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Abstract: The objective of this paper is to estimate the causal effect of retirement on health care utilization. To do so, we use data from the 1992-2008 waves of the Health and Retirement Study (HRS) and the 2004-2006 waves of the Survey of Health, Aging, and Retirement in Europe (SHARE). In particular, we estimate the causal impact of retirement on health care utilization as measured by: doctor visits, visits to a general practitioner, nights in the hospital, and preventative care use. This paper uses panel data and instrumental variable methods, exploiting variation in statutory retirement ages across countries, to estimate the causal effects. Cross-country comparisons allow us to examine the role of a health care system's use of the general practitioner as a gate keeper to specialists in this relationship. We find that while retirement is associated with increased health care use, our causal estimates show that retirement leads to fewer doctor visits in both the US and continental Europe. Nights in the hospital are unaffected by retirement status. Further we find that health care systems with primary care physicians who act as gatekeepers are particularly effective at decreasing doctor visits at retirement. Therefore, we conclude that increasing the statutory retirement age to help the solvency of the retirement systems will also increase doctor visits as individuals continue to work longer. In the US, the burden of this increased utilization will likely be borne by private insurance companies and public insurance to the extent it covers working individuals in their 60's. European evidence suggests that this increase in doctor visits due to delayed retirement will be particularly evident in health systems without strong gatekeeper roles for general practitioners.

Key Words: Health; Retirement; Health care utilization; preventive care

Introduction

A lot of attention has been focused on the impact retirement has on physical and mental health (Charles 2004; Neuman 2008; Coe and Lindeboom 2008; Bound and Waidmann 2007;Coe and Lindeboom 2008; Johnston and Lee 2009; Rohwedder and Willis 2010; Coe and Zamarro 2011, Bonsang and Perelman 2012, Coe et al. 2012, Mazzonna and Peracchi 2012; Börsch-Supan and Schuth 2013, Kajitani, Sakata, and McKenzie 2013; Insler 2014, Coe and Zamarro 2015). Recent work has tried to determine the potential pathways through which this relationship holds, focusing primarily on health behaviors (Ekerdt et al. 1989; Roman and Johnson 1996; Neve et al. 2000; Perreira and Sloan 2001; Gallo et al. 2001; Evenson et al. 2002; Bacharach et al. 2004; Chung et al. 2007; Lang et al. 2007; Zheng et al. 2008, Zantinge et al. 2014, Insler 2014, Coe and Zamarro 2015). Despite this strong interest and growing literature, very little is currently known about how retirement impacts health care use directly (visits to the doctor, preventative care), or how the structure of the health care system might influence that relationship.

Health care utilization may change with retirement as a direct result of the change in opportunity cost of time. Retirement is accompanied by an increase in leisure time, which means that the opportunity cost for health investments declines when exiting the labor force, especially for time-consuming activities. The increased leisure time could increase the amount of health-seeking behavior in retirement, such as more visits to the doctor, since the implicit price for these activities decreases.[1]

The health care system likely plays an important role in determining the effect retirement has on health care utilization. However, using data from one country can be limiting in determining the role of the health care system. In the US, we have a fractured health insurance and care delivery system, and we often do not have sufficient information in surveys to determine what type of health insurance an individual might have, such as HMO, or whether or not the general practitioner plays a gatekeeper role, limiting access to specialists. Further, in the US, leaving employment is often accompanied with a shift in the price and source of health insurance, which could lead to changes in health care utilization itself. While this change in health insurance is part of the effect of retirement on health care use, it could also be of interest to isolate the effect between the change in health insurance and the change in the opportunity cost of health care use.

To address both of these issues, we take an international comparison approach, analyzing the effect of retirement in the US as well as continental Europe. Retirement is not associated with health insurance changes in single-payer European systems. Further, the role of the general practitioner as a gate keeper to specialist care is set at a country-level in Europe, as opposed to at the health insurance plan level. Thus we can identify differences in the effect of retirement on health care utilization based on country-differences in the design of the health care system.

