findings by proposing different model specifications and different definitions of the main outcomes.

Intra-household spill-over effects of a dementia diagnosis

In this section we explore whether, within a couple living in the same household, the dementia diagnosis for one member of the couple has a spill-over effect on the wellbeing of their partner. It should be stressed that the proximity of relatives is an important driver of care provision, which in turn affects wellbeing (Choi et al, 2021). Since in our analysis we do not investigate the role of children, which is explored in Bassoli and Brugiavini 2024, we limit the investigation to co-

residing couples[12]. There are several theoretical reasons why we can expect the spousal wellbeing to react to their partner ill-health. First, if love and affection are present, which we consider "altruistic motives", the health and wellbeing of one partner enters the utility function of the other member of the couple and has a direct effect on wellbeing (Becker, 1981; Kolm, 2006).[13] Moreover, we have shown in the main analysis that dementia leads to an increase of healthcare use and out-of-pocket expenditure, which is likely to affect the living standards of the whole household. In turn this is likely to be detrimental for the wellbeing, and especially the psychological wellbeing, of the other members of the household (Robinson et al., 2011, Egilstrod et al, 2019).

To explore this line of investigation, we estimate our model presented in Section 2, where the new dependent variable is a measure of the spousal wellbeing and the explanatory variables include a dummy capturing whether the partner has a diagnosis of dementia. The other controls are: spousal sociodemographic characteristics and the partner's age. We estimate this model separately for male spouses (with female partners), and for female spouses (with male partners).

In order to measure wellbeing, we can rely on several variables available in the SHARE/ELSA survey, which have been validated and widely exploited in the socio-economic literature. In particular, we focus on self-reported happiness (measured with a binary variable for reporting being "happy"), life-satisfaction, risk of depression (the EURO-D[14] variable for SHARE Countries, see Castro-Costa et al., 2008; and the CES-D variable for ELSA's England, see Karim et al., 2015), and quality of life score (the CASP score, see Oliver et al., 2021).

Happiness is a dummy equal to one if the respondent reported to be happy "often" or "sometimes" to the question "*How often, on balance, do you look back on your life with a sense of happiness?"*. It has been used in the literature by Finkelstein et al. (2013), Kools and Knoef (2019), Simonsen and Kjaer (2021) and Bassoli (2022).

[12] In order to mitigate issues of endogeneity we consider couples who report co-residence for several years before the event. Of course, one could also discuss the problem of assortative mating, but this would go beyond the scope of our work. In any case, if assortative mating is present for our couples, the gender asymmetry that we find is even more striking.

[13] An altruistic spouse could also find comfort in providing care to the partner after the onset of dementia. This would contribute to a marginal positive increase in well-being. However, we hypothesize, especially in the short-term, this effect is likely to be dominated by the other negative-oriented effects described in this paragraph.

[14] The Euro-D score includes 12 item from a list of symptoms such as: loneliness, depression, irritability, lack of sleep, feeling of guilt, tiredness, lack of appetite, wishing death, tearfulness, concentration, enjoyment and pessimism. It has been validated by Prince et al. (1999) and largely used in the scientific literature.

Another item available in SHARE is the life satisfaction question: "*On a scale from 0 to 10, where 0 means completely dissatisfied and 10 means completely satisfied, how satisfied are you with your life?",* While the scale ranges between 1 (*Very Satisfied) to* 7 (*Very Dissatisfied*) in the ELSA questionnaire.

In SHARE, EURO-D is a dummy equal to one if the respondent has at least 3 out of 12 conditions on the Euro-depression scale. The scale includes having feeling of depression, sadness, fatigue, irritability, guilt, suicidal, being tearfulness, having lack of sleep, concentration, appetite, enjoyment or interest. The scale has been validated by Prince et al. (1999). In ELSA, the scale of depression is based on a 8 item score that includes feeling of depression, sadness, loneliness, inability to get going, restless sleep, life satisfaction, happiness and feeling everything as an effort. More information can be found in Karim et al., 2015.

Finally, the CASP score is a measure which focuses on the quality of life of the individuals and includes questions regarding control, autonomy, self-realization and pleasure in life. The SHARE CASP score includes 48 items, while for ELSA 19 items.

To harmonize the different scales used in the SHARE and ELSA surveys questionnaires for life satisfaction and CASP, we proceed by normalizing the scale by country and wave.

Intra-household wellbeing spillovers

First it should be noted that as in Choi et al (2021) we find that cases of dementia are more common for singles by a significant percentage: 1.55% have dementia if singles, 0.8% if in a couple. When we focus on couples, we find a very interesting asymmetry in care provision and effects of caring activities on the caregiver.

Table 6.1 (a) describes the effect on the wellbeing of male spouses after their female partner is diagnosed with dementia. We find a significant increase in the risk of facing clinical depression (by 11.8 percentage points, compared to an average risk of depression of 15.8%) and a simultaneous decline in quality of life (CASP) by 1.42 points, out of an average of 38.8. When looking at the opposite case in Table 6.1 (b), that is the effect on the wellbeing of the female spouse when the male partner is diagnosed with dementia, results are more striking. Female spouses exhibit a lower life satisfaction (a reduction of 0.5 points compared to an average of 8), which was not observed among male spouses. Moreover, consistently with what was observed among male spouses, female spouses also report a higher risk of depression (by 10.5 points,

compared to an average of 28.7%) and a lower quality of life (by 1.9 points compared to an average of 38) as a result of their male spouse being diagnosed with dementia.

Our results suggest that women are particularly suffering from the male partner's diagnosis, possibly due to the fact that the incidence of depression and psychological illness is more prevalent among women (Kuehner, 2017), or that women exhibit a stronger reaction, in terms of psychological wellbeing, to negative shocks than men do. Regardless of the different potential explanations, the difference is remarkable.

Intra-household care spillovers

We then explore whether the onset of dementia affects the spousal likelihood to provide care to the sick partner. As shown in Table 6.2, the onset of dementia is linked to an increase in spousal care support, regardless of sex. However, and consistently with our previous results (Table 5.2), we find that it is much more likely that the female spouse will start providing informal care to their male partner (we estimate an increase of 11.5 percentage points), compared to the probability that the male spouse will start providing informal care to their female partner (which increases by 5.8 percentage points). This is in line with the well-known gender-biased distribution of care tasks within households in relation to changes in health of one partner (see for example Choi et al. 2021, Bassoli and Brugiavini 2023 for recent evidence).

Sensitivity analysis

Alternative measure of dementia

We assess the sensitivity of our results by using an alternative definition of dementia diagnosis and we exploit the Langa-Weir different classification for the US (Langa et al. 2005 and Crimmins et al. 2011). The Langa-Weir score classifies individuals based on thresholds from a series of cognitive tests including immediate word recall, delayed word recall, date naming, cognition tests, verbal fluency and verbal numeracy. Individuals fell into categories of demented, cognitively impaired without dementia, or having normal cognitive functioning. The score from 0 to 9 is assigned to a state of dementia. We proceed by computing the Langa-Weir score both in SHARE and ELSA, and we assigned a diagnosis of dementia when the score fell below 10 from

one wave to the subsequent one. We run the baseline analysis with this alternative measure of dementia. The results are reported in Table A 5.3 a and b. The main findings are confirmed, however the magnitude of the results is smaller for some outcomes such as food, rent and out-of-pocket spending. Nevertheless, the effects are in line with the baseline evidence of Table 5.1 a and b.

Alternative controls: measure of economic resources

In our main specification we included income as a control variable to capture the current level of economic resources for individuals. However, the lifecycle theory suggests that wealth is a better proxy for lifetime resources. Our measure of wealth includes net financial assets, plus the value of house, car and business. As shown in Table 6.3a and Table 6.3b, our main findings are fully confirmed (full results in the Appendix tables A.6.3a and A.6.3b).

Alternative controls: pre-diagnosis hospital stays

In our main specification we controlled for a substantial set of health conditions (including chronic conditions), yet we ignored whether respondents' were already using hospital care before the dementia diagnosis. We now include this information as a control, as we hypothesize that previous hospitalization could be a further signal of weak health and could be an additional confounder on the impact of dementia on consumption. The sample is significantly reduced, but it still remains large. Results (available in the Online Appendix Tables A.1.1a-A.1.1) show that our findings are largely confirmed, and in some cases with improved estimates' precision.

Further heterogeneity: living arrangements

In our main analysis we pooled together respondents living in couple and single. However, it is well known that partners are the first source of support with activity limitations and dementia (OECD health at a glance 2019), and we have shown at the beginning of this Section that people do take up caregiving activities once their partner is diagnosed with dementia. For this reason, we re-estimate our models by splitting the sample between respondents living in couple and

single (where single pools together respondents who are never married, separated, divorced or widow(er)) at the time of the diagnosis. Results are shown in the online Appendix, at Tables A.2.1a-d (for those living in couple) and Tables A.2.1e-h (for singles). While most findings are confirmed, there are notable differences between the two groups.

First, single react much less than people in couple in terms of their consumption choices, with lower estimated changes on food expenditure, yet they show higher changes in rent expenditure and out-of-pocket spending. This might be due to the lower availability of economic resources which typically characterize older people in single households compared to those in couple.

Second, the effect of dementia onset on care use is much larger among respondents living in couples (Table A.2.1b) than among singles (Table A.2.1f), at both the extensive (column (i)) and the intensive margin (column (ii)). This can be explained by the aforementioned spousal support, as shown in Section 5 where we discussed the intra-household care spillover. On the other hand, this points to a higher risk of unmet needs for older people living alone with cognitive impairments. Indeed, while singles report a higher probability of formal care take-up (Table A.2.1f, column iii) than people in couple (Table A.2.1b, column iii), the coefficients are rather comparable and it would be the matter for further research to investigate whether the higher reliance on formal care for singles can compensate the reduction in informal care use, compared to respondents living in couple.

Further heterogeneity: home-ownership

In our main specification we do not control for whether respondents are home owners or not. However, given that most of the respondents are retired, having to pay rent might be an essential expenditure that could constraint the household budget. For this reason, controlling for this home-ownership could help disentangling further heterogeneity. Tables A3.1a-d report the results for eq.(2) including the variable for home ownership and the interaction of this term with dementia. Looking at the net effects of the interaction in Table A3.1c and A3.1d, there is a statistically significant difference in the effect of dementia on food consumption and hospital utilization between home-owners and renters, with the first category reducing food and increasing hospital access. Another evidence is found for home based formal care, where those who owns their home experience a larger and positive effect on formal care use compared to

those who do not own their home. This is in line with the preference for staying at their home while being formally cared. No other significant effects are found.

Alternative time-span: longer-term effects

In our main analysis, we focused on the *short-term effects* of the onset of dementia, by only including respondents in the sample up to the wave in which they reported having been diagnosed with dementia. We now relax this assumption and follow up respondents in the subsequent wave after the diagnosis (t+1), in order to estimate a medium term effect of dementia as the average between the almost contemporaneous effect and the effect estimated in the following wave. In this way, we aim to study whether individuals' response to the diagnosis has spill over effects in the medium term, or whether it is primarily a short term.

Tables A.4.1a-d reports the results for Eq(2) for the outcomes of interest. Overall, the results are confirmed and suggest that households reduce consumption and increase rent and house related expenditures up to four years after the diagnosis (since the survey is biannual). Moreover, the evidence for the demand for formal and informal care is in line with the baseline analysis of Table 5.2. This evidence further confirms the robustness of our baseline analysis and suggest that the dementia diagnosis has critical effect in terms of changes in the consumption basket and demand for healthcare, even in the medium term, i.e. four year after the event.

