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A Longitudinal Analysis of the impact of Health Shocks on the wealth: Evidence from England

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Abstract

This paper investigates the impact of health shocks on wealth using four waves of data from English longitudinal Study of Ageing (ELSA). We investigate short, medium and long term impact of existing and new health conditions on the wealth of the elderly. The results reveal that onset of new health events lead to wealth depletion during the period in which they occur and the impact disappears over time. The impact of existing health conditions in maximum in short and medium term and declines in the long run.

Introduction

The study of individuals with low wealth and in particular with intense amount of decline in wealth holdings late in life is particularly relevant for the analysis of social security and public health insurance programmes, because such individuals may have limited access to capital markets and therefore be heavily dependent upon the state for both retirement income and protection against health and other outlay shocks. Thefirst and foremost question one needs to address is how they reached this position? One possibility is that, once these individuals reached retirement with substantial saving, but drew down their resources rapidly; perhaps in response to unexpectedly large expenditure shocks, including a health shock. A large literature, summarized for example by DiNardi, et al., (2016) on the rate at which retirees draw down their wealth. If some spend at a higher rate, they could become low-wealth elderly in late life. This could either be due to high levels of consumption, or gaps in the social safety net that leave the elderly exposed to expenditure shocks such as out-of-pocket spending for some types of medical care. Another factor that we will not explore is that some live to a very old age and deplete their assets without rapid spend down but as a result of many years of modest spending. Our study concentrates on the former.

Health problems and associated health care expenses impose excessive financial burden on both elder populations and public health care programs across the globe. Increasingly with age, chronic health conditions are common inevitably leads to higher out-of-pocket health care expenses, (Hwang et al., 2001), higher medical costs (Wolff et al., 2002) at individual level and great burden on the health care programme of the state [1].

[1]For example, at an individual level, mean annual out-of-pocket health care expenditure for elders (age 65 or older) with three or more chronic conditions is three times the amount spent by elders without any chronic conditions ($1,492 vs $455 in 1996; Hwang et al. 2001). Chronic conditions of elders also place a great burden

Generally, older citizens pay for health care needs, primarily using either a health insurance or through their own personal resources, such as income and wealth. In most cases, elders find that the incomes which they receive through social security systems are still insufficient to cover the cost of treatment including the out of pocket expenditure putting pressure on the wealth accumulated over the life time. Inevitably, many elders use liquid and non-liquid wealth to cover the health shocks of varying degrees.

The framework draws the strength from the life cycle theory of savings. It is argued that wealth depletion is expected or even is planned by most of the elders as they age (Mirer, 1979). Fundamentally, people accumulate the wealth before retirement and deplete it after retirement to finance consumption for the remainder of their live (Modigliani and Brumberg, 1954), therefore reducing wealth to zero at the time of death (Yaari, 1965). In the recent past, the modified versions of life cycle hypothesis were employed allowing variations in optimal target wealth due to uncertainty in the life span, bequest intentions and most importantly unexpected shocks like, health shocks[2]. In these lines, (Haider et al., 2000, Hurd and Reardon, 2003; Feinstein & Ho, 2000 and Wu, 2003) argue that potential wealth decline is influenced by health shocks, widowhood (Weir et al.,2004; Johnson et al., 2005 and Coile and Milligan, 2009) and unexpected gains or losses in investment (Coile and Milligan, 2009). Life Cycle Theory of Savings provides a theoretical foundation to explain wealth depletion in the retirement phase. This theory suggests that people accumulate wealth during their years of employment to fund consumption for the post retirement period.

This paper tries to explore the relationship between health shocks and wealth levels using English Longitudinal Survey of Ageing (ELSA) whose respondents at aged 70 and above, a common age, with these assets just before death. It relies primarily on longitudinal data and yields results on differential impact of types of chronic diseases on wealth that are broadly consistent with earlier results using repeated cross-sections. It also provides new evidence on the role of educational attainment, income, the role of additional insurance and positive marital status in mitigating the likelihood of reporting wealth decline in late life.

The paper is as follows, section 2 discusses the relevant literature, section 3 mentions the data and proposed methodology section 4 discusses of result of the regressions and section 5 concludes the paper.