An important issue that complicates the analysis is determining the causal mechanism between retirement and health care utilization, since retirement itself can be caused by a decline in health (see e.g. Boskin and Hurd 1978, Burkhauser 1979, among many others). In this respect, this paper makes use of panel data and instrumental variable methods, exploiting information about statutory retirement ages, to assess how retirement causally affects health-related investments and behaviors. This paper uses well-established instrumental variables that exploit the financial incentives for retirement imbedded in the rules determining Social Security benefits, as well as by employer-provided pension benefits. (Charles 2004, Neuman 2008, Bound and Waidmann 2007, Coe and Zamarro 2011, Rowhedder and Willis 2010, Coe et al. 2012, Coe and Zamarro 2015).

METHODS

Data

We make use of panel data from two harmonized, longitudinal studies on middle-aged and elderly adults in the US and continental Europe – the Health and Retirement Study (HRS) (1992-2008; 9 waves) and the Survey of Health Aging and Retirement in Europe (SHARE)[2] (11 European countries) (2004-2006; 2 waves), respectively. SHARE was developed having HRS as role model and with cross-country studies in mind, as a result, they collected conceptually comparable data in the key domains of demographics, health, work and retirement, income and assets, family and social networks (See Lee (2010) for a detailed discussion on the comparability of the surveys at conceptual level). Despite the intention for cross-survey comparability, creating comparable data between data sets remains non-trivial. In this respect this paper benefits from harmonization efforts as part of the Gateway to Global Aging Data (https://www.g2aging.org/).

There are very few sample restrictions necessary for this analysis. First, we eliminate incomplete survey records. Second, we eliminate those individuals who have never worked and those who have not worked since age 50, either due to individual choice or physical or mental limitations. Finally, we limit our analysis to men, since we are less worried about the potential for cohort effects in the characteristics of the working population for men than for women. The final sample consists of 51,110 total person-wave observations for the HRS and 22,056 total person-wave observations for SHARE.

We supplemented these data sets with information regarding country-specific statutory ages of retirement, as shown in Table 1. These statutory retirement ages allow us to construct instruments based on dummy variables indicating whether the individual is above the full or early retirement ages set in his country, in a given wave. While most countries in this sample have 65 as their full retirement age (the age at which they receive their "full" retirement benefits), there is considerable cross-country variation in the early retirement age (the earliest age in which individuals can claim retirement benefits from the state). The early retirement age ranges from 57 (France, Greece, and Italy), to 63 (Germany, Switzerland). This cross-country variation helps insure that we are not identifying an age-specific effect on health care utilization, but a true effect of retirement on health care utilization.[3] Finally, for the countries included in SHARE we also made use of information about the characteristics of the health system in the analysis for health care use. In particular we used information about whether general practitioners act as gate keepers for specialized treatment in each country (Majo, 2010). Here we see that Denmark, Italy, Netherlands, Spain and Sweden form the group of countries where general practitioners act as gatekeepers. Since this is dependent on the health insurance plan within the US, and we do not know plan specifics with the HRS sample, we omit the US from this analysis.

Outcome Variables

Total doctor visits: For SHARE this variable indicates the number of times in total that the respondent has seen or talked to a medical doctor about his/her health, during the last 12 months. SHARE respondents are instructed to exclude dentist visits and hospital stays, but include emergency room or outpatient clinic visits. For HRS, this variable records the number of times the respondent visited a doctor in the previous two years from the date of interview.

GP doctor visits: This variable is only available in SHARE and indicates the number of times that the respondent has seen a general practitioner or a doctor at the respondent's health care center, during the last 12 months.

Nights in hospital: This variable shows information about the number of nights that the respondent has spent in hospitals during the last 12 months in the case of SHARE and during the previous two years for the case of HRS.

Flu shots: This variable is only available in HRS and represents a dummy variable that takes value one if the respondent reports having received a flu shot in the previous two years from the date of interview.

Prostate check: This variable is only available in HRS and represents a dummy variable that takes value one if a male respondent reports having an examination of prostate to screen for cancer in the previous two years from the date of interview.

Cholesterol check: This variable is only available in HRS and represents a dummy variable that takes value one if the respondent reports having a blood test for cholesterol in the previous two years from the date of interview.