Non-linear transformation of dependent variable

In our main model, we included the dependent variables on expenditure (food, rent and OOP) as continuous, and we measured them in monetary terms. However, because the distribution of expenditure levels in the population is often skewed, our imposed linear estimation might fail to capture the whole mechanisms. We therefore implement an inverse hyperbolic sine transformation for all the monetary dependent variables, namely, food, rent and OOP expenditure (Bellemare & Wichman, 2020). Consistently, we apply the same transformation to household income among the control variables. The results are shown in Table 6.4. Overall, all our main findings are confirmed, in that we do not find significant sex-based differences nor education differences in expenditure changes.

7. Conclusion

Our paper provides novel estimates of the costs of dementia for individuals and their families in Europe by analysing a panel data of 11 countries of older people recorded in the Share survey and the ELSA study. Our study is the first attempt at providing a comprehensive account of the possible changes in the basket of commodities and services, for people who have been diagnosed with dementia. Our estimates, based on the SHARE and ELSA studies, exploit the panel nature of the data to control, as much as possible, for unobserved heterogeneity, by making use of fixed-effect methodologies. One further novelty of the paper is that we provide new evidence on out-of-pocket health expenditures at the individual level in the SHARE data.

We show that individuals change the allocation of their basket of goods by reducing food expenditures and increasing housing expenditures and out-of-pocket health related expenditures. At the same time, the demand for care, both formal and informal care, increases.

We estimate an average net increase in expenditures per individual amounts to €820, if we do not account for Long-term Care and other health related expenditures. If we include the costs for hospital stays and doctor visits, the net increase is in the range of €1,658 per individual. The impact on the formal and informal care costs of the onset of dementia is marked: it spans from a net increase of €9,835 for informal care at market value costs, to an increase of €15,700 for informal care when the estimate is based on foregone wages. Finally, we estimate a net increase of €29,200 for formal care costs of services received at home.

Overall, the total net increase in expenditure due to the onset of dementia spans from €820 if limited to the consumption basket of food, housing expenditures and OOP expenditures, reaching €31,680 if formal care and hospital costs are included.

Further analyses disentangle heterogeneous effects based on sex, education and income level. Different groups are exposed to this type of shock in different ways, thus likely calling for more social protection. Overall, men are more likely than women to increase the number of doctor visits. As per the long-term-care assistance, men are more likely to resort to informal care than women, who are more likely than men to resort to formal care.

Moreover, we show that the onset of dementia has relevant spillover effects on the wellbeing and time use decisions of the spouse. In particular, we show that the spousal wellbeing significantly deteriorates following the partner's dementia diagnosis. However, such spillovers are unequally distributed by sex: while both partners increase their caregiving activity once the spouse is diagnosed with dementia, such increase is significantly higher when the spouse diagnosed with dementia is male, and the caregiver is female.

We want to stress that our estimates capture the short-term impact on the socio-economic conditions for individuals and their families of such changes in health conditions. These expenditures occur immediately after the diagnosis of dementia, and many households could be totally unprepared for bearing the costs of the onset of dementia, even in cases when these costs are partly covered by the health care system. At the same time, with the increasing share of an ageing population, welfare systems could be under strain in future years, due to the predicted increase in the number of cases of dementia.

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Tables

Table 1 Descriptive Statistics

	Original dataset		
Variable	Obs	Mean	Std.Dev.
Dementia	231000	0.017	0.127
Age	255000	66.614	10.211
Female sex	255000	0.548	0.498
Low educated	175000	0.439	0.496
Mid educated	175000	0.335	0.472
High educated	175000	0.226	0.418
Income	255000	34601.89	57235.96
comorbidities	255000	0.347	0.61
Any out-of-pocket	170000	0.468	0.499
Out of pocket amount	152730	365.647	5151.614
Rent	197000	1639.523	3830.288
Food	254000	4688.796	4436.622
In-home food	254000	3799.97	3527.382
Out of home food	255000	703.604	1357.099
Doctor visits	128000	6.786	9.867
Been to the hospital	178000	0.152	0.359
Times at the hospital	178000	0.257	0.845
Nights at the hospital	178000	1.727	8.881
Formal care received	139000	0.106	0.308
Informal care received	234000	0.182	0.386
Weekly Informal care	234000	0.105	0.307
Home-based care	139000	0.048	0.214
Residential care	175000	0.006	0.075

NOTE: This table reports descriptive statistics for all the variable of interest based on the original dataset

Table 2 – Descriptive outcomes by dementia status (selected sample)

	WITH DEMENTIA			NO DEMENTIA			Statistical difference controlling for age
	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs	p-value
age	78.391	8.295	1914	66.270	9.662	224127	0.000
female	0.576	0.494	1914	0.547	0.498	224127	0.012
Low educated	0.616	0.484	1678	0.338	0.473	190205	0.000
Mid educated	0.214	0.415	1914	0.356	0.479	224127	0.000
High educated	0.116	0.320	1914	0.206	0.405	224127	0.001
income	22927.898	27205.462	1889	33,964.384	52,168.384	223716	0.000
comorbidities	1.225	1.128	1914	0.778	0.910	224127	0.000
Any out-of-pocket	0.377	0.485	1469	0.478	0.500	141207	0.000
Out of pocket amount	594.869	716.542	1271	386.729	529.793	125296	0.000
rent	2,702.664	5,999.034	1657	1,597.685	3,815.450	167517	0.000
food	3,945.608	3,711.887	1914	4,547.642	4,394.191	224127	0. 000
Doctor visits	13.512	16.616	817	6.718	9.706	101951	0.000
Been to the hospital	0.300	0.458	1542	0.151	0.358	148555	0.000
Times at the hospital	0.619	1.404	1542	0.254	0.845	148555	0.000
Nights at the hospital	5.864	23.637	1542	1.631	8.242	148555	0.000
Formal care received	0.450	0.498	1153	0.095	0.293	112824	0.000
Informal care received	0.598	0.490	1852	0.170	0.376	203275	0.000
Weekly Informal care	0.482	0.500	1852	0.091	0.288	203275	0.000

NOTE: This table reports the descriptive statistics for the demographic characteristics and the outcomes of interest for individuals with and without dementia, for the selected sample. Statistical difference of the variables is tested between the groups

Table 3 Transitions to dementia for respondents not affected by dementia in previous waves

Sample of respondents without dementia at t0	No dementia at t1	With dementia at t1	Total
WHOLE	133,195	1,657	134,852
%	98.77	1.23	100.00
AGED 65+	63,672	1,476	65,148
%	97.73	2.27	100.00
AGED 50-64	56,809	129	56,938
%	99.77	0.23	100.00
FEMALE	71,520	932	72,452
%	98.71	1.29	100.00
MALE	61,670	725	62,395
	98.84	1.16	100.00
LOW INCOME LEVEL	25,355	540	25,895
%	97.91	2.09	100.00
MID INCOME LEVEL	24,193	324	24,517
%	98.68	1.32	100.00
HIGH INCOME LEVEL	33,011	161	33,172
%	99.51	0.49	100.00

LOW EDUCATION	44,672	1,011	45,683
%	97.79	2.21	100.00
MIDDLE EDUCATION	55,794	419	56,213
%	99.25	0.75	100.00
HIGH EDUCATION	32,117	222	32,339
%	99.31	0.69	100.00

Table 5.1 a, expenditure and health care use, individual fixed-effects analysis, Panel A

Dependent variable	i Food spending	ii Rent spending	iii Out-pocket spending	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
dementia	-405.9***	1,126***	99.85***	2.556***	0.0582***	0.135***	1.674***
	(98.73)	(157.3)	(22.25)	(0.692)	(0.0148)	(0.0433)	(0.572)
income	0.00109**	0.000274**	20.25***	-3.39e-07	1.09e-08	5.19e-09	-1.09e-07
	(0.000505)	(0.000140)	(2.928)	(4.47e-07)	(2.17e-08)	(3.34e-08)	(2.39e-07)
age 6575	114.9***	-128.5***	1.95e-05	-0.159	-0.00710	-0.0359***	-0.167*
	(35.12)	(31.26)	(3.11e-05)	(0.145)	(0.00440)	(0.0105)	(0.0987)
age 7685	58.04	-45.44	-27.90***	-0.333	-0.00351	-0.0309*	0.127
	(52.23)	(57.52)	(6.301)	(0.245)	(0.00727)	(0.0186)	(0.188)
age 85+	-155.2**	660.5***	-5.732	0.296	0.0265**	0.0648**	0.691**
	(74.51)	(105.2)	(10.30)	(0.369)	(0.0113)	(0.0277)	(0.288)
comorbidities	-4.039	-21.17	93.60***	1.198***	0.0481***	0.0884***	0.652***
	(14.99)	(13.50)	(16.28)	(0.0805)	(0.00230)	(0.00602)	(0.0613)
Constant	6,481***	1,896***	508.5***	5.077***	0.138***	0.265***	1.578***
	(45.89)	(43.84)	(8.725)	(0.107)	(0.00590)	(0.0148)	(0.141)
Average outcome	6820.38	1803.369	386.66	6.71	0.15	0.25	1.62

for respondents without dementia							
Observations	149,810	149,810	126,645	102,513	149,810	149,810	149,810
Number of id	64,821	64,821	56,461	60,571	64,821	64,821	64,821

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table 5.1 b, expenditure and health care use, individual fixed-effects analysis, Panel B

Dependent variable	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
dementia	0.180***	0.192***	0.174***	0.0372***
	(0.0162)	(0.0156)	(0.0167)	(0.00619)
income	-7.51e-09	-1.53e-08	-4.80e-09	-4.86e-09
	(1.36e-08)	(1.14e-08)	(1.40e-08)	(3.32e-09)
age 6575	-0.0265***	-0.0180***	-0.0180***	-0.00140*
	(0.00396)	(0.00342)	(0.00272)	(0.000795)
Age 7685	0.000340	0.00275	-0.00429	-0.00134
	(0.00705)	(0.00634)	(0.00522)	(0.00165)
Age 85plus	0.108***	0.0846***	0.0973***	0.00947***
	(0.0115)	(0.0106)	(0.00997)	(0.00300)
comorbidities	0.0268***	0.0229***	0.00535***	0.000268
	(0.00206)	(0.00187)	(0.00161)	(0.000464)

Constant	0.177*** (0.00551)	0.103*** (0.00474)	0.0420*** (0.00362)	0.00381*** (0.00119)
Average outcome for respondents without dementia	0.13	0.101	0.037	0.003
Observations	149,483	149,483	113,706	148,439
Number of id	64,708	64,708	59,847	64,409

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table 5.2, expenditure and health care use, heterogeneity analysis, Panel A