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on the Medicare program (Wolff et al. 2002); annual per capita Medicare expenditure in 1999 was $211 for elders without any chronic conditions and $13,973 for those with four or more chronic conditions.

[2]Arithmetically, savings may fall as current health deteriorates because poor health reduces current period income or increases either consumption or out-of-pocket medical expenses.

Section2: Health issues and Wealth decline: Related literature

Numerous studies employing different estimation techniques including (Hurd and Kapteyn 2003; Lee and Kim 2005; Lee and Kim 2003; Smith 1999, 2003) have examined how health affects the wealth depletion of the elderly and have concluded univocally that poor health significantly increases wealth depletion.

Recent studies also examine the channels through which health shocks create reduction in wealth. For example, Smith (1997, 1999) found that, new health events in later life result in wealth depletion through out-of-pocket medical expenses. Kelley et al., (2015) estimate the costs associated with different health conditions in the last five years of life. They report mean out-of-pocket spending of $61,522 for those diagnosed with dementia, $35,294 for heart disease, and $28,818 for cancer.

Feinstein and Ho (2000) reported that sudden changes in family structure and health status increase the likelihood of using up assets. Wu (2003) found that a change in a spouse's health condition affects the financial security of the other spouse, and the effects are greater when health changes happen to wife rather than to husband. Lee and Kim (2008) study the older AHEAD cohort (age 70 and older in 1993) argues that, health shocks in the form of new health events are likely to have only short term impact on wealth, while health shocks at later in life significantly affect wealth.

Health shocks are denoted by mental and physical ability decline, a personal attribute among the elderly which has significant influence on the portfolio decisions (Rosen and Wu, 2004) including decisions to accumulate sufficient amount of assets during retirement Empirical evidence generated by Pang and Warchawsky (2012) and Coile and Milligan (2009) reveals that any reduction in the health attribute, especially in the older age is correlated with shifts from risky to non-risky assets, supress consumption to meet adequate financial resources Hurd and Rowender (2013) argue that both resources available and utility of expenditure display changes over the life cycle and in the case of elderly, medical needs and assisted living facilities significantly influence financial adequacy after retirement.

A number of studies have documented negative cross-sectional associations between poor heath and wealth, and negative correlations in panel data between changes in health and changes in financial status. Lee and Kim (2008) study the older AHEAD cohort (age 70 and older in 1993) and find that new health conditions are associated with substantial.

Similar study by Coile and Milligan (2009) analyses the data from Health and Retirement Survey (hereafter HRS) and studies how the portfolio of U.S evolves after the retirement. Their findings say that with the age the households start decreasing their ownership of vehicles, financial assets, businesses and real estate and in turn there is increase in the share of assets held in liquid and time deposits. More interestingly, the effects of shocks associated to health and widowhood has the same magnitude and it strengthens with the time. In these lines Kim et al., (2012), the increased awareness of one's own expected mortality, health shocks may result in changing the priorities including bequest motives influencing the wealth patterns and its allocation in the older ages

Recent studies using longitudinal and cross sectional data confirms the decline in wealth due to health shocks and other shocks including changes in family structure (widowhood), or cognition decline. Smith (2005) finds, in the first five waves of the HRS, that households headed by individuals between the ages of 51 to 61 in 1992 exhibit a drop of roughly $40,000 ($2000) in wealth following a major health event. Studies that find that health declines are correlated with wealth declines include Smith (1999, 2004), Levy (2002), Wu (2003), Coile and Milligan (2009), Cook et al., (2010), and Wallace et al., (2014), particularly among older individuals.

For example, Wallace et al., (2010) in their study, analyse the data drawn from HRS for the older households from their first year of retirement up to 15 years. They estimate the changes in wealth due to family re-structuring, cognitive decline, health decline and many other changes. They find that assisted living facility and nursing home utilization has the largest effect on wealth decline followed by health decline. Cognitive decline in the older age seems to have negligible effect on the wealth decline among older retirees.