Endogenous Variables

Retirement: There are two common ways of defining retirement: self-reported retirement status, or anyone who is not in the paid labor force. Often individuals report that they are retired even when working full- or part-time, simply because they have left their "career" job. Since we want to determine the effect of work status on health behaviors and investments, we employ the latter definition. We consider this a cleaner measure of retirement behavior than the self-reported measure. Thus, while we limit our sample to those who are working in the paid labor market at the age of 50, we consider individuals that report themselves to be retired, a homemaker, sick and disabled, separated from the labor force (not temporarily), and unemployed (not temporarily) as retired.

Control Variables

Household income: It is the sum of all income of the respondent and the spouse in the household.[4]

Net worth: It is the net value of total wealth, which is calculated as the sum of all wealth (excluding second home, if applicable) less all debt of the household.[5]

Years of education: In HRS this variable collects the number of years of education and it takes a maximum value 17 for post college education. In SHARE the maximum value of years of education is 21 for wave1 and 25 for wave 2.

Econometric Methods

We want to determine the effect of the binary decision of being retired (R_{ict}) on each measure of health care utilization (U_{ict}). We estimate the following empirical model:

$$U_{ict} = \beta_i + \beta_1 R_{ict} + \beta_2 X_{ict} + \beta_3 C_i + \varepsilon_{ict} \qquad (1)$$

where U_{ict} refers to the specific outcome we are interested in studying (e.g., doctor visits, preventive care) for individual *i* in country *c* at time *t*. X_{ict} is a vector of socio-demographic explanatory variables relevant for the analysis such as age, age squared, household income, household wealth, years of education, marital status, ethnic group and race. R_{ict} is an indicator for retirement status, making β_1 our main coefficient of interest as it estimates how retirement affects health care use.

Separate models are estimated for the HRS and SHARE surveys. In the case of SHARE, time-invariant country-specific characteristics are captured introducing country dummies (C_i), while region dummies are used for the US sample. For the study of doctor visits using SHARE we also included a variable about whether the general practitioner acts as a gate keeper in the health system of the country of residence of the respondent. Finally, including an individual constant term (β_i) allows us to control for individual unobserved heterogeneity. If we make the more plausible assumption that β_i is correlated with the explanatory variables, fixed-effect models are needed and the effects of time-invariant regressors (e.g. country specific effects (C_i)) are not separately estimable from the individual's fixed effect. Fixed effect models and IV fixed effect models were estimated for HRS where more waves of data are available.[6]

A selection problem may arise because R_{ict} can be correlated with the unobservables. This would be the case if, for example, individuals who expect to benefit more in terms of health and who invest more on their health when retired try to retire earlier. Fixed effects panel data estimation of equation (1) corrects for a time-invariant correlation among retirement decisions and the unobservables.[7] However, this does not account for time-varying factors such as a sudden change in the individual's environment. The addition of instrumental variable methods to the panel data methods above aims to correct for these time-varying factors. Note that combining fixed effects and instrumental variables methods is possible because the instruments change over time with the age of the individual. Although retirement and health care use are both a function of age themselves, retirement is a nonlinear and non-monotonic function. This is so because significant increases in the probability of retirement are observed as individuals become eligible for early and full retirement pensions. We can therefore control for a wide range of smooth-age effects in health care use when still using early and full retirement ages to build instruments as follows:

$$Instrument_{ict} = 1(age_{it} \geq Statutory\_retirement\_age_{ct}) \qquad (2)$$

where *i* refers to the individual, *c* a country and *t* a particular year. Note that these instruments present variation among individuals of different ages in a given country (depending on the individual being above or below the statutory retirement age set in his country in a particular year) and among individuals residing in different countries given a particular age (as statutory retirement ages vary across countries).

Despite of the difficulty to claim that Ordinary Least Squares (OLS) estimates are consistent in this context, due to the endogeneity or retirement, we also estimate equation (1) using OLS methods to compare the results with panel data and instrumental variable approaches. Specifically, linear OLS, Instrumental Variables (IV), fixed effects (FE) and IV fixed effect (IV FE) models are estimated for continuous non censored outcomes (i.e. doctor visits).[8] Linear probability models are estimated for binary outcomes (preventive care use).[9]

Finally, we test for heterogeneous effects of retirement on health care utilization based on country-specific institutional considerations, specifically whether a country uses a primary care physician as a gatekeeper.