Dependent Variable	i Food spending	ii Rent spending	iii Out-pocket spending	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
Net effects by sex							
Male with vs without dementia	-487.5***	1,093***	102.4***	4.672***	0.0735***	0.174**	2.173***
	(154.1)	(253.2)	(34.38)	(1.170)	(0.0245)	(0.0712)	(0.723)
Female with vs without dementia	-422.1***	1,309***	130.1***	1.925**	0.0449**	0.132**	1.882**
	(143.2)	(231.5)	(34.26)	(0.922)	(0.0216)	(0.0638)	(0.865)
Statistical significance of diff				*			
Net effects by Education							
Low educ with vs without dementia	-381.6***	1,026***	65.06**	2.069**	0.0661***	0.141***	1.470**
	(124.4)	(181.7)	(27.21)	(0.812)	(0.0183)	(0.0543)	(0.745)
Middle educ with vs without dementia	-325.1	1,632***	189.1***	5.290***	0.0586*	0.148	1.401
	(213.5)	(418.8)	(47.16)	(1.616)	(0.0322)	(0.0940)	(0.870)
High educ with vs without dementia	-762.5***	926.0**	105.6	2.049	0.0421	0.174	3.884**
	(265.1)	(373.0)	(68.71)	(1.809)	(0.0447)	(0.127)	(1.706)
Statistical significance of diff			*	*			
Average outcome for respondents without dementia	6820.38	1803.369	386.66	6.71	0.15	0.25	1.62
Observations	147,081	147,081	124,476	100,470	147,081	147,081	147,081

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5.2, use of long-term care, heterogeneity analysis, Panel B

Dependent variable	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
Net effects by Sex				
Male with vs without dementia	0.216***	0.212***	0.154***	0.0340***
	(0.0240)	(0.0226)	(0.0233)	(0.00964)
Female with vs without dementia	0.184***	0.195***	0.203***	0.0512***
	(0.0245)	(0.0238)	(0.0268)	(0.0104)
Statistical significance of diff				
Net effects by Education				
Low educ with vs without dementia	0.152***	0.178***	0.164***	0.0285***
	(0.0203)	(0.0198)	(0.0207)	(0.00698)
Middle educ with vs without dementia	0.253***	0.235***	0.213***	0.0639***
	(0.0346)	(0.0328)	(0.0354)	(0.0156)
High educ with vs without dementia	0.201***	0.201***	0.164***	0.0398*
	(0.0436)	(0.0414)	(0.0483)	(0.0208)
Statistical significance of diff	**			**
Average outcome for respondents without dementia	0.13	0.101	0.037	0.003
Observations	146,764	146,764	111,828	145,747

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Intra-household effects

Table 6.1 (a), Spillover effects of dementia onset on male partner's wellbeing

Male respondent VARIABLES	i happy	ii lifesat	iii depression dummy	iv casp
Dementia_female partner	0.00406	-0.109	0.118***	-1.422***
	(0.0248)	(0.104)	(0.0299)	(0.336)
Age	-0.00641	0.00417	-0.00132	0.0364
	(0.00500)	(0.0209)	(0.00568)	(0.0706)
Middle income	0.00141	0.0388	-0.00226	0.160**
	(0.00540)	(0.0253)	(0.00634)	(0.0799)
High income	0.00142	0.0831***	0.000387	0.350***
	(0.00567)	(0.0266)	(0.00671)	(0.0864)
Mean	0.915	8.050	0.158	38.82
N. Observations	47,065	47,065	47,065	47,065

NOTE: The model is estimated including individual fixed effect. Life satisfaction, EUROD and Casp have been normalized.
Clustered Robust standard errors at individual level are in parentheses, wave dummies apply. Controls include age of the spouse and income level.
*** p<0.01, ** p<0.05, * p<0.1

Table 6.1 (b), Spillover effects of dementia onset on female partner's wellbeing

Female respondent VARIABLES	i happy	ii lifesat	iii depression	iv casp

			dummy	
Dementia male spouse	-0.0257	-0.498***	0.104***	-1.891***
	(0.0179)	(0.0967)	(0.0276)	(0.294)
age	-0.00442	-0.0145	-0.000396	-0.00948
	(0.00480)	(0.0214)	(0.00694)	(0.0693)
Middle income	0.00311	0.0171	0.000943	0.0489
	(0.00508)	(0.0240)	(0.00724)	(0.0743)
High income	0.00690	0.0638**	-0.00198	0.350***
	(0.00567)	(0.0255)	(0.00796)	(0.0820)
Mean	0.911	8.001	0.287	38.39
N. Observations	47,031	47,031	47,031	47,031

NOTE: The model is estimated including individual fixed effect. Life satisfaction, EUROD and Casp have been normalized.
Clustered Robust standard errors at individual level are in parentheses, wave dummies apply. Controls include age of the spouse and income level.
*** p<0.01, ** p<0.05, * p<0.1

Table 6.2, Spill over effects of dementia onset on partner's care provision

Dep var	Personal care to the partner	
	M	F
Dementia femalespouse	0.0585***	
	(0.0156)	
Dementia malespouse		0.115***
		(0.0141)
age 6575	0.00608***	0.0257***
	(0.000363)	(0.00205)
age 7685	0.000146***	0.0573***
	(3.83e-05)	(0.00438)
age 85+	0.00323*	0.0695***

	(0.00180)	(0.00910)
Income level	0.00225	3.75e-10
	(0.00181)	(7.02e-09)
Constant	-0.373***	0.0130***
	(0.0223)	(0.00112)
Observations	83,904	83,901

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Sensitivity Analyses

Table 6.3-a Wealth as a control, Consumption and healthcare outcomes

Dependent Variable	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
Net effects by Sex							
Male with vs without dementia	-445.4***	986.0***	103.4***	5.284***	0.103***	0.253***	2.547***
	(164.2)	(249.8)	(37.44)	(1.162)	(0.0276)	(0.0791)	(0.823)
Female with vs without dementia	-414.4***	1,254***	177.3***	2.423***	0.0621***	0.201***	2.718***
	(157.1)	(236.4)	(37.25)	(0.920)	(0.0239)	(0.0705)	(1.026)
Statistical significance of diff				*			
Net effects by Education							
Low with vs without dementia	-412.2***	1,120***	53.92*	2.531***	0.0593***	0.161***	1.692*
	(136.1)	(194.3)	(28.96)	(0.811)	(0.0198)	(0.0582)	(0.870)
Middle with vs without dementia	-247.7	1,354***	238.6***	5.876***	0.101***	0.237**	2.188**
	(241.3)	(395.4)	(51.70)	(1.605)	(0.0375)	(0.109)	(1.043)
High with vs without dementia	-724.2***	827.4**	161.2**	2.706	0.0880*	0.321**	5.001**
	(260.7)	(393.2)	(76.82)	(1.806)	(0.0499)	(0.139)	(1.956)
Statistical significance of diff				*			
Observations	137,618	137,618	115,377	100,442	137,618	137,618	137,618

Table 6.3-b Wealth as a control, Long-Term Care use

Dependent Variable	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
Net effects by Sex				
Male with vs without dementia	0.235***	0.208***	0.180***	0.0357***
	(0.0262)	(0.0244)	(0.0321)	(0.0107)
Female with vs without dementia	0.217***	0.211***	0.225***	0.0483***
	(0.0270)	(0.0264)	(0.0324)	(0.0110)
Statistical significance of diff				
Net effects by education				
Low with vs without dementia	0.176***	0.187***	0.172***	0.0285***
	(0.0223)	(0.0219)	(0.0270)	(0.00782)
Middle with vs without dementia	0.279***	0.238***	0.245***	0.0581***
	(0.0385)	(0.0360)	(0.0472)	(0.0155)
High with vs without dementia	0.236***	0.206***	0.204***	0.0447*
	(0.0469)	(0.0447)	(0.0550)	(0.0237)
Statistical significance of diff	**			*
Observations	137,321	137, 321	102,551	136,383

Table 6.4 – Alternative measure of income (log)

Dependent Variable	IHS(Food)	IHS(Rent)	IHS(OOP)
Gender			
Male with vs without dementia	-0.720***	0.524***	0.214***
	(0.118)	(0.143)	(0.0780)
Female with vs without dementia	-0.832***	0.675***	0.0428
	(0.112)	(0.163)	(0.0652)
Statistical significance of diff			
Education			
Low with vs without dementia	-0.829***	0.624***	0.0396
	(0.0961)	(0.124)	(0.0637)
Middle with vs without dementia	-0.649***	0.649***	0.262***
	(0.159)	(0.220)	(0.0935)
High with vs without dementia	-0.890***	0.514*	0.0517
	(0.220)	(0.298)	(0.120)
Statistical significance of diff			
Observations	145,142	145,142	122,953

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table 7.1 Monetary costs for doctor visits and nights at the hospital

Variable	Prevalence Increase	Average Value	Total	Unit cost	Current cost	Increase costs	Total cost per ID	
				Austria				CI
			Visit (Unit)	€	€	€	€	€
Number of visit Doctor	2.6 visits se (0.692)	6.7 visit	9.3	31.8	213.06	82.68	295.74	(252.61; 338.87)
CI up	3.96		10.66			125.81	338.87	
CI down	1.24		7.94			39.55	252.61	
Nights hospital	1.7 nights se (0.572)	1.6 night	3.3	926.94	1483.10	1575.80	3058.90	(2019.69; 4098.11)
CI up	2.82		4.42			2615.01	4098.11	
CI down	0.58		2.18			1112.33	2595.43	

Table 7.2 Monetary costs for informal and formal care

Variable	Prevalence Increase	Average Value	Total	Unit cost	Current cost	Increase costs	Total cost per ID	
				Austria				
Opportunity cost approach			**Percentage (unit)**					
Informal care at home	18pp se (0.0162)	0.13 (hours per week 9)	0.31(9.5+12.5hours)	24.22 € per hour (46,506 salary per average worker)	11,335	15,743	27,078	CI (24,370; 29,584)
CI up	0.21					18,249	29,584	
CI down	0.15					13,035	24,370	

Market value approach			**Percentage (unit)**					
Informal care at home	18pp	0.13 (hours per week 9)	0.31(9.5+12.5hours)	15.13 € per hour (29,064 € salary per care worker)	7081	9835	16,915	CI (15,224; 18,481)
CI up						11,400	18,481	
CI down						8143	15,224	
Market value approach			**Percentage (unit)**					
Formal care at home	17.4 pp se(0.0167)	0.037 (hours per week 7.9)	21.1	15.13 € per hour (29,064 € salary per care worker)	9323	29,212	38,536	CI (33,190; 43,942)
CI up	0.20					34,620	43,943	
Ci down	0.14					23,867	33,190	

APPENDIX

Table A-4 Tabulation of dementia by country

Country identifier	Mean	sd	N.obs
England	0.005	0.07	76066
Austria	0.014	0.117	13854
Germany	0.009	0.093	14670
Sweden	0.011	0.104	13815
Netherlands	0.006	0.079	9354
Spain	0.019	0.137	18226
Italy	0.011	0.104	17304
France	0.008	0.091	17318
Denmark	0.006	0.077	13492
Switzerland	0.006	0.074	11410
Belgium	0.009	0.095	20540