Poterba et al., (2011) examine how non-pension wealth is affected by family status and health changes and report on the evolution of non-pension assets into retirement. They find strong evidence that the response of couples to adverse shocks to both individual and household health status leads to temporal decreases in the stock of available wealth. Additionally, they find that individuals facing adverse family structure and health shocks have lower asset trajectories in the years following the shock than similar individuals who did not face such shocks

Wallace et al., (2013) tries to identify the nature of shocks to physical and cognitive health of older married couple in the first ten years of their retirement. They estimate the absolute and

relative risk of these shocks, and find that in case of cognitive decline the men are at more risk than the women but in the case of other shocks, the risk rate is similar across the sex. More importantly, they estimate the impact of the occurrence of these shocks on wealth-based measures of retirement adequacy and the study reveals that events indicating cognitive and health decline is having 1.5 times more likelihood of annualized net wealth fall below the federal poverty threshold. The erosion of wealth due to health and cognitive effects are potentially very large if the population is clustered around the adequacy standard (federal poverty threshold).

Kelley et al., (2015) estimate the costs associated with different health conditions in the last five years of life. They report mean out-of-pocket spending of $61,522 ($2010) for those diagnosed with dementia, $35,294 for heart disease, and $28,818 for cancer. They do not explore how these outlays translate into changes in wealth, or ask how often they push those experience health care costs to very low wealth levels.

Wallace et al., (2017) in their study of the retired cohort of the population from the data derived from the (HRS) find that, there is average health decline in post-retirement age and most interestingly, individuals with possess better health condition during retirement face more health decline. The health decline in this phase of post-retirement is more permanent as recovery is very uncommon and in contrast they face severe health deterioration. In the study they find that, there are long-run effects of health decline on the wealth decline and this in turn has the implication for both the optimal behaviour of individuals entering retirement and for the design of public pension and health insurance programs.

Poterba and Venti (2017) have analysed the role of health expenditure shocks in reduction of retirement wealth by analysing the data drawn from HRS through ten waves spanning from 1996-2014. They provide new evidence on the role of educational attainment, lifetime earnings, adverse health shocks after retirement, and the death of a spouse on the likelihood of reporting low wealth in late life. HRS respondents in better health in 1994 accumulated substantially more wealth by 2010 than those with poorer health, in 1994. In fact, it is shown that individuals with lowest latent health quintile with medium total assets in 1992-94 reported one-third of total wealth assets by 2004 to 2006.

The literature in this area throws up certain limitations and gap. Though, existing studies have attempted to investigate the impact of potential difference between new health events and existing health conditions, we believe that a further classification of existing health

conditions into mild and severe health issues could further bring more dynamics into the result. In this regard, we attempt to examine the effect of health shocks classified as mild and severe diseases either in the repertoire of current health issues or new health events. Secondly, we include new channels by which health affects wealth depletion. We include variables like family network effects and additional insurance purchase into the existing models to further improve the model. Finally, we exploit the age dynamics of the diseases (dummy for living with the disease severe/mild for more than 3 years and dummy for living with severe/mild diseases for less than 1 year) using information from earlier waves to examine the differential impacts on changes in wealth.

Section 3: Data and Methodology

In order to address the above research questions we use the data are drawn from the English longitudinal Survey of Ageing (hereafter ELSA) from year 2008 to 2014 (wave 4, wave 5, wave 6 and wave 7). This is a longitudinal survey on a large representative sample of men and women living in England, containing information on demographic factors, economic circumstances, social and psychological variables, health, cognitive function and biology. ELSA also provides in-depth information about the economic status of households, including assets and income, as well as comprehensive information about different aspects of the health status of individuals, including the occurrence of chronic conditions and new health events. Moreover, the longitudinal nature of the data set allows us to estimate the impact of changes in health status on the financial security of elders (70+ years of age).

