Dementia and Long-run Trajectories in Household Finances

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Abstract

We use two decades of the U.S. Health and Retirement Study data to compare long-run trajectories in household finances between individuals who eventually developed dementia and those who did not, using inverse probability weighting to account for differences in basic demographics. We find large and steady divergence in household wealth (net worth and financial wealth) that starts 8 to 10 years prior to dementia onset, which results in much lower wealth (a difference of about $100,000 in net worth) among the dementia cohort at and after the onset of the condition. These patterns are not explained by higher out-of-pocket healthcare expenses or intentional "spend-down" to qualify for Medicare coverage of nursing home residence. Rather, our findings suggest that they are driven by earlier exit from the labor force and potentially suboptimal investment decisions, which negatively affect long-term income in multiple areas among the dementia cohort relative to their counterparts. Our findings offer new evidence on dementia related economic disparities.

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Extended Abstract

1. Introduction

Dementia is one of the most expensive and prevalent medical conditions afflicting older adults and their families (Hurd et al. 2013; Alzheimer's Association 2019). The process of cognitive decline may start years before the onset of the condition, potentially affecting decision-making in many areas, especially financial decision-making (Ameriks et al. 2022; Angrisani and Lee 2019; Nicholas et al. 2021). The accumulation of these decisions could have long-term consequences that profoundly impact well-being at older age. Most existing literature on dementia and financial decision-making either examines decisions at a single point in time (Peterson et al. 2014; Sudo and Laks 2017), or examine them in a few limited domains (Angrisani and Lee 2019; Hsu and Willis 2013). In this study, we use two decades of nationally representative data from Heath and Retirement Study to examine the extent to which dementia-related cognitive decline changes long-run trajectories of multiple measures of household finances. They reflect decisions in various domains, including labor market participation, investment, consumption, and planning for long-term care.

We begin by comparing the long-term trajectories in overall household wealth between matched older adults who eventually developed dementia versus those who did not. We find that household wealth started to diverge between individuals with and without dementia as early as eight years prior to dementia onset, with a difference in median net worth as large as $100,000 at the time of dementia onset. We then seek to explain the gap in wealth between the two groups by zooming in on their income trajectories in several categories and spending patterns over the same time period. These investigations are driven by a few hypothesized mechanisms through which cognitive decline may be related to financial decision-making in the household. First, cognitive

decline may directly affect individual earnings by affecting their participation in the labor force, for instance due to difficulty in carrying out certain job duties, and may also impact subsequent income from pension and social security (possibly due to earlier withdrawal or benefit claim). Second, cognitive decline could impact judgement on financial decision-making, leading to suboptimal investment decisions and hence less income or higher loss on financial assets (Angrisani and Lee 2019; Christelis, Jappelli, and Padula 2010). Third, cognitive decline itself or associated comorbidities could prompt higher out-of-pocket medical spending if the individual sought treatments (Hudomiet, Hurd, and Rohwedder 2019; Kelley et al. 2015), which could then lower wealth. Finally, cognitively impaired individuals and their families could be aware of their risk of developing dementia and the likelihood of needing long-term care, which prompted them to dissave intentionally, possibly in order to qualify for Medicaid coverage of nursing home residence ("spend-down") as Medicare has no coverage for long-term care (Wiener et al. 2013). These hypotheses yield distinct empirical predictions in income (the first two) and spending (the last two), which we explore in the data. We find evidence that both the first (lower labor force participation) and second (suboptimal investment decisions) mechanism likely explain the long-run wealth divergence between the dementia and non-dementia groups.

2. Data and Methods

We use the nationally representative and longitudinal Health and Retirement Study (HRS) from 1998-2016. HRS is a biennial survey of U.S. older adults aged 50 and above. We construct a cohort of respondents with incident dementia (cases) using an established dementia ascertainment algorithm developed using HRS data (Hurd et al. 2013). The algorithm classifies a respondent in a given wave as having probable dementia if they have a predicted dementia

probability of at least 0.5 based on age, education, sex, number of activities of daily living (ADL) limitations, number of instrumental ADL (IADL) limitations, and scores on the Telephone Interview for Cognitive Status (TICS). We construct a control cohort who was never classified as having probable dementia in HRS, never had a spouse with dementia, and were never a spouse to an individual with dementia. For both cases and controls, we impose the following inclusion restrictions (and their waves included in the study): 1) aged between 65 and 100, 2) continuously enrolled in Medicare, 3) having at least two consecutive waves (cases were required to have at least one "clean" wave before dementia wave to qualify as having incident dementia).