Table A.5.2 Full results for table 5.2a and 5.2b

Dependent Variable	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
dementia	-412.1**	884.8***	42.26	3.643***	0.0841***	0.166*	1.582**
	(175.2)	(227.5)	(39.50)	(1.173)	(0.0280)	(0.0881)	(0.746)
dementia#female	51.22	236.7	36.36	-2.636*	-0.0302	-0.0407	-0.189
	(201.4)	(305.3)	(46.21)	(1.387)	(0.0311)	(0.0944)	(1.044)
dementia#middle educ	60.49	624.7	132.3**	3.004*	-0.00979	0.00397	-0.0831
	(247.4)	(446.9)	(54.87)	(1.820)	(0.0377)	(0.112)	(1.095)
dementia#high educ	-376.0	-77.35	73.21	-0.292	-0.0269	0.0286	2.396
	(294.7)	(416.4)	(78.39)	(1.950)	(0.0485)	(0.141)	(1.838)
income level	0.00108**	0.000258*	3.05e-05	-4.00e-07	9.70e-09	5.82e-09	-1.16e-07
	(0.000505)	(0.000137)	(3.78e-05)	(4.53e-07)	(2.18e-08)	(3.36e-08)	(2.39e-07)
age 6575	119.6***	-120.7***	-26.89***	-0.164	-0.00778*	-0.039***	-0.180*
	(35.42)	(31.68)	(6.374)	(0.147)	(0.00445)	(0.0105)	(0.100)
age 7685	54.33	-33.76	-1.002	-0.354	-0.00507	-0.0351*	0.123
	(52.78)	(58.42)	(10.46)	(0.247)	(0.00735)	(0.0187)	(0.191)
age 85+	-159.6**	673.3***	87.36***	0.253	0.0256**	0.0619**	0.673**
	(75.32)	(107.2)	(16.56)	(0.372)	(0.0115)	(0.0280)	(0.292)
comorbidities	-6.059	-21.03	20.50***	1.205***	0.0478***	0.0863***	0.637***
	(15.16)	(13.71)	(2.962)	(0.0814)	(0.00233)	(0.00605)	(0.0612)
Constant	6,484***	1,891***	508.0***	5.068***	0.140***	0.271***	1.605***
	(46.31)	(44.78)	(8.914)	(0.108)	(0.00599)	(0.0149)	(0.140)
Average	6820.38	1803.369	386.66	6.71	0 .15	0 .25	1.62

outcome for respondents without dementia							
Observations	147,081	147,081	124,400	100,470	147,081	147,081	147,081
R-squared	0.006	0.015	0.101	0.017	0.010	0.008	0.005
Number of id	63,891	63,891	55,701	59,393	63,891	63,891	63,891

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
dementia	0.168***	0.186***	0.134***	0.0172*
	(0.0289)	(0.0279)	(0.0285)	(0.00972)
dementia#female	-0.0265	-0.0140	0.0509	0.0191
	(0.0332)	(0.0321)	(0.0342)	(0.0127)
dementia#middle educ	0.0982**	0.0561	0.0521	0.0368**
	(0.0405)	(0.0388)	(0.0413)	(0.0173)
dementia#high educ	0.0462	0.0216	0.00443	0.0131
	(0.0488)	(0.0466)	(0.0535)	(0.0219)
income level	-7.58e-09	-1.55e-08	-3.76e-09	-4.59e-09
	(1.36e-08)	(1.15e-08)	(1.43e-08)	(3.25e-09)
age 6575	-0.0272***	-0.0177***	-0.0177***	-0.00148*
	(0.00401)	(0.00347)	(0.00274)	(0.000808)
age 7685	-0.000302	0.00274	-0.00284	-0.00148
	(0.00713)	(0.00643)	(0.00525)	(0.00168)
age 85+	0.107***	0.0834***	0.0984***	0.00954***
	(0.0116)	(0.0107)	(0.0101)	(0.00306)
comorbidities	0.0261***	0.0222***	0.00551***	0.000180

	(0.00209)	(0.00189)	(0.00163)	(0.000471)
Constant	0.178***	0.103***	0.0409***	0.00385***
	(0.00559)	(0.00480)	(0.00365)	(0.00120)
Average outcome for respondents without dementia	0.13	0.101	0.037	0.003
Observations	146,764	146,764	111,828	145,747
R-squared	0.022	0.017	0.027	0.007
Number of id	63,781	63,781	59,047	63,486

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table A 5.3 a, expenditure and health care use, individual fixed-effects analysis with Langa Weir dementia score, Panel A

Dependent variable	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
Dementia LangaWeir	-186.1***	260.3***	13.73*	0.490**	0.0348***	0.0931***	1.358***
	(44.53)	(43.68)	(7.073)	(0.229)	(0.00640)	(0.0180)	(0.224)
income	0.00109**	0.000274**	5.40e-05*	-3.47e-07	1.14e-08	6.71e-09	-8.55e-08
	(0.000505)	(0.000140)	(2.99e-05)	(4.47e-07)	(2.18e-08)	(3.36e-08)	(2.38e-07)
age 6575	117.0***	-138.5***	-26.44***	-0.169	-0.00728*	-0.0361***	-0.167*
	(35.09)	(31.51)	(5.451)	(0.145)	(0.00440)	(0.0105)	(0.0975)
age 7685	60.16	-51.59	0.925	-0.339	-0.00380	-0.0315*	0.119
	(52.20)	(57.76)	(9.032)	(0.245)	(0.00728)	(0.0186)	(0.188)
age 85+	-165.1**	707.5***	89.63***	0.380	0.0273**	0.0657**	0.688**
	(74.37)	(104.9)	(14.36)	(0.377)	(0.0113)	(0.0276)	(0.284)
comorbidities	-4.938	-18.59	23.04***	1.203***	0.0483***	0.0886***	0.655***
	(14.99)	(13.50)	(2.470)	(0.0806)	(0.00230)	(0.00601)	(0.0613)
Constant	6,484***	1,904***	506.4***	6.436***	0.137***	0.262***	1.524***

	(45.98)	(44.27)	(8.287)	(0.128)	(0.00590)	(0.0148)	(0.140)
Average outcome for respondents without dementia	6820.38	1803.369	386.66	6.71	0 .15	0 .25	1.62
Observations	149,810	149,810	149,829	102,513	149,810	149,810	149,810
Number of id	64,821	64,821	62,491	60,571	64,821	64,821	64,821

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply
*** p<0.01, ** p<0.05, * p<0.1

Table A 5.3 b, expenditure and health care use, individual fixed-effects analysis with Langa Weir dementia score, Panel B

Dependent variable	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
Dementia LangaWeir	0.0701***	0.0777***	0.0508***	0.00690***
	(0.00639)	(0.00610)	(0.00536)	(0.00152)
income	-6.81e-09	-1.45e-08	-3.78e-09	-4.89e-09
	(1.37e-08)	(1.15e-08)	(1.38e-08)	(3.38e-09)
age 6575	-0.0275***	-0.0192***	-0.0193***	-0.00166**
	(0.00396)	(0.00342)	(0.00272)	(0.000800)
Age 7685	-0.000529	0.00182	-0.00528	-0.00139
	(0.00705)	(0.00634)	(0.00524)	(0.00166)
Age 85plus	0.113***	0.0900***	0.102***	0.0109***
	(0.0115)	(0.0106)	(0.00999)	(0.00302)

comorbidities	0.0272***	0.0234***	0.00593***	0.000349
	(0.00207)	(0.00187)	(0.00162)	(0.000465)
Constant	0.176***	0.102***	0.0422***	0.00404***
	(0.00552)	(0.00474)	(0.00363)	(0.00120)
Average outcome for respondents without dementia	0.13	0.101	0.037	0.003
Observations	149,483	149,483	113,706	148,439
Number of id	64,708	64,708	59,847	64,409

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

TABLE A 6.3a Full results for Table 6.3-a

Dependent variable	i Food spending	ii Rent spending	iii Out pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
dementia	-426.3**	961.6***	1.974	4.165***	0.0820***	0.186*	1.490*
	(188.0)	(234.2)	(39.70)	(1.167)	(0.0311)	(0.0962)	(0.858)
dementia#female	23.70	266.6	86.44*	-2.736**	-0.0381	-0.0419	0.340
	(218.4)	(310.9)	(48.32)	(1.383)	(0.0346)	(0.104)	(1.224)
dementia#middle educ	166.3	254.5	191.3***	3.121*	0.0392	0.0718	0.523
	(277.8)	(429.4)	(59.11)	(1.812)	(0.0431)	(0.126)	(1.303)
dementia#high educ	-309.8	-267.1	115.7	-0.107	0.0250	0.155	3.342
	(295.0)	(438.9)	(82.38)	(1.947)	(0.0541)	(0.155)	(2.113)
wealth	0.000219***	-0.000405***	2.98e-05***	2.64e-07**	5.12e-09	5.63e-09	2.42e-08
	(5.65e-05)	(4.51e-05)	(8.35e-06)	(1.09e-07)	(4.72e-09)	(8.97e-09)	(1.24e-07)
age 6575	50.61	75.96***	-23.79***	0.628***	0.0124***	0.0256**	0.197**
	(36.82)	(28.39)	(6.680)	(0.135)	(0.00441)	(0.0101)	(0.0977)
age 7685	-83.46	330.2***	8.798	1.096***	0.0375***	0.0847***	0.819***
	(53.09)	(51.00)	(10.97)	(0.224)	(0.00726)	(0.0178)	(0.181)
age 85+	-245.5***	1,072***	84.40***	2.061***	0.0750***	0.190***	1.368***
	(76.38)	(118.3)	(17.72)	(0.347)	(0.0120)	(0.0291)	(0.268)
comorbidities	43.79***	-26.57*	16.85***	1.094***	0.0431***	0.0799***	0.598***
	(15.88)	(13.66)	(3.040)	(0.0802)	(0.00242)	(0.00629)	(0.0648)
Constant	6,730***	1,812***	451.0***	5.313***	0.101***	0.157***	0.889***
	(27.21)	(22.73)	(5.886)	(0.107)	(0.00337)	(0.00819)	(0.0839)
Observations	137,618	137,618	115,377	100,442	137,618	137,618	137,618

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

TABLE A 6.3.b Full results for Table 6.3 b

Dependent variable	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
dementia	0.183***	0.184***	0.143***	0.0199*
	(0.0318)	(0.0308)	(0.0388)	(0.0111)
dementia#female	-0.0114	0.00556	0.0486	0.0145
	(0.0366)	(0.0355)	(0.0446)	(0.0139)
dementia#middle educ	0.102**	0.0515	0.0764	0.0307*
	(0.0450)	(0.0428)	(0.0549)	(0.0176)
dementia#high educ	0.0587	0.0197	0.0365	0.0176
	(0.0527)	(0.0506)	(0.0624)	(0.0251)
wealth	6.67e-09**	5.00e-09*	4.46e-09	1.23e-10
	(3.22e-09)	(2.87e-09)	(3.94e-09)	(1.10e-09)
age 6575	0.00129	-0.00445	0.00888**	-0.000661
	(0.00380)	(0.00322)	(0.00364)	(0.000714)
age 7685	0.0493***	0.0279***	0.0931***	-0.000632
	(0.00684)	(0.00619)	(0.00719)	(0.00155)
age 85+	0.152***	0.104***	0.257***	0.0144***
	(0.0122)	(0.0114)	(0.0144)	(0.00344)
comorbidities	0.0222***	0.0209***	0.00964***	0.000719
	(0.00219)	(0.00199)	(0.00238)	(0.000488)
Constant	0.102***	0.0774***	0.0585***	0.00273***
	(0.00298)	(0.00266)	(0.00308)	(0.000715)
Observations	137,321	137,321	102,551	136,383

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table A 6.4 Full results for Table 6.4