The dependent variable in our case is wealth depletion measured as a binary variable, indicating whether an individual has depleted more than 10% of the wealth between wave 6 (2012) and wave 7 (2014). Our independent variable wealth is defined as the accumulation of resources, both financial and non-financial assets. Past research has employed unique measures of wealth change that lead to distinct conclusions. Total wealth is comprised of: Housing and Non housing wealth, net value of primary residence, social security wealth, smooth pension wealth, smooth veteran's benefit wealth and smooth annuity wealth, financial assets (stocks,bonds,Inividual Retirement Accounts) (Wallace et 2012,Coile&Miligan2009; Wallace at al.,,2017).Wealth is defined as total value of financial and non-financial assets minus the total debts(Kim and Lee,2007,2003;James M Poterba,2009).Instead of using the measure of wealth depletion, Smith (1999) used the out of pocket medical expenditure to study the impact of health

We keep the cut-off of more than 10% as it is beyond simple market fluctuations[3]. Previous literature has employed the dollar amount of change (Wu 2003) the percentage change of wealth (Hurd and Kapteyn 2003) and median values of wealth (Lee and Kim, 2008) which are robust to outliers and in all cases the evidence of health impacts has been found in all the measures. Net wealth is equal to the total value of all assets minus total debts (see appendix A1). The figures for net wealth (both financial and physical) in Pound Sterling are converted into 2014 prices, using the adequate version of the CPI with base period of 2014 =100.

The main independent variable in our model is the change in health outcome. Previous studies like Hurd and Kapteyn (2003) capturing the health statuses have employed self-reported health status[4] while other studies (Adams et al., 2003; Lee and Kim 2003; Smith 1999, 2003; Wu 2003) have examined the impacts of chronic health conditions such as heart diseases, cancer and diabetics on wealth. Lee and Kim (2003) moved one step ahead by investigating the separate effects of new health event and existing chronic conditions on changes in wealth. Most of the studies univocally advocate that severe chronic conditions of health have negative impact on accumulated wealth for older individuals. It is also found from (Lee and Kim 2003; Wu 2003) that existing conditions (health stocks) and new health events (health shocks) have different impacts on wealth.

We use three separate proxy measures to capture the change in either health stock (existing health condition) or health shock (new health events) based on severe and mild chronic conditions. The eight chronic conditions which are prevalent among the elders are diabetes, cancer, lung-disease, heart condition, stroke, high blood pressure, psychiatric problem and arthritis. We follow Wallace and Herzog (1995) classification of severe and mild chronic diseases, based on the severity and associated financial burden. Measures of health vary across the previous literature in terms of its construction and estimation. The most widely used measure of health shocks is the categorization of disorders into severe and mild conditions from the Health and Retirement Survey (HRS) Database.(Kim and Lee,2007,2003;Coile and Miligan ,2009;James P Smith,1999).Health status is also measured by the existence of comorbidity defined as existence of two or more severe conditions(Kim and Lee,2006). Construction of a latent health index based on responses to certain questions (James M Poterba, 2009). Another approach developed by Wallace (2017) , health is

[3]We use more than 50% decline in wealth as an additional variable to ensure the stability of data. However, the lack of people in the group (50-90%) is relatively low in the sample.

[4] Self –reported health is measured in a five-point scale of excellent, very good, good, fair, or poor

measure by its Rating of on five pointer scale. Wallace, 2010, 2012; measured decline in physical and cognitive health was measured in terms of health indicators of Self-Reported physical and cognitive health, experiencing trouble in gross motor skills and activities of daily life. This study investigates the impact of chronic health conditions such as Heart disease, cancer, stroke and diabetes.

The Model

This paper investigates the impact of existing and new health events on the wealth of the elderly over three time periods; short, medium and long term. The short run change in wealth conditions was calculated as a percentage change in wealth from 2008 to 2010, medium term change in wealth condition was computed as a percentage change in wealth condition from 2008 to 2012 and long run change in wealth condition was calculated as a percentage change in wealth condition from 2008 to 2014.This study will adopt Quantile Regression technique, as median is more robust to outliers than the mean.