RESULTS

Descriptive statistics

Table 2 shows descriptive statistics for the data used in this paper. Considering the number of different countries involved in the analysis, the demographic characteristics are remarkably similar between the two data sources used. The average age is between 64.5 and 66.5, with the percent self-reported retired between 60 and 62 percent. The SHARE is the younger sample and the most retired, consistent with broad labor force participation patterns in continental Europe compared to the US. The HRS sample has more years of education, on average, and is more likely to be married. These differences, however, could be due to small divergences in the way this information is collected in these surveys.

There is more variation observed between the different countries in terms of health care use. Americans go to the doctor less frequently over a 2-year period than their continental European counterparts, but get considerable amounts of preventative medicine, with almost 60 percent of the sample reporting getting flu shot, 72 percent getting a prostate check, and 80 percent having their cholesterol checked.

Instrument validity

In order for instrumental variables based on statutory retirement ages to be valid, they must be related to actual retirement behavior. Earlier work on the causal effect of retirement on health has shown that these proposed instruments are very strong predictors of retirement behavior (see e.g. Charles 2004, Neuman 2008, Bound and Waidmann 2007, Coe and Zamarro 2011, Coe and Zamarro 2015). The first stage regression indicates that retirement ages are important predictors for retirement behavior in both settings, as shown in table 3.[10] Being at or above the early retirement age increases the probability of being retired by 30 percentage points in the US and 21 percentage points in Europe. Being above the full retirement age in Europe increases the probability of being retired by an additional 18 percentage points. These effects are sizable and statistically significant. Further, the f-statistics are well above the threshold of 10 suggested by Staiger and Stock (1997), suggesting we do not have a weak instrument problem. For the analysis using SHARE, we have two instruments for retirement available. We performed a Hansen J test and failed to reject the null hypothesis that both instruments were valid (p-value = 0.993).

Identification also requires that there not be an independent, discontinuous change in health behaviors, activities and health care measures at the particular statutory retirement ages in place in each country. In this respect, a concern in using full retirement ages for instrumenting retirement in the United States is that for the majority of the birth cohorts in the HRS sample, they coincide with eligibility for Medicare (age 65). Therefore, our specification only uses the eligibility for early retirement in the U.S. (62).

Health Care Utilization

In Table 4 we explore how health care utilization changes with retirement and the corresponding decrease in the opportunity cost of time. Each set of columns refers to the different models (OLS, IV, FE, IV FE) and each data set (HRS, and SHARE) respectively. Each panel provides the results for a different outcome measure.

For both the U.S. and continental Europe, retiring is associated with a higher number of doctor visits. However, once we control for the endogeneity of the retirement decision, the effect is reversed and statistically significant. In the US, retirement leads to 2.5 fewer total doctor visits in the previous 2 years ($p<0.1$); in continental Europe, retirement leads to 2.3 fewer GP visits ($p<0.1$) in the previous 12 months. This finding suggests that recently retired individuals are not using their increased leisure time to see the doctor more, despite the reduced opportunity cost of their time. Although somewhat counterintuitive, this result is consistent with previous results suggesting that retirement leads to improvements in self-reported health status. If retirement leads to better health, fewer visits to the doctor may be needed. For the US, it could also be consistent with a change, and perhaps loss, of health insurance coverage with the end of employment. (It is important to note that this is *not* a Medicare effect since we are using the Early Eligibility Age (age 62) as our instrument, and not age 65.) An alternative explanation could be that individuals prefer to do their health treatments before they retire and then be able to spend their extra leisure time in retirement in activities other than health care.

We also observe a positive correlation between retirement and nights spent in the hospital. However, the relationship becomes insignificant once we address the endogeneity of the retirement decision. This relationship highlights the reverse causality in the OLS regressions – bad health is leading people to retire. Finally, for the U.S., where information is available, we find little effect of retirement on preventive care use. We do find that there is an uptick in individuals receiving their flu shots due to retirement (9.6 percentage point increase, $p<0.1$).