VARIABLES	i IHS(Food)	ii IHS(Rent)	iii IHS(OOP)
dementia	-0.764***	0.536***	0.138
	(0.132)	(0.171)	(0.0994)
dementia#female	-0.109	0.147	-0.164
	(0.155)	(0.206)	(0.103)
dementia#middle educ	0.171	0.0363	0.210*
	(0.185)	(0.255)	(0.117)
dementia#high educ	-0.0711	-0.0966	-0.00366
	(0.242)	(0.328)	(0.137)
log_income	0.0341***	-0.00923	0.0215***
	(0.00361)	(0.00848)	(0.00596)
age 6575	0.0120	-0.0633***	-0.0770***
	(0.00866)	(0.0229)	(0.0177)
age 7685	-0.0162	-0.0276	-0.115***
	(0.0167)	(0.0374)	(0.0258)
age 85+	-0.378***	0.240***	-0.130***
	(0.0372)	(0.0661)	(0.0369)
comorbidities	0.0190***	-0.0309***	0.187***
	(0.00543)	(0.0115)	(0.00777)
Constant	8.976***	2.270***	5.917***
	(0.0370)	(0.0866)	(0.0640)
Observations	145,142	145,142	122,953

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table A 6.5 Generated regression to estimate the amount of out of pocket

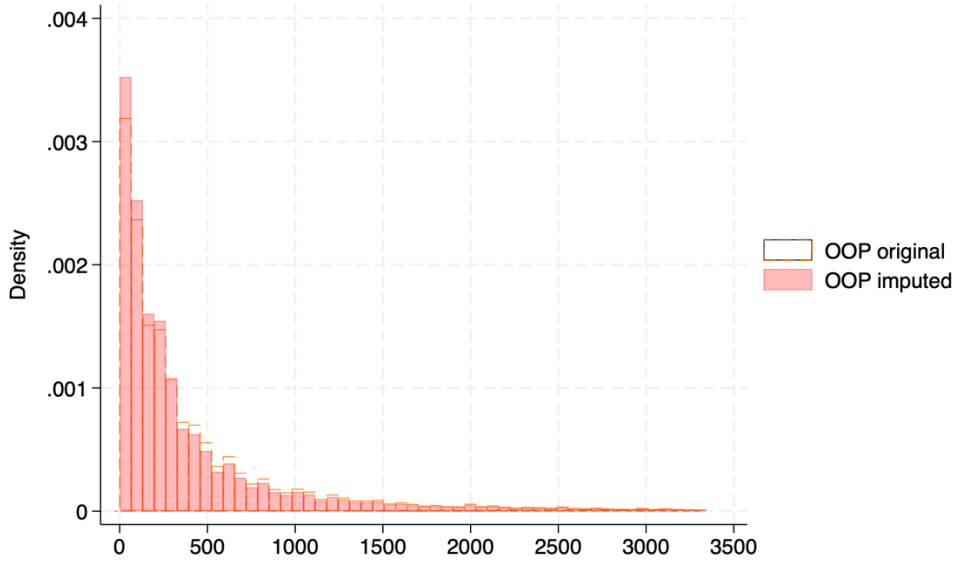
Dep var	OOP amount
age	6.639***
	(2.317)
age^2	-0.0352**
	(0.0176)
female	9.457***
	(3.334)
single	4.116
	(3.873)
# child	-1.489
	(1.212)
drugs	183.6***
	(2.913)
OOP dummy	156.3***
	(3.626)
income	8.78e-05***
	(2.75e-05)
diabetes	28.62***
	(5.367)
cancer	31.21***
	(7.075)
stroke	59.30***
	(10.75)
Lung disease	32.64***
	(6.971)
Heart disease	55.47***
	(5.326)
arthritis	27.83***
	(4.048)
hypertension	8.599***
	(3.316)

Depression	33.25***
	(3.802)
#adl	14.12***
	(3.781)
#iadl	24.53***
	(3.131)
Average OOP spending OECD stat	0.360***
	(0.0387)
Country FE	Y
# Individuals	66,425
R-squared	0.180

NOTE: The model is estimated including country fixed effect. Clustered Robust standard errors at individual level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure A.1 Distribution of original out of pocket amount and imputed one



NOTE: This figure show the distribution of the base measure of OOP from the raw data compared to the imputed measure of OOP generate by the results of Table A6.5

Table A 6.6 Analysis for the out of pocket amount with original variable and imputed one from Table 6.5

	(original)	(estimated)
Dep var:	Amount OOP	Amount OOP

dementia	109.5***	99.85***
	(30.28)	(22.25)
comorbidities	43.31***	20.25***
	(3.984)	(2.928)
income	8.04e-05**	1.95e-05
	(3.53e-05)	(3.11e-05)
Age 6575	-22.26***	-27.90***
	(8.003)	(6.301)
Age 7685	9.215	-5.732
	(13.62)	(10.30)
Age 85plus	104.3***	93.60***
	(21.25)	(16.28)
Constant	405.9***	508.5***
	(7.586)	(8.725)
OOP for id without dementia	376.200	386.66
% increase in OOP	29%	25.8%
Observations	113,823	126,645

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Online Appendix

Table A.1.1a Full results for being in hospital at previous waves

VARIABLES	i	ii	iii	iv	v	vi	vii
	Food spending	Rent spending	Out-pocket amount	# Doc visits	Hospital stay Y/N	# hospital stays	# hospital nights
dementia	-439.4	1,281***	53.35	0.795	0.0908**	0.164	0.809
	(272.9)	(349.6)	(62.44)	(1.835)	(0.0392)	(0.137)	(1.041)
dementia#female	-102.3	-187.3	-13.75	-0.354	-0.0525	-0.153	0.777
	(298.0)	(448.1)	(70.81)	(2.118)	(0.0439)	(0.142)	(1.552)
dementia#middle educ	-26.20	585.5	139.2*	6.213**	-0.0236	0.0509	-0.149
	(356.4)	(649.5)	(83.96)	(2.587)	(0.0506)	(0.158)	(1.543)
dementia#high educ	-334.1	-58.65	57.19	-1.779	-0.0206	0.0539	0.885
	(449.6)	(660.9)	(117.3)	(2.204)	(0.0681)	(0.225)	(2.084)
income level	0.000777	0.000152	5.24e-05	6.91e-07	2.07e-08	-2.54e-08	-3.98e-07
	(0.000642)	(0.000143)	(3.76e-05)	(1.79e-06)	(2.86e-08)	(3.85e-08)	(2.73e-07)
age 6575	65.93	33.78	-33.82***	0.880***	0.0189***	0.0298**	0.327***
	(43.10)	(36.60)	(9.342)	(0.217)	(0.00549)	(0.0118)	(0.119)
age 7685	-5.917	292.0***	-11.99	1.278***	0.0479***	0.104***	1.172***
	(61.00)	(68.66)	(15.87)	(0.359)	(0.00856)	(0.0212)	(0.221)
age 85+	-384.0***	1,124***	78.14***	2.690***	0.109***	0.280***	2.225***
	(89.27)	(138.9)	(23.93)	(0.579)	(0.0143)	(0.0354)	(0.394)
comorbidities	3.037	-32.49	33.37***	1.391***	0.0621***	0.101***	0.721***
	(23.02)	(23.04)	(4.787)	(0.162)	(0.00362)	(0.00958)	(0.0944)
Hospital t-1	11.66	59.70	-6.250	1.207***	-0.250***	-0.343***	-1.931***
	(39.86)	(40.52)	(8.481)	(0.287)	(0.00617)	(0.0157)	(0.168)
Constant	6,673***	1,655***	520.5***	5.079***	0.122***	0.194***	0.978***
	(40.09)	(30.04)	(12.05)	(0.202)	(0.00460)	(0.0109)	(0.118)
Observations	84,476	84,476	76,440	42,519	84,476	84,476	84,476
R-squared	0.002	0.010	43,032	0.021	0.070	0.028	0.013
Number of id	46,635	46,635	0.056	33,177	46,635	46,635	46,635

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table A.1.1b Full results for being in hospital at previous waves

VARIABLES	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
dementia	0.221***	0.204***	0.130***	0.0126
	(0.0391)	(0.0379)	(0.0336)	(0.0122)
dementia#female	-0.0702	-0.0468	0.0394	0.0230
	(0.0457)	(0.0443)	(0.0403)	(0.0159)
dementia#middle educ	0.0697	0.0646	0.0468	-0.00149
	(0.0544)	(0.0539)	(0.0477)	(0.0206)
dementia#high educ	-0.00572	-0.0200	0.0227	-0.0188
	(0.0731)	(0.0663)	(0.0654)	(0.0303)
income level	-4.59e-09	7.76e-09	-6.06e-09	-3.34e-09
	(2.23e-08)	(1.17e-08)	(1.55e-08)	(2.57e-09)
age 6575	0.00788*	-0.00378	-0.00883***	-0.000178
	(0.00469)	(0.00393)	(0.00261)	(0.000713)
age 7685	0.0662***	0.0257***	0.00853*	0.000116
	(0.00815)	(0.00713)	(0.00485)	(0.00164)
age 85+	0.205***	0.121***	0.116***	0.00941***
	(0.0147)	(0.0137)	(0.0111)	(0.00315)
comorbidities	0.0336***	0.0264***	0.00702***	7.21e-05
	(0.00324)	(0.00293)	(0.00209)	(0.000624)
Hospital t-1	-0.00533	-0.00293	-0.00775**	0.00153
	(0.00544)	(0.00481)	(0.00329)	(0.00104)
Constant	0.0985***	0.0755***	0.0329***	0.00257***
	(0.00410)	(0.00353)	(0.00248)	(0.000765)
Observations	84,348	84,348	81,939	83,664
R-squared	0.020	0.015	0.024	0.004
Number of id	46,575	46,575	45,952	46,282

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table A.1.1c Net results of Table A.1.1a for being in hospital at previous waves

Net effects VARIABLES	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
Male with vs without dementia	-535.4**	1,478***	118.9**	2.604	0.0769**	0.196**	0.983
	(236.4)	(357.1)	(50.11)	(1.711)	(0.0328)	(0.0985)	(0.826)
Female with vs without dementia	-621.5***	1,270***	97.21*	2.044	0.0263	0.0384	1.726
	(197.8)	(347.5)	(53.70)	(1.279)	(0.0308)	(0.0966)	(1.332)
Statistical significance of diff							
Education							
Low educ with vs without dementia	-501.0***	1,168***	45.03	0.581	0.0593**	0.0717	1.276
	(176.8)	(248.4)	(40.21)	(1.373)	(0.0268)	(0.0760)	(1.238)
Middle educ with vs without dementia	-519.0*	1,768***	185.3***	6.825***	0.0398	0.135	1.065
	(303.7)	(606.2)	(71.29)	(2.238)	(0.0416)	(0.125)	(1.128)
High educ with vs without dementia	-825.0**	1,128*	103.6	-1.159	0.0438	0.141	2.084
	(409.0)	(601.0)	(107.4)	(1.736)	(0.0624)	(0.205)	(1.751)
Statistical significance of diff			*	**			
Observations	84,476	84,476	76,440	42,519	84,476	84,476	84,476

Table A.1.1d Net results of Table A.1.1b for being in hospital at previous waves

Net effects VARIABLES	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
Male with vs without dementia	0.245***	0.222***	0.153***	0.00721
	(0.0328)	(0.0308)	(0.0272)	(0.0134)
Female with vs without dementia	0.172***	0.174***	0.190***	0.0311**
	(0.0346)	(0.0335)	(0.0316)	(0.0125)
Statistical significance of diff				
Education				
Low educ with vs without dementia	0.179***	0.176***	0.154***	0.0265***
	(0.0277)	(0.0268)	(0.0242)	(0.00910)
Middle educ with vs without dementia	0.254***	0.244***	0.198***	0.0231
	(0.0463)	(0.0461)	(0.0402)	(0.0184)
High educ with vs without dementia	0.180***	0.160***	0.173***	0.00537
	(0.0666)	(0.0594)	(0.0597)	(0.0294)
Statistical significance of diff				
Observations	84,348	84,476	81,939	83,664