The model is as follows

Short term percentage change in wealth= Age+ Gender+ Education+ Marital Status+ Existing condition in 2008+ new health events +Baseline wealth in 2008+Log Income in 2008 +Health Insurance

Medium term percentage change in wealth =Age+ Gender+ Education+ Marital Status+ Existing condition in 2008+ new health events +Baseline wealth in 2008+Log+Log Income in 2010 +Health Insurance

Long term percentage change in wealth = Age+ Gender+ Education+ Marital Status+ Existing condition in 2008+ new health events +Baseline wealth in 2008+Log Wealth in 2008+Log Income in 2012 +Health Insurance

Quantile Regression results

Table 1 shows the impact of existing and new health shocks on wealth of the elderly. The results of Quantile Regression reveals that chronic health conditions both existing and new health shocks significantly influence wealth depletion in later life. Existing health conditions in 2008 have a consistent negative impact on the wealth of the elderly. The magnitude of the impact changes over the three time periods, with maximum negative effect in the short and medium term and gradually depletes in the long run. The depletion in wealth caused due to

the onset of new health events is significant during the period it occurred, but the impact tends to disappear over time. The respondents who experience the occurrence of new heath shocks between 2008 and 2010,led to 3.9% depletion in wealth in the short run as compared to the wealth depletion of 2.7% and 0.5% in the medium and long term. The respondents who experienced onset of chronic health conditions in the medium term of 2008-2012 led to a wealth depletion of 4.3% as compared to its insignificant effect of 0.8% in the long run. Health shocks in the long run of 2008-2014 led to a wealth depletion of 3.8% in the same period.

An investigation of the impact of independent variables reveals that age does not have a very significant impact on wealth depletion. The female gender has greater wealth depletion with passage of time. The significance of Education qualification deteriorates over time as with the existing health conditions and onset of new health shocks, the educational attainments are not sufficient to mitigate the risk. Marital status has a positive impact on wealth as the wealth of spouse prevents wealth depletion of the respondents but the this variable has a negative effect on wealth depletion in the long run as with the passage of time, the income of the spouse is not sufficient to cover the medical expenses. Health insurance is a very critical factor to overcome wealth depletion and presence of health insurance prevents a steep decline in wealth levels. Log wealth indicates a constant fall in the wealth of the elderly which is evident given the onset of health shocks. The income levels so not show a deteriorating trend.

Table 1

	2008-2010	2008-2012	2008-2014
Existing health conditions in 2008	-5.05321(1.32)***	-6.445218(1.30)***	-3.8548(1.90)**
New Health events			
2008-2010	-3.958131(1.66)**	-2.79494(1.64)*	-0.5981848(2.41)
2010-2012	-	-4.384847(1.63)**	0.8199539(2.40)
2012-2014	-	-	-3.825997(2.23)*
Age	0.0087052(0.11)	-0.1081654(0.11)	0.0408313(0.16)
Female	-0.0340853(1.21)	-2.003997(1.20)	-1.958748(1.76)
Education			
High School	4.846966(1.40)*	1.541358(1.39)	4.16047(2.41)
College graduates	2.359931(1.67)***	3.894201(1.66)**	3.99505(2.41)*

Marital Status	2.437924(1.46)*	2.782157(1.46)**	-1.99471(2.13)**
Insurance	3.607375(1.81)**	3.963645(1.79)**	6.046211(2.62)**
Log Income	1.299759(1.09)*	1.663364(1.17)*	6.399633(1.78)***
Log Baseline wealth	-3.117529(0.42)***	-1.992359(0.43)***	-4.934069(0.61)***
Constants	27.9121(11.09)***	12.61928(11.38)*	16.2352(17.00)
N	2626	2596	2593
Pseudo R2	0.0147	0.0117	0.0078

Conclusion

The main contribution of this study is to analyze the impact of health shocks on wealth changes of the elderly. Longitudinal analysis reveals that severe health conditions, both existing and new health shocks, lead to depletion in wealth for the older cohort consisting of respondents aged 65 and older. This study also reveals that significance and magnitude of such health events differ over time. Existing health conditions lead to a consistent depletion wealth in the short and medium term with a lesser impact in the long run. The occurrence of new health shocks lead to considerable wealth depletion during the period it occurs and its effect disappears over time.

Future Research

This study can be extended further to analyze the impact of co-morbidity, the existence of two or more chronic health conditions and bequest intentions of the respondents, on the wealth changes of the elderly.