Our final analysis sample includes 2,583 cases (16,774 person-years) and 5,525 controls (27,229 person-years). Table 1 shows summary statistics among cases and controls two years prior to actual dementia onset among cases or randomly assigned dementia onset year for controls. Column 1 and 3 show that they are different along several dimensions in terms of key demographics, in that cases tend to be older, less likely to be female, and lower educated.

In order to account for these differences in basic demographics, for each year we observe in the data relative to dementia onset among cases (e.g. t = -10, -8,… -2, 0, 2, 4, 6), we apply inverse probability weighting to all person-year observations among controls so they were observably similar to cases on distributions of age, gender, education and marital status. We then compare long-term trends between cases and re-weighted controls along measures of wealth, income and spending. We also use an event study approach that control for a variety of time-varying individual characteristics and individual fixed effects as an alternative approach to confirm findings from inverse probability weighted trends.

After re-weighting, cases and controls look observably similar in terms of age, fraction female, education and marital status (Panel A, Column 1 and 2, Table 1). As expected, they are more different along covariates not used to estimate the propensity score: even after re-weighting, cases have a higher fraction of racial and ethnic minorities and higher fraction of certain comorbidities, including stroke, diabetes, and psychiatric condition, and much higher index of ADLs and IADLs.

Table 1. Summary statistics of cases and controls, two years prior to dementia onset among cases

	Case	Control, reweighted	Control, unweighted
Panel A. Covariates used in propensity score estimation			
Age (SD)	82.12 (6.61)	82.48 (7.59)	80.16 (4.98)
Female	0.63	0.62	0.66
Less than HS education level	0.40	0.41	0.21
HS degree or GED education level	0.33	0.32	0.38
Some college or above education level	0.27	0.27	0.41
Married or partnered	0.44	0.44	0.35
Divorced or separated	0.07	0.07	0.12
Widowed	0.47	0.48	0.49
Never married	0.02	0.02	0.04
Panel B. Other covariates			
Non-Hispanic Black	0.15	0.09	0.08
Non-Hispanic White/Other	0.76	0.86	0.88
Hispanic	0.08	0.05	0.04
Cancer	0.19	0.20	0.21
Lung Disease	0.12	0.12	0.12
Heart Condition	0.39	0.38	0.35
Stroke / TIA - core	0.18	0.11	0.09
Hypertension	0.67	0.67	0.65
Diabetes	0.25	0.21	0.20
Psychiatric Condition	0.19	0.12	0.11
Arthritis	0.71	0.71	0.71
Index of ADLs	0.47	0.22	0.10
Index of IADLs	0.82	0.35	0.14
Panel C. Financial variables			
Net worth - median ($)	128,128	199,180	267,618
Net worth – mean ($)	389,241	496,082	587,918
Financial wealth – median ($)	8,921	30,769	44,690
Financial wealth – mean ($)	146,411	204,895	235,462

Home ownership	0.61	0.65	0.69
Median household income ($)	22,710	27,781	29,847
Any individual earnings	0.03	0.07	0.09
Any pension/annuity income	0.36	0.44	0.51
Median social security retirement income ($)	11,296	12,383	12,635
Median household capital income ($)	15	409	1,056
Median checking, dividend, bonds and CD income ($)	0	153	486
Median household spending ($)	24,811	26,950	25,590
Median out-of-pocket healthcare spending ($)	5,670	6,173	6,101
Self-reported prob. of living in nursing home in the next five years (in percentage)	18.85	18.67	16.92
Fraction living in a nursing home	0.04	0.02	0.01
Observations	2,546	27,229	1,191

Notes: Means are reported, except noted otherwise. Column 2 shows values for controls weighted to represent cases using propensity score estimated from a logistic function using age, gender, education (no high school degree, high school degree, some college or above) and marital status (married or partnered, divorced or separated, widowed, never married) as covariates. Cases from 2 years prior to dementia onset and control observations across all years were included in the propensity score estimation for each year relative to incident dementia.