Table A.2.1a Results for being in couple

Dependent Variable (couples)	i Food spending	ii Rent spending	iii Out pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
dementia	-471.7**	759.7***	53.40	4.641***	0.0811**	0.123	1.796**
	(207.6)	(222.3)	(44.66)	(1.246)	(0.0333)	(0.113)	(0.900)
dementia#female	-204.8	-399.1	39.99	-4.141**	-0.000256	0.0456	1.278
	(266.9)	(316.0)	(56.78)	(1.648)	(0.0390)	(0.129)	(1.824)
dementia#middle educ	207.2	768.8	100.9	3.200	0.00272	0.0658	-1.342
	(325.7)	(580.0)	(68.77)	(2.037)	(0.0461)	(0.147)	(1.464)
dementia#high educ	-323.1	0.611	-18.84	1.068	0.0466	0.227	2.972
	(418.4)	(402.3)	(89.04)	(2.920)	(0.0652)	(0.208)	(2.557)
income level	0.000760*	0.000113	1.97e-05	-5.57e-07	2.09e-08	2.89e-08	9.79e-09
	(0.000451)	(0.000106)	(4.09e-05)	(4.86e-07)	(2.29e-08)	(3.54e-08)	(2.46e-07)
age 6575	121.8***	-80.47**	-24.79***	-0.113	-0.00785	-0.036***	-0.138
	(44.13)	(32.12)	(7.273)	(0.173)	(0.00521)	(0.0123)	(0.119)
age 7685	119.3*	5.072	-6.447	-0.307	-0.0127	-0.0460**	0.00580
	(69.78)	(58.19)	(12.56)	(0.308)	(0.00899)	(0.0234)	(0.222)
age 85+	-165.0	617.4***	87.27***	0.285	0.00780	0.0391	0.378
	(106.7)	(131.2)	(22.53)	(0.517)	(0.0156)	(0.0401)	(0.431)
comorbidities	-12.39	0.403	20.83***	1.246***	0.0526***	0.0935***	0.683***
	(19.53)	(14.61)	(3.394)	(0.0999)	(0.00283)	(0.00752)	(0.0683)
Constant	7,297***	1,175***	490.3***	4.715***	0.0808***	0.112***	0.524***
	(37.41)	(23.57)	(10.24)	(0.123)	(0.00404)	(0.00946)	(0.0880)
Average outcome for respondents without dementia	7482.95	1385.03	371.566	6.427	0.140	0 .233	1.397
Observations	105,497	105,497	89,497	72,788	105,497	105,497	105,497
R-squared	0.006	0.009	0.095	0.019	0.011	0.008	0.006
Number of id	47,105	47,105	41,082	43,730	47,105	47,105	47,105

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table A.2.1b Results for being in couple

Couple VARIABLES	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
dementia	0.196***	0.217***	0.154***	0.0221**
	(0.0347)	(0.0337)	(0.0317)	(0.00954)
dementia#female	-0.0342	-0.0223	0.0489	0.000311
	(0.0439)	(0.0419)	(0.0429)	(0.0136)
dementia#middle educ	0.0984*	0.0608	0.0208	0.0146
	(0.0522)	(0.0490)	(0.0493)	(0.0171)
dementia#high educ	0.0333	-0.0319	-0.0653	0.00643
	(0.0614)	(0.0562)	(0.0591)	(0.0269)
income level	-1.91e-10	-9.46e-09	-3.18e-09	-5.19e-09
	(1.41e-08)	(1.03e-08)	(1.45e-08)	(3.53e-09)
age 6575	-0.027***	-0.0194***	-0.00984***	-0.000705
	(0.00438)	(0.00356)	(0.00285)	(0.000822)
age 7685	-0.00173	0.00226	0.00868	-0.000615
	(0.00820)	(0.00700)	(0.00576)	(0.00167)
age 85+	0.128***	0.120***	0.0921***	0.00767**
	(0.0155)	(0.0140)	(0.0137)	(0.00376)
comorbidities	0.0239***	0.0176***	0.00497***	-0.000365
	(0.00241)	(0.00210)	(0.00176)	(0.000529)
Constant	0.0699***	0.0324***	0.0202***	0.00192***
	(0.00336)	(0.00280)	(0.00372)	(0.000729)
Average outcome for respondents without dementia	0.107	0.071	0.024	0.002
Observations	105,302	105,302	80,645	105,065
R-squared	0.020	0.023	0.022	0.003
Number of id	47,034	47,034	43,527	46,997

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table A.2.1c Net effect of Table A.2.1a Results for being in couple

Dependent Variable(couples)	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
Male with vs without dementia	-481.9**	1,037***	84.75**	6.076***	0.0943***	0.206**	2.093**
	(187.2)	(307.0)	(39.13)	(1.414)	(0.0289)	(0.0831)	(0.847)
Female with vs without dementia	-677.8***	618.5***	123.2***	1.792	0.0919***	0.241**	3.276*
	(215.6)	(226.9)	(46.58)	(1.162)	(0.0296)	(0.103)	(1.690)
Statistical significance of diff				**			
Education							
Low educ with vs without dementia	-582.5***	543.7***	75.25**	2.387**	0.0809***	0.148**	2.488*
	(161.3)	(169.8)	(33.48)	(1.072)	(0.0236)	(0.0724)	(1.314)
Middle educ with vs without dementia	-363.1	1,336**	173.8***	5.862***	0.0837**	0.211*	1.070
	(285.1)	(557.4)	(59.74)	(1.752)	(0.0388)	(0.122)	(1.070)
High educ with vs without dementia	-887.9**	578.8	52.93	3.856	0.128**	0.371*	5.349**
	(383.1)	(364.3)	(82.16)	(2.753)	(0.0602)	(0.190)	(2.363)
Statistical significance of diff							
Observations	105,497	105,497	89,497	72,788	105,497	105,497	105,497

Table A.2.1d Net effect of Table A.2.1b Results for being in couple

Net effects Couple VARIABLES	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
Male with vs without dementia	0.241***	0.230***	0.144***	0.0290**
	(0.0281)	(0.0264)	(0.0256)	(0.0114)
Female with vs without dementia	0.202***	0.208***	0.195***	0.0287***
	(0.0357)	(0.0336)	(0.0360)	(0.0110)
Statistical significance of diff				
Education				
Low educ with vs without dementia	0.178***	0.205***	0.181***	0.0222***
	(0.0268)	(0.0262)	(0.0261)	(0.00804)
Middle educ with vs without dementia	0.278***	0.267***	0.199***	0.0368**
	(0.0448)	(0.0414)	(0.0422)	(0.0154)
High educ with vs without dementia	0.214***	0.175***	0.111**	0.0286
	(0.0548)	(0.0493)	(0.0531)	(0.0259)
Statistical significance of diff	*			
Observations	105,302	105, 302	80,645	105,065

Table A.2.1e Results for being single

Dependent Variable (Single)	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
dementia	-98.43	1,016*	70.92	-0.451	0.106*	0.234	1.129
	(361.3)	(524.1)	(90.84)	(2.770)	(0.0577)	(0.153)	(1.613)
dementia#female	102.9	710.3	-35.81	1.409	-0.0639	-0.0979	-0.498
	(365.2)	(577.8)	(95.26)	(2.656)	(0.0603)	(0.158)	(1.667)
dementia#middle educ	81.22	-58.45	223.3**	1.316	-0.0189	-0.0809	0.232
	(375.1)	(680.7)	(100.5)	(3.214)	(0.0711)	(0.173)	(1.628)
dementia#high educ	-921.1**	-62.68	180.1	-1.565	-0.143*	-0.275	1.578
	(395.4)	(937.9)	(150.5)	(2.473)	(0.0751)	(0.172)	(2.872)
income level	0.00222***	0.00203**	9.16e-05	2.20e-06	-9.26e-08	-1.25e-07	-1.57e-06
	(0.000809)	(0.000863)	(0.000157)	(1.93e-06)	(6.92e-08)	(1.29e-07)	(1.30e-06)
age 6575	92.81	-173.3**	-27.01**	-0.548*	-0.00743	-0.0439**	-0.356*
	(60.30)	(76.37)	(13.61)	(0.293)	(0.00900)	(0.0221)	(0.190)
age 7685	-2.575	-97.72	14.14	-0.666	0.00995	-0.00595	0.289
	(79.30)	(129.4)	(19.53)	(0.432)	(0.0134)	(0.0337)	(0.366)
age 85+	-51.02	491.8**	88.54***	-0.0295	0.0448**	0.0861**	0.851*
	(107.6)	(199.9)	(26.25)	(0.556)	(0.0187)	(0.0434)	(0.440)
comorbidities	28.48	-48.72	21.08***	1.104***	0.0380***	0.0699***	0.532***
	(23.51)	(30.13)	(6.006)	(0.149)	(0.00433)	(0.0107)	(0.131)
Constant	4,890***	2,221***	557.5***	7.391***	0.112***	0.158***	0.980***
	(57.19)	(67.90)	(19.04)	(0.274)	(0.00790)	(0.0186)	(0.194)
Average outcome for respondents without dementia	5120.264	2871.226	428.558	7.487	0 .178	0 .303	2.207
Observations	41,542	41,542	34,866	27,658	41,542	41,542	41,542
R-squared	0.003	0.024	0.113	0.012	0.009	0.009	0.005
Number of id	18,930	18,930	16,430	16,725	18,930	18,930	18,930

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply

*** p<0.01, ** p<0.05, * p<0.1

Table A.2.1f Results for being single

VARIABLES	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
dementia	0.0867	0.107	0.0944*	0.0188
	(0.0531)	(0.0706)	(0.0501)	(0.0254)
dementia#female	0.0112	0.0510	0.0353	0.0258
	(0.0569)	(0.0738)	(0.0545)	(0.0271)
dementia#middle educ	0.111	0.116	0.0902	0.0686*
	(0.0680)	(0.0822)	(0.0672)	(0.0380)
dementia#high educ	0.0180	0.104	0.0685	0.0125
	(0.0816)	(0.121)	(0.0838)	(0.0384)
income level	-5.79e-09	8.31e-09	-1.95e-08	-1.58e-09
	(7.57e-08)	(6.82e-08)	(6.75e-08)	(1.36e-08)
age 6575	-0.0205**	-0.0321***	-0.0149*	-0.00318*
	(0.00894)	(0.00663)	(0.00835)	(0.00186)
age 7685	0.00160	-0.0194*	-0.00333	-0.00471
	(0.0137)	(0.0108)	(0.0131)	(0.00364)
age 85+	0.0738***	0.0883***	0.0482***	0.00844
	(0.0190)	(0.0164)	(0.0179)	(0.00555)
comorbidities	0.0327***	0.00642*	0.0324***	0.00124
	(0.00418)	(0.00365)	(0.00393)	(0.00101)
Constant	0.148***	0.0456***	0.147***	0.00111
	(0.00790)	(0.00577)	(0.00746)	(0.00164)
Average outcome for respondents without dementia	0 .212	0 .070	0 .178	0 .005
Observations	41,420	31,148	41,420	40,640
R-squared	0.023	0.034	0.014	0.013
Number of id	18,884	17,199	18,884	18,581

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply
*** p<0.01, ** p<0.05, * p<0.1