References

Selected References

Adams, P,.Hurd,M,D., McFadden,D ., Merrill,A and Ribeiro,T (2003): Healthy, wealthy, and wise? Tests for direct causal paths between health and socioeconomic status. Journal of Econometrics, 112, 3–56

Barcellos,S.H. and Jacobson M (2015) .The effects of medicare on medical expenditure risk and financial strain. American Economic Journal: Economic Policy 7(4) ,41-70.

Coile, C and Milligan, K. (2009). How Household Portfolios Evolve after Retirement: The Effect of Aging and Health Shocks, Review of Income and Wealth, 55(2): 226-248.

Cook, K, Dranove,D and Sfekas,A. (2010). Does Major Illness Cause Financial Catastrophe? Health Services Research. 45(2):418-436.

Dannefer, D., (2003). Cumulative Advantage/Disadvantage and the Life Course: Cross-Fertilizing Age and Social Science Theory. Journal of Gerontology: Social Sciences 58 :S327-37.

DeNardi, M, Erick F, and J.B., Jones. (2016). Saving After Retirement: A Review. Annual Review of Economics 8: 177-204

Dobkin, C., Finkelstein,A., Kluender, R., and Notowidigdo, M.J. (2018). The Economic Consequences of Hospital Admissions. American Economic Review 108, 308-352.

Feinstein, J. S., Ho, C. C. (2000).Elderly asset management and health: An empirical analysis. Yale School of Management Working Paper No. H-8.

Feinstein, J. S., Ho, C. C.(2000) Elderly asset management and health: An empirical analysis. Yale School of Management Working Paper No. H-8.

Haider S, Hurd M, Reardon E, Williamson S (2000) *Patterns of dissaving in retirement*. The Public Policy Institute, AARP, Washington, DC

House, J,S., Lepkowski J, M., Kinney A, M.,. Mero, R, P.,. Kessler, R,C , and Hertzog,A, V., (1994). The Social Stratification of Aging and Health. Journal of Health and Social Behavior35:213-34.

Hurd M, Kapteyn A (2003) Health, wealth, and the role of institutions. Labor and population program, Working Paper Series 03–09, Rand Corporation, Santa Monica, CA

Hurd M, Reardon E (2003) Real wealth changes from 1982 to 1991 among the newly retired. labor and population program, Working Paper Series 03–15, Rand Corporation, Santa Monica, CA.

Hurd, M,D. and Rohwedder,S (2003). The Retirement-Consumption Puzzle: Anticipated and Actual Declines in Spending and Retirement, National Bureau of Economic Research Working Paper No. 9586.

Hurd, M., and McGarry,K (1997). Medical Insurance and the Use of Health Care Services by the Elderly. Journal of Health Economics, 16 (2): 129-154.

Hurd, Michael, Erik Meijer, Michael Modloff, and Susann Rohwedder. (2016). “Improved Wealth Measures in the Health and Retirement Study: Asset Reconciliation and Cross-Wave Imputation.” RAND Corporation Working Paper WR-1150

Hwang W, Weller W, Ireys H, Anderson G (2001) Out-of-pocket medical spending for care of chronic conditions. Health Aff 20(6):267–278

Johnson R. W., Mermin G. B. T, Uccello C. E., (2005) When the nest egg cracks: Financial consequences of health problems, marital status changes, and job layoffs at older ages Chestnut Hill, MA Center for Retirement Research at Boston College

Johnson, R., Cori, U., and Joshua, G. (2005). Who Forgoes Survivor Protection in Employer-Sponsored Pension Annuities, The Gerontologist. 45(1), 26-35.

Kelley, A, Kathleen M., Gorges,R., and Skinner, J., (2015). The Burden of Health Care Costs for Patients with Dementia in the Last Five Years of Life. Annals of Internal Medicine. 163:10:731-736.

Kim, E. J., Hanna, S. D., Chatterjee, S., &Lindamood, S. (2012). Who among the elderly owns stocks? The role of cognitive ability and bequest motive. Journal of Family Economic Issues, 33(3), 338-352.

Lee, J and Kim,H (2003) An examination of the impact of health on wealth depletion in elderly individuals. Journal of GerontologyB Psychol Sci Soc 58(2); S120-126.