3. Results

3.1. Household wealth

Both median household net worth and financial wealth, while largely similar at 10 to 8 years prior to dementia onset between the two groups, start to diverge afterwards, with a difference of over $100,000 in net worth and about $25,000 in financial wealth at and after dementia onset (Panel A and B in Figure 1). The divergence appears continuously and consistently for the years leading up to dementia onset, and continues on for net worth after dementia onset. As another key measure of wealth, home ownership does not appear to exhibit the same pattern: the proportion of respondents reporting owning any homes largely tracks each other and declines steadily in the two groups prior to dementia onset (from 70% to over 60%), with a sharp decline among cases of over 10 percentage points relative to controls in the year of dementia onset. This suggests that cases do not appear to be more likely to sell their homes than controls prior to

dementia onset, and other mechanisms likely explain the early divergence in wealth between the two groups.

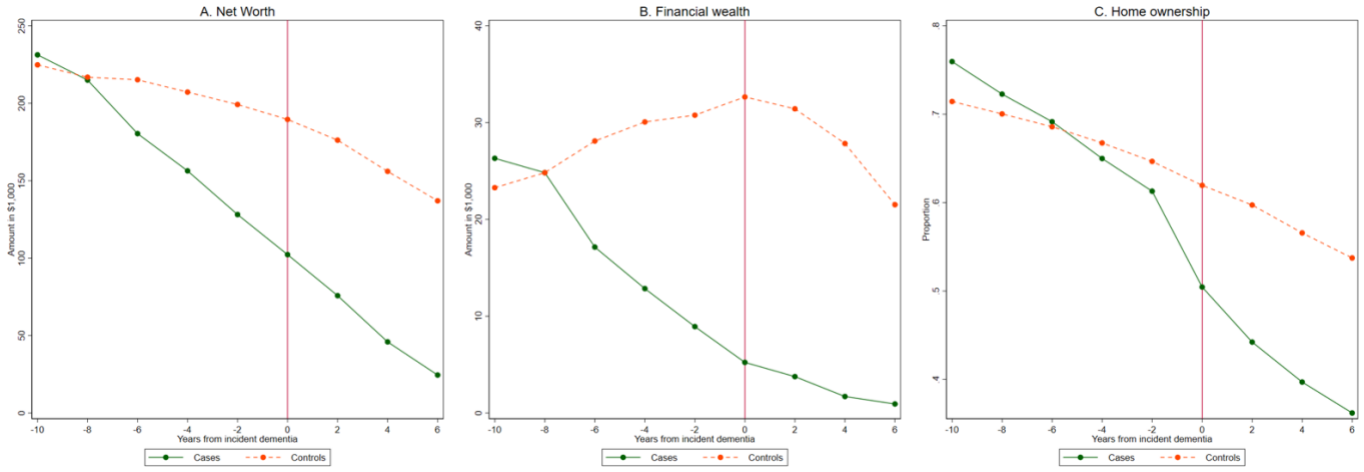


Figure 1. Household wealth and home ownership

Notes: Values for controls were re-weighted to represent cases using propensity score estimated from a logistic function using age, gender, education (no high school degree, high school degree, some college or above) and marital status (married or partnered, divorced or separated, widowed, never married) as covariates. Control observations across all years were included in the propensity score estimation and weighting for each year relative to incident dementia.

3.2. Individual and household income

We proceed to examine the first two hypothesized mechanisms in Section 1 related to income: 1) lower labor force participation, and 2) suboptimal investment decisions. The results are shown in Figure 2. We show trends in median for any income category with median above $0 in at least one of the two groups, and show proportion with any income in that category otherwise. First, we observe that the gap in total annual household income more than doubled during the 8 years prior to dementia onset, from less than $2,500 to over $5,000, though cases were already at a lower point 10 years prior to dementia onset (Panel A). This divergence is partially explained by accelerated decline in the proportion of having any individual earnings among the cases relative

to the controls during the same period (Panel B). The graph for labor force participation has almost identical trends to Panel B (not shown).