Table A.2.1g Net effect of Table A.2.1e Results for being single

Net effects Single VARIABLES	i	ii	iii	iv	v	vi	vii
	Food spending	Rent spending	Out-pocket amount	# Doc visits	Hospital stay Y/N	# hospital stays	# hospital nights
Male with vs without dementia	-293.4	978.1**	202.6**	-0.314	0.0633	0.135	1.607
	(299.0)	(438.8)	(83.03)	(1.885)	(0.0516)	(0.135)	(1.441)
Female with vs without dementia	-161.7	1,695***	143.3***	1.052	0.00626	0.0535	1.031
	(188.6)	(394.1)	(55.44)	(1.480)	(0.0335)	(0.0827)	(0.939)
Statistical significance of diff							
Education							
Low educ with vs without dementia	-24.02	1,530***	44.74	0.572	0.0595*	0.163*	0.769
	(210.6)	(378.6)	(49.85)	(1.442)	(0.0304)	(0.0873)	(0.748)
Middle educ with vs without dementia	46.21	1,396**	271.8***	1.733	0.0474	0.0925	1.054
	(301.5)	(547.7)	(87.46)	(2.617)	(0.0633)	(0.151)	(1.468)
High educ with vs without dementia	-955.0***	1,400	228.3	-1.131	-0.0774	-0.103	2.394
	(337.2)	(851.9)	(140.1)	(1.791)	(0.0676)	(0.145)	(2.677)
Statistical significance of diff	**		*		*		
Observations	41,542	41,542	34,886	27,658	41,542	41,542	41,542

Table A.2.1h Net effect of Table A.2.1f Results for being single

Net effects Single VARIABLES	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
Male with vs without dementia	0.134***	0.146***	0.178***	0.0486**
	(0.0466)	(0.0440)	(0.0612)	(0.0201)
Female with vs without dementia	0.136***	0.172***	0.216***	0.0687***
	(0.0353)	(0.0355)	(0.0449)	(0.0184)
Statistical significance of diff				
Education				
Low educ with vs without dementia	0.0948***	0.120***	0.144***	0.0375***
	(0.0323)	(0.0313)	(0.0373)	(0.0134)
Middle educ with vs without dementia	0.205***	0.206***	0.255***	0.103***
	(0.0587)	(0.0581)	(0.0714)	(0.0339)
High educ with vs without dementia	0.112	0.185**	0.243**	0.0475
	(0.0741)	(0.0768)	(0.112)	(0.0344)
Statistical significance of diff				*
Observations	41,420	41,420	31,148	40,640

Table A.3.1a Results controlling for being home-owner

VARIABLES	i	ii	iii	iv	v	vi	vii
	Food spending	Rent spending	Out-pocket amount	# Doc visits	Hospital stay Y/N	# hospital stays	# hospital nights
dementia	406.3*	-48.90	87.27	4.554***	0.0343	0.143	0.614
	(239.6)	(256.0)	(59.01)	(1.589)	(0.0406)	(0.143)	(1.060)
Dementia#home	-604.9***	198.7	-89.14*	0.0338	0.0673*	0.0402	1.111
	(220.6)	(225.9)	(52.93)	(1.492)	(0.0356)	(0.110)	(1.105)
dementia#female	25.28	-86.97	34.10	-2.930**	-0.00427	0.00724	0.0178
	(206.5)	(157.2)	(49.21)	(1.387)	(0.0335)	(0.102)	(1.085)
dementia#middle educ	-119.6	193.9	137.1**	1.580	-0.00557	-0.00837	-0.317
	(253.7)	(198.1)	(60.22)	(1.650)	(0.0399)	(0.121)	(1.096)
dementia#high educ	-455.7	84.87	100.7	-0.996	0.00329	0.109	2.319
	(288.6)	(269.1)	(83.93)	(2.024)	(0.0529)	(0.155)	(1.844)
home	391.6***	-4,447***	-9.021	-0.310	-0.00730	-0.0246*	-0.251*
	(48.27)	(86.35)	(9.665)	(0.240)	(0.00674)	(0.0137)	(0.134)
income level	0.00107**	0.000348***	3.34e-05	-2.51e-07	1.52e-08	2.39e-08	1.35e-08
	(0.000522)	(0.000134)	(2.61e-05)	(4.46e-07)	(2.59e-08)	(3.85e-08)	(2.41e-07)
age 6575	23.94	39.50*	-26.50***	0.637***	0.0152***	0.0262***	0.269***
	(32.64)	(20.64)	(6.449)	(0.136)	(0.00399)	(0.00899)	(0.0858)
age 7685	-102.9**	114.1***	-2.703	1.084***	0.0348***	0.0792***	0.842***
	(46.76)	(32.62)	(10.62)	(0.227)	(0.00646)	(0.0159)	(0.156)
age 85+	-160.7**	156.9***	98.59***	1.903***	0.0744***	0.205***	1.597***
	(68.25)	(53.87)	(16.72)	(0.354)	(0.0108)	(0.0267)	(0.277)
comorbidities	23.59	-11.00	18.88***	1.098***	0.0466***	0.0842***	0.644***
	(15.08)	(9.883)	(3.003)	(0.0809)	(0.00233)	(0.00603)	(0.0602)
month	12.81***	6.344***	-4.879***	-0.0587***	-0.000539	-0.00169	0.0216**
	(3.831)	(2.410)	(0.593)	(0.0139)	(0.000458)	(0.00107)	(0.00990)
Constant	6,449***	4,942***	543.7***	5.904***	0.106***	0.180***	0.848***
	(49.53)	(65.66)	(11.42)	(0.219)	(0.00646)	(0.0137)	(0.137)

Observations	144,761	144,761	122,590	99,068	144,761	144,761	144,761
R-squared	0.002	0.214	55,186	0.011	0.008	0.006	0.004
Number of id	63,288	63,288	0.103	58,836	63,288	63,288	63,288

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply
*** p<0.01, ** p<0.05, * p<0.1

Table A.3.1b Results controlling for being home-owner

VARIABLES	i	ii	iii	iv
	Home-based Informal care Y/N	Home-based informal care weekly Y/N	Home-based Formal personal care Y/N	Residential care Y/N
dementia	0.190***	0.163***	0.0679*	0.0332**
	(0.0410)	(0.0398)	(0.0410)	(0.0147)
Dementia#home	0.00581	0.0451	0.0703*	-0.0194
	(0.0368)	(0.0357)	(0.0376)	(0.0141)
dementia#female	-0.0286	-0.00852	0.0602*	0.0131
	(0.0352)	(0.0340)	(0.0348)	(0.0125)
dementia#middle educ	0.0889**	0.0633	0.0773*	0.0295*
	(0.0435)	(0.0420)	(0.0428)	(0.0170)
dementia#high educ	0.0313	0.00953	0.0160	0.00679
	(0.0510)	(0.0479)	(0.0547)	(0.0213)
home	-0.0268***	-0.0163***	-0.0115***	-0.00491***
	(0.00625)	(0.00538)	(0.00426)	(0.00146)
income level	-1.06e-08	-1.39e-08	1.19e-08	-3.69e-09
	(1.41e-08)	(1.17e-08)	(9.76e-09)	(3.17e-09)
age 6575	0.00862**	-0.00175	-0.00858***	-0.000699
	(0.00349)	(0.00291)	(0.00214)	(0.000610)
age 7685	0.0648***	0.0304***	0.0126***	-0.000104
	(0.00621)	(0.00549)	(0.00418)	(0.00134)
age 85+	0.191***	0.120***	0.112***	0.00997***
	(0.0111)	(0.0103)	(0.00967)	(0.00275)
comorbidities	0.0247***	0.0220***	0.00605***	0.000470
	(0.00210)	(0.00190)	(0.00163)	(0.000459)
month	-0.00145***	0.000299	0.00119***	0.000240***
	(0.000397)	(0.000344)	(0.000295)	(8.09e-05)
Constant	0.124***	0.0854***	0.0300***	0.00529***
	(0.00585)	(0.00505)	(0.00394)	(0.00131)

Observations	144,656	144,656	110,623	144,639
R-squared	0.016	0.014	0.024	0.006
Number of id	63,259	63,259	58,638	63,252

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply
*** p<0.01, ** p<0.05, * p<0.1

Table A.3.1c Net effects of Table A.3.1a Results controlling for being home-owner

Net effects VARIABLES	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
Male with vs without dementia	-214.6	194.8*	96.72***	4.905***	0.0841***	0.199***	1.942**
	(160.0)	(104.6)	(36.93)	(1.143)	(0.0260)	(0.0743)	(0.762)
Female with vs without dementia	-139.6	88.52	125.2***	1.956**	0.0771***	0.200***	1.824**
	(144.0)	(111.2)	(37.92)	(0.877)	(0.0233)	(0.0696)	(0.912)
Statistical significance of diff				*			
Education							
Low educ with vs without dementia	-23.36	45.50	42.09	2.834***	0.0812***	0.177***	1.441*
	(130.8)	(86.20)	(28.20)	(0.858)	(0.0199)	(0.0583)	(0.776)
Middle educ with vs without dementia	-127.3	240.1	178.8***	4.652***	0.0740**	0.167*	1.090
	(214.3)	(160.8)	(52.33)	(1.415)	(0.0336)	(0.0972)	(0.880)
High educ with vs without dementia	-507.4**	147.1	135.9*	2.141	0.0878*	0.287**	3.805**
	(258.8)	(241.1)	(77.84)	(1.845)	(0.0487)	(0.139)	(1.748)
Statistical significance of diff							
Homeownership							
No home with vs without dementia	284.9	-8.454	180.6***	3.259**	0.0303	0.165*	0.961
	(182.5)	(223.7)	(45.51)	(1.328)	(0.0307)	(0.0858)	(0.784)
With home with vs without dementia	-338.9**	189.2***	88.13***	3.319***	0.0983***	0.211***	2.208***
	(134.2)	(56.63)	(33.27)	(0.809)	(0.0212)	(0.0653)	(0.825)
	***				*		

Observations	144,761	144,761	122,590	99,068	144,761	144,761	144,761

Table A.3.1d Net effects of Table A.3.1b Results controlling for being home-owner

Net effects VARIABLES	I Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
Male with vs without dementia	0.235***	0.223***	0.153***	0.0311***
	(0.0255)	(0.0239)	(0.0238)	(0.00957)
Female with vs without dementia	0.202***	0.210***	0.207***	0.0436***
	(0.0264)	(0.0256)	(0.0276)	(0.0100)
Statistical significance of diff			*	
Education				
Low educ with vs without dementia	0.178***	0.191***	0.155***	0.0267***
	(0.0215)	(0.0210)	(0.0208)	(0.00688)
Middle educ with vs without dementia	0.269***	0.254***	0.226***	0.0558***
	(0.0373)	(0.0356)	(0.0368)	(0.0152)
High educ with vs without dementia	0.212***	0.203***	0.169***	0.0314
	(0.0459)	(0.0427)	(0.0495)	(0.0202)
Statistical significance of diff	*		*	*
Homeownership				
No home with vs without dementia	0.214***	0.184***	0.136***	0.0535***
	(0.0301)	(0.0291)	(0.0311)	(0.0127)
With home with vs without dementia	0.218***	0.227***	0.200***	0.0322***
	(0.0234)	(0.0222)	(0.0234)	(0.00858)
			*	