Lee, J and Kim,H(2005) Unequal Effects of Elders' Health Problems on Wealth Depletion across Race and Ethnicity. Journal of Consumer Affairs., 39(1): 148–172.

Lee, J and Kim,H. (2008). A Longitudinal Analysis of the Impact of Health Shocks on the Wealth of Elders." Journal of Population Economics. 21:217-230.

Levy, H. (2002). The Economic Consequences of Being Uninsured, Economic Research Initiative on the Uninsured Working Paper 12, October.

Mirer, T. W. (1979). The wealth-age relation among the aged.*American Economic Review*,69,435-443.

Pang, G &Warshawsky, M (2010). Optimizing the equity-bond-annuity portfolio in retirement: The impact of uncertain health expenses. Insurance: Mathematics and Economics, vol. 46(1), 198-209.

Poterba, J, Venti,S and Wise,D. (2011). The Composition and Drawdown of Wealth in Retirement. Journal of Economic Perspectives, Fall. 25(4):95-118.

Poterba, James and Steven Venti. (2017). Financial Well-Being in Late Life: Understanding the Impact of Adverse Health Shocks and Spousal Deaths. Mimeo.

Poterba, James, Steven Venti and David Wise. (2011). The Composition and Drawdown of Wealth in Retirement. Journal of Economic Perspectives, Fall. 25(4):95-118.

Poterba,P, Venti,S. Wise,D (2017)The asset cost of poor health J. Econ. Aging,9, 172-184.

Prus, S,G. (2007): Age, socioeconomic status, and health: a population level analysis of health inequalities over the life course. Sociology of Health and Illness 29, 275–96.

Rosen, H,S., and Wu, S (2004), Portfolio choice and health status, Journal of Financial Economics 72, 457–484.

Siegel, J.(1993). A Generation of Change.NewYork:Russell Sage.

Smith James P.(1997) Wealth Inequality among Older Americans. Journal of Gerontology Series B.;52B (Special Issue):74–78.

Smith, J. P.(1999). Healthy bodies and thick wallets: The dual relation between health and economic status. Journal of Economic Perspectives, 13,145-166.

Smith, James P. (2004) Unraveling the SES-Health Connection, Population and Development Review Supplement: Aging, Health and Public Policy, 30:108-132.

Smith, James P. (2005). *Consequences and Predictors of New Health Events*, in D. Wise (ed.) Analyses in the Economics of Aging, University of Chicago Press. 213-240.

Waite, L. (1995). Does Marriage Matter? *Demography* ,*32*(4), 483-507

Wallace GL, Haveman R, Wolfe B. Health Status, Health Shocks, and Asset Adequacy Over Retirement Years. Res Aging. 2017;39(1):222–48. pmid:28181872.

Wallace, G, Haveman,R and Wolfe,B. (2014). Health Status, Health Shocks, and Asset Adequacy over Retirement Years. Mimeo, University of Wisconsin-Madison, Department of Economics.

Wallace, G. L., Haveman, R., Holden, K., & Wolfe, B. (2010). Trigger Events and Financial Outcomes Among Older Households. Center for Financial Security Working Paper WP 10-2, University of Wisconsin, Madison.

Wallace, G. L., Haveman, R., Holden, K., & Wolfe, B. (2013). Health and wealth in early retirement. In K. Couch, M. Daly, & J. Zissimopoulos (Eds.), Life cycle events and their consequences: Job loss, family change, and declines in health. Stanford, CA: Stanford University Press.

Wallace, R. B., & Herzog, A. R. (1995). Overview of the health measures in the health and retirement study. The Journal of Human Resources, 30, 24.

Weir D, Purvi, S and Willis, R (2004). "The Economic Consequences of a Husband's Death: Evidence from the HRS and AHEAD, Social Security Bulletin. 65(3): 31-44.

Wolff J, Starfield B, Anderson G (2002) Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. Arch Intern Med 162(20):2269–2276

Wu S (2003) The effects of health events on the economic status of married couples. J Hum Resources 38(1):219–230

YaariM,E (1965) Uncertain lifetime, life insurance, and the theory of the consumer. Rev Econ Stud 32(2):137–150.