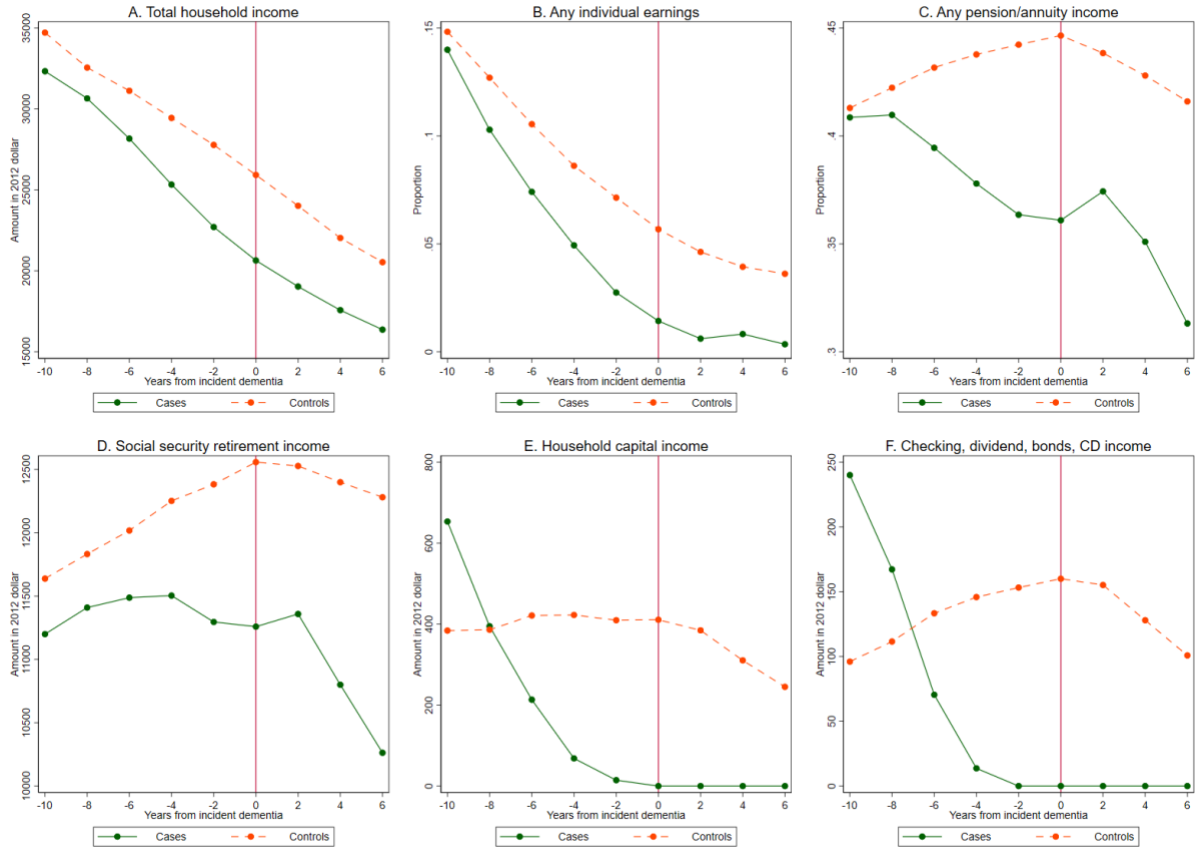


Figure 2. Individual and household income

As two other major components of individual income among older adults, pension/annuity (Panel C) and social security retirement income (Panel D) both diverged widely between the two groups. The gap in social security retirement income represents the largest difference among categories of median income between cases and controls, growing from less than $500 to about $1500 during the 10 years prior to dementia onset. This is potentially explained by a combination of higher prior earnings and later benefit start time among controls relative to cases.

While both pension/annuity and social security retirement income are related to historical earnings and length of time in the labor force, income from pension/annuity could also reflect investment decisions (unless the individual has a defined benefit plan). We further examine changes in household capital income (Panel E) which also reflect investment decisions: during the 10 years prior to dementia onset, median household capital income dropped sharply from about $650 to $0 among the cases, while it remained steady at about $400 among controls. Among subcategories of capital income (most of which had $0 median), this pattern was only mimicked by income from financial markets, e.g. income from checking, stock or mutual funds dividend, bonds and CDs (Panel E). Taken together, these results appear to be consistent with both earlier exit from the labor market and suboptimal investment decisions among cases compared to controls. However, it is still possible that individuals with cognitive decline and their families intentionally decumulate assets in order to qualify for Medicaid coverage of nursing homes, if they are conscious of the risk of needing long-term care.

3.3. Household spending and nursing home status

To examine the last two hypothesized mechanism (higher out-of-pocket healthcare spending and spending down to qualify for Medicaid coverage), we show household spending patterns in Figure 3. We find no evidence that households with cases spend more than controls during the 8-10 years leading up to dementia onset, either overall (Panel A) or in terms of out-of-pocket healthcare expenses (Panel B). Out-of-pocket healthcare spending only start to rise sharply among cases upon dementia onset. As a further confirmation, we compare the trajectory of self-reported probability of moving to a nursing home in the next five years, and see little difference between the two groups (Panel C), although the proportion of living in a nursing home jumps up

sharply (from 5% to over 20%) among cases at dementia onset, with no discernible evolution in controls (Panel D). These results suggest that neither out-of-pocket healthcare spending nor intentional spend-down is unlikely to explain the divergence in wealth between cases and controls. All of our results are confirmed by event study analysis using only within-individual variations (results not shown).