Observations	144,656	144,656	110,623	144,639

Table A.4.a Baseline Results including one wave after the diagnosis

Dependent Variable	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
dementia	-861.5**	786.4*	43.23	1.435	0.0705	0.107	3.274
	(339.1)	(438.7)	(35.73)	(2.138)	(0.0462)	(0.0907)	(2.034)
dementia#female	74.85	556.9	23.45	-2.593	-0.0646	-0.131	-3.727*
	(362.5)	(493.4)	(41.51)	(2.331)	(0.0499)	(0.107)	(1.911)
dementia#middle educ	500.5	-548.0	100.0**	-0.237	0.0239	0.0668	-0.206
	(393.2)	(483.0)	(50.34)	(2.223)	(0.0583)	(0.120)	(2.035)
dementia#high educ	-435.4	838.5	38.77	3.844	0.0544	0.0837	2.034
	(576.1)	(1,026)	(69.70)	(3.641)	(0.0772)	(0.219)	(2.539)
income	0.00164***	0.000188	2.38e-05	-7.65e-07*	6.36e-09	-1.58e-09	-2.24e-07
	(0.000531)	(0.000123)	(3.10e-05)	(4.29e-07)	(1.97e-08)	(2.95e-08)	(2.75e-07)
age 6575	141.3***	-110.8***	-28.21***	-0.155	-0.0119***	-0.0330***	-0.296***
	(34.97)	(29.46)	(6.348)	(0.122)	(0.00400)	(0.00923)	(0.0854)
age 7685	48.22	59.26	-4.440	-0.134	-0.00197	-0.0184	0.0861
	(53.91)	(54.06)	(10.31)	(0.206)	(0.00672)	(0.0164)	(0.170)
age 85+	-283.6***	800.3***	79.93***	0.133	0.0316***	0.0815***	0.910***
	(79.63)	(98.95)	(16.15)	(0.299)	(0.0105)	(0.0250)	(0.273)
comorbidities	-3.581	-10.28	18.19***	1.283***	0.0469***	0.0845***	0.661***
	(15.25)	(11.96)	(2.957)	(0.0680)	(0.00206)	(0.00524)	(0.0593)
Constant	6,433***	1,847***	511.5***	4.696***	0.142***	0.266***	1.671***
	(47.70)	(43.05)	(8.803)	(0.0924)	(0.00579)	(0.0140)	(0.131)
Average outcome for respondents without dementia	6730.281	1773.847	378.760	6.67	0.148	0.247	1.63
Observations	169,480	169,480	125,550	122,893	169,480	169,480	169,480

R-squared	0.005	0.015	0.101	0.019	0.012	0.010	0.006
Number of id	69,737	69,737	56,093	65,301	69,737	69,737	69,737

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply
*** p<0.01, ** p<0.05, * p<0.1

Table A.4.b Baseline Results including one wave after the diagnosis

Dependent variable	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
dementia	0.153***	0.165***	0.140***	0.0624***
	(0.0464)	(0.0451)	(0.0496)	(0.0217)
dementia#female	0.00472	0.0161	0.0813	-0.0225
	(0.0520)	(0.0510)	(0.0564)	(0.0231)
dementia#middle educ	0.0902	0.0622	0.0646	-0.0175
	(0.0620)	(0.0613)	(0.0687)	(0.0233)
dementia#high educ	-0.00404	0.00511	0.158*	0.0104
	(0.0753)	(0.0739)	(0.0891)	(0.0406)
income level	1.77e-09	-5.08e-09	-4.90e-10	-1.27e-09
	(1.27e-08)	(9.70e-09)	(1.02e-08)	(2.22e-09)
age 6575	-0.0276***	-0.0197***	-0.0169***	-0.00189**
	(0.00364)	(0.00316)	(0.00246)	(0.000762)
age 7685	0.0104	0.0100*	-0.000573	-0.00182
	(0.00649)	(0.00589)	(0.00480)	(0.00156)
age 85+	0.116***	0.0953***	0.0996***	0.00579**
	(0.0106)	(0.00985)	(0.00937)	(0.00287)
comorbidities	0.0262***	0.0217***	0.00657***	0.000451
	(0.00187)	(0.00169)	(0.00145)	(0.000420)
Constant	0.179***	0.105***	0.0195***	0.00458***
	(0.00540)	(0.00460)	(0.00201)	(0.00113)
Average outcome for respondents without	0 .140	0.105	0 .038	0.004

dementia				
Observations	168,993	168,993	133,157	167,927
R-squared	0.019	0.014	0.022	0.003
Number of id	69,565	69,565	64,853	69,350

NOTE: The model is estimated including individual fixed effect. Clustered Robust standard errors at individual level are in parentheses, wave dummies apply
*** p<0.01, ** p<0.05, * p<0.1

Table A.4.c Baseline Results including one wave after the diagnosis

Dependent Variable	i Food spending	ii Rent spending	iii Out-pocket amount	iv # Doc visits	v Hospital stay Y/N	vi # hospital stays	vii # hospital nights
Male with vs without dementia	-791.8***	802.2**	90.12***	2.313	0.0930**	0.153	3.718**
	(265.7)	(342.5)	(32.21)	(1.927)	(0.0398)	(0.108)	(1.724)
Female with vs without dementia	-716.6***	1,342***	108.0***	-0.462	0.0249	0.0154	-0.0939
	(246.7)	(384.3)	(30.82)	(1.270)	(0.0325)	(0.0654)	(0.751)
Statistical significance of diff							*
Education							
Low educ with vs without dementia	-817.0***	1,118***	57.34**	-0.110	0.0321	0.0295	1.058
	(219.9)	(282.4)	(23.74)	(1.349)	(0.0291)	(0.0604)	(1.052)
Middle educ with vs without dementia	-322.3	526.3	155.5***	-0.131	0.0610	0.107	1.141
	(313.7)	(374.2)	(43.95)	(1.594)	(0.0493)	(0.106)	(1.676)
High educ with vs without dementia	-1,260**	1,901**	93.88	4.012	0.0929	0.126	3.459
	(521.1)	(957.2)	(64.81)	(3.558)	(0.0709)	(0.217)	(2.288)
Statistical significance of diff							
Observations	169,480	169,480	125,550	122,893	169,480	169,480	169,480

Table A.4.d Baseline Results including one wave after the diagnosis

Net effects VARIABLES	i Home-based Informal care Y/N	ii Home-based informal care weekly Y/N	iii Home-based Formal personal care Y/N	iv Residential care Y/N
Male with vs without dementia	0.184***	0.188***	0.204***	0.0588***
	(0.0386)	(0.0379)	(0.0426)	(0.0181)
Female with vs without dementia	0.186***	0.202***	0.275***	0.0365**
	(0.0363)	(0.0358)	(0.0404)	(0.0152)
Statistical significance of diff				
Education				
Low educ with vs without dementia	0.156***	0.174***	0.188***	0.0490***
	(0.0322)	(0.0316)	(0.0333)	(0.0143)
Middle educ with vs without dementia	0.245***	0.235***	0.247***	0.0333*
	(0.0524)	(0.0519)	(0.0587)	(0.0182)
High educ with vs without dementia	0.151**	0.178***	0.338***	0.0617*
	(0.0667)	(0.0658)	(0.0818)	(0.0372)
Statistical significance of diff			*	
Observations	168,993	168,993	133,157	167,927

Table A.5.1 Further descriptive by age group

	N	Mean	SD	N	Mean	SD
	Female			Male		
Age 50-64						
dementia	68834	0.003	0.052	87097	0.002	0.043
Low educ	62989	0.268	0.443	78607	0.305	0.46
Middle educ	52855	0.411	0.492	65755	0.393	0.488
High educ	52855	0.263	0.44	65755	0.232	0.422
comorbidities	52855	0.595	0.818	65755	0.543	0.775
OOP dummy	6052	0.071	0.257	8355	0.118	0.322
OOP amount	39299	331.644	482.359	30599	286.369	446.597
rent	40334	1519.377	3619.955	50453	1601.537	3685.697
food	52855	5246.663	4810.735	65755	5005.103	4602.1
# doctor visit	28647	5.191	8.707	35241	6.25	9.556
Hospital dummy	36604	0.119	0.323	45725	0.111	0.315
Times at the hospital	36604	0.195	0.737	45725	0.176	0.687
Nights at the hospital	36604	1.162	6.739	45725	1.036	7.207
Formal care dummy	28314	0.034	0.182	35401	0.051	0.22
Informal care dummy	46942	0.09	0.287	59717	0.133	0.34
Age 65-75						
dementia	51662	0.007	0.085	59019	0.006	0.076
Low educ	46042	0.361	0.48	50996	0.445	0.497

Middle educ	39478	0.35	0.477	44019	0.319	0.466
High educ	39478	0.224	0.417	44019	0.155	0.362
comorbidities	39478	0.951	0.971	44019	0.87	0.928
OOP dummy	6177	0.108	0.31	7753	0.207	0.405
OOP amount	27106	397.563	530.759	24145	364.698	499.975
rent	30766	1395.789	3481.892	34176	1568.05	3555.457
food	39478	4872.974	4479.821	44019	4381.79	4214.862
# doctor visit	19024	6.748	9.364	20978	7.541	10.226
Hospital dummy	27521	0.171	0.376	30623	0.152	0.359
Times at the hospital	27521	0.292	0.898	30623	0.253	0.828
Nights at the hospital	27521	1.93	9.075	30623	1.688	8.91
Formal care dummy	22049	0.058	0.234	24421	0.099	0.299
Informal care dummy	35689	0.13	0.337	40950	0.192	0.394
Age 76-85						
dementia	24516	0.028	0.165	31444	0.03	0.17
Low educ	21668	0.478	0.5	26246	0.605	0.489
Middle educ	19013	0.278	0.448	23478	0.231	0.421
High educ	19013	0.179	0.383	23478	0.092	0.288
comorbidities	19013	1.154	1.033	23478	1.112	0.999
OOP dummy	4049	0.271	0.444	6421	0.384	0.486
OOP amount	14097	467.313	602.087	11589	426.526	552.360
rent	14985	1585.113	3864.718	18245	2003.87	4274.224
food	19013	4393.844	4140.019	23478	3557.08	3553.585
# doctor visit	8920	8.495	11.179	10916	8.956	11.102
Hospital dummy	13477	0.221	0.415	16321	0.21	0.407
Times at the hospital	13477	0.401	1.081	16321	0.352	0.969
Nights at the hospital	13477	2.872	11.33	16321	2.852	11.838
Formal care dummy	10693	0.168	0.374	12804	0.285	0.451
Informal care dummy	17786	0.249	0.432	22512	0.356	0.479
Age 85-90						

dementia	3808	0.064	0.244	6122	0.082	0.274
Low educ	3328	0.534	0.499	5070	0.692	0.462
Middle educ	3066	0.234	0.423	4825	0.188	0.391
High educ	3066	0.172	0.377	4825	0.075	0.263
comorbidities	3066	1.13	1.007	4825	1.159	1.046
OOP dummy	4540	0.42	0.494	3027	0.437	0.496
OOP amount	3666	573.043	691.363	2408	527.211	664.308
rent	4965	2845.296	5553.122	3312	2236.739	5294.454
food	5818	3376.777	3278.398	3842	4185.155	3742.730
# doctor visit	2781	9.108	11.092	1844	9.031	10.952
Hospital dummy	4554	0.249	0.433	3004	0.241	0.428
Times at the hospital	4554	0.444	1.110	3004	0.442	1.135
Nights at the hospital	4554	3.757	13.418	3004	3.259	11.986
Formal care dummy	5670	0.516	0.500	3723	0.389	0.488
Informal care dummy	3405	0.26	0.439	2306	0.2	0.400