Data Measures and Organization

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The Model

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Long term percentage change in wealth = Age+ Gender+ Education+ Marital Status+ Existing condition in 2008+ new health events +Baseline wealth in 2008+Log Wealth in 2008+Log Income in 2012 +Health Insurance

Quantile Regression

Table 1 shows the impact of existing and new health shocks on wealth of the elderly. The results of Quantile Regression reveals that chronic health conditions both existing and new health shocks significantly influence wealth depletion in later life. Existing health conditions in 2008 have a consistent negative impact on the wealth of the elderly. The magnitude of the impact changes over the three time periods, with maximum negative effect in the short and medium term and gradually depletes in the long run. The depletion in wealth caused due to the onset of new health events is significant during the period it occurred, but the impact tends to disappear over time. The respondents who experience the occurrence of new heath shocks between 2008 and 2010,led to 3.9% depletion in wealth in the short run as compared to the wealth depletion of 2.7% and 0.5% in the medium and long term. The respondents who experienced onset of chronic health conditions in the medium term of 2008-2012 led to a wealth depletion of 4.3% as compared to its insignificant effect of 0.8% in the long run. Health shocks in the long run of 2008-2014 led to a wealth depletion of 3.8% in the same period.

An investigation of the impact of independent variables reveals that age does not have a very significant impact on wealth depletion. The female gender has greater wealth depletion with passage of time. The significance of Education qualification deteriorates over time as with the existing health conditions and onset of new health shocks, the educational attainments are not sufficient to mitigate the risk. Marital status has a positive impact on wealth as the wealth of spouse prevents wealth depletion of the respondents but the this variable has a negative effect on wealth depletion in the long run as with the passage of time, the income of the spouse is not sufficient to cover the medical expenses. Health insurance is a very critical factor to overcome wealth depletion and presence of health insurance prevents a steep decline in wealth levels. Log wealth indicates a constant fall in the wealth of the elderly which is evident given the onset of health shocks. The income levels so not show a deteriorating trend.

Table 1

	2008-2010	2008-2012	2008-2014
Existing health conditions in 2008	-5.05321(1.32)***	-6.445218(1.30)***	-3.8548(1.90)**

New Health events			
2008-2010	-3.958131(1.66)**	-2.79494(1.64)*	-0.5981848(2.41)
2010-2012	-	-4.384847(1.63)**	0.8199539(2.40)
2012-2014	-	-	-3.825997(2.23)*
Age	0.0087052(0.11)	-0.1081654(0.11)	0.0408313(0.16)
Female	-0.0340853(1.21)	-2.003997(1.20)	-1.958748(1.76)
Education			
High School	4.846966(1.40)*	1.541358(1.39)	4.16047(2.41)
College graduates	2.359931(1.67)***	3.894201(1.66)**	3.99505(2.41)*
Marital Status	2.437924(1.46)*	2.782157(1.46)**	-1.99471(2.13)**
Insurance	3.607375(1.81)**	3.963645(1.79)**	6.046211(2.62)**
Log Income	1.299759(1.09)*	1.663364(1.17)*	6.399633(1.78)***
Log Baseline wealth	-3.117529(0.42)***	-1.992359(0.43)***	-4.934069(0.61)***
Constants	27.9121(11.09)***	12.61928(11.38)*	16.2352(17.00)
N	2626	2596	2593
Pseudo R2	0.0147	0.0117	0.0078

Conclusion

The main contribution of this study is to analyze the impact of health shocks on wealth changes of the elderly. Longitudinal analysis reveals that severe health conditions, both existing and new health shocks, lead to depletion in wealth for the older cohort consisting of respondents aged 65 and older. This study also reveals that significance and magnitude of such health events differ over time. Existing health conditions lead to a consistent depletion wealth in the short and medium term with a lesser impact in the long run. The occurrence of new health shocks lead to considerable wealth depletion during the period it occurs and its effect disappears over time.

Future Research

This study can be extended further to analyze the impact of co-morbidity, the existence of two or more chronic health conditions and bequest intentions of the respondents, on the wealth changes of the elderly.