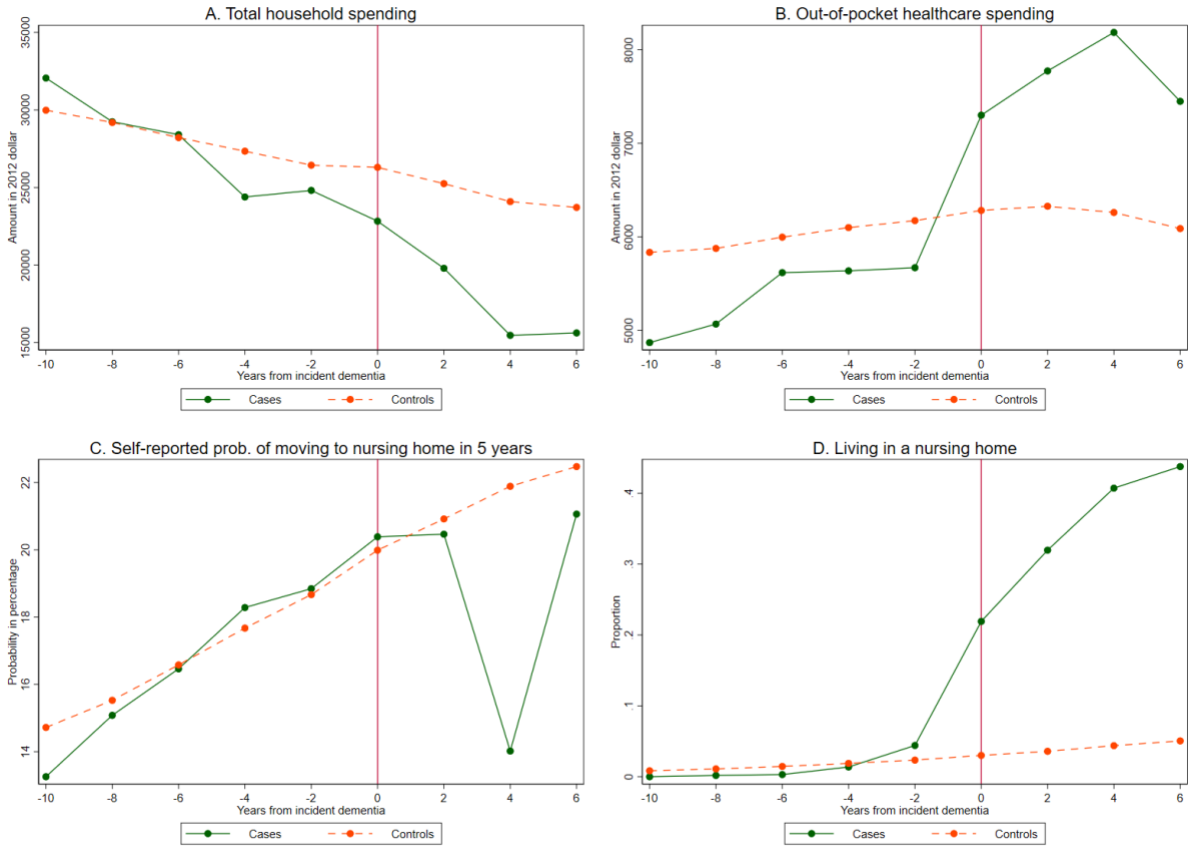


Figure 3. Household spending and nursing home status

4. Conclusion

Using two decades of HRS data, we find glaring divergence in household wealth between individuals with and without dementia during the decade prior to dementia onset. Our evidence potentially supports two explanations. First, cognitive decline preceding dementia onset prompts

individuals to exit from the labor force earlier, leading to lower earnings and possibly lower income from social security retirement account in the years to come. Second, cognitive impairment affects financial decision-making, leading to potentially suboptimal investment decisions which negatively impacts capital income. Both mechanisms could also lead to lower income from pension/annuity accounts. Our findings add new evidence to dementia related economic disparities. Early detection of cognitive impairment and advanced financial planning are important in order to mitigate long-run financial consequences of dementia even before the clinical onset of the condition.

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