Within continental Europe, we explore how institutions can impact the causal relationship between retirement and health care use. The results are presented in Table 5. We first present again the baseline (no interaction) results already presented and discussed in Table 4. Second, we present the results including controls for the gatekeeping role of general practitioners and interactions with retirement. Here we find important heterogeneity based on how the health care system manages access to specialty care.

Panel A presents the results total doctor visits; Panel B presents the results for GP visits in particular, and Panel C presents the results for nights in a hospital. We find that countries with gatekeepers are successful at keeping total doctor visits lower, by about 3 doctor visits per year. We also find that retirement decreases total doctor visits the most in these countries, decreasing total doctor visits by almost 1 visit per year and decreasing general practitioner visits by 0.6 visits ($p<0.10$) per year, on average. There is no differential effect on number of nights in a hospital, so the decrease in doctor visits does not seem to be associated with worse health outcomes that are treated in hospitals instead of the doctor's office, at least in the short-term.

DISCUSSION

A growing body of literature has focused on measuring the causal relationship between retirement and health, as a way to tease out the potential spillover effects that increasing the retirement age will have on health care services and spending. This literature has found that retirement seems to have a causal positive effect on general health. As a result of these studies researchers have started to study possible changes in behaviors during retirement that could explain the positive effects found. Yet few have examined the impact of retirement on health care use directly. Our findings suggest that, in both the US and Europe, we find that retirement leads to a decrease in the propensity of seeing a doctor. In the US, retirement is found to lead to a decrease of about 2.5 visits over 2 years and for Europe to 2.3 less GP visits over 12 months. Further, we find that retirement leads to even fewer doctor visits in health care systems with general practitioners that act as a gate keeper to specialist care. However, we do not see a differential utilization of hospitals due to retirement status, suggesting that the effect of changing the retirement age on health care utilization may be limited to the most discretionary health care spending.

APPENDIX A: First Stage Regression Results

	HRS	SHARE
	Baseline	*Baseline*
Early Retirement Age	0.299***	0.2147***
	(0.008)	(0.0123)
Full Retirement Age		0.1763***
		(0.0106)
age	0.0791***	0.1350***
	(0.003)	(0.0044)
Age squared	-0.000448***	-0.0009***
	(0.000)	(0.00003)
Log household income	-0.109***	-0.0333***
	(0.003)	(0.0034)
log household net worth	0.0271***	-0.0068****
	(0.001)	(0.0015)
Years of Education	0.00162***	-0.0040***
	(0.001)	(0.0006)
married	0.0349***	0.0281****
	(0.004)	(0.0038)
African American	0.0133**	N.A.
	(0.005)	
Other race	-0.0257***	N.A.
	(0.009)	
Hispanic ethnicity	-0.0578***	N.A.
	(0.007)	
Constant	-2.030***	-4.1218***
	(0.100)	(0.1534)
N	51110	22056
F-stat	2673.55	300.68
(p-value)	(0.000)	(0.000)

Note: All regressions also include region (HRS) or country (SHARE) indicator variables.

References

Anderson, Patricia M., Alan L. Gustman, and Thomas L. Steinmeier. 1999. “Trends in Male Labor Force Participation and Retirement: Some Evidence on the Role of Pensions and Social Security in the 1970’s and 1980’s.” *Journal of Labor Economics* 17(4): 757-783.

Bolin, Kristian, Anna Lindgren, Björn Lindgren, and Petter Lundborg. 2009. “Utilisation of Physician Services in the 50+ Population: The Relative Importance of Individual versus Institutional Factors in 10 European Countries.” *International Journal of Health Care Finance and Economics* 9(1): 83-112.

Bonsang, E., S. Adams, and S. Perelman. 2012. “Does retirement affect cognitive functioning?” *Journal of Health Economics*, 31:490-501.

Börsch-Supan, A, and M. Schuth. 2013. “Early Retirement, Mental Health and Social Networks.” In Wise, D.A. *Discoveries in the Economics of Aging*. University of Chicago Press.

Boskin, Michael J. and Michael D. Hurd. 1978. “The Effect of Social Security on Early Retirement.” *Journal of Public Economics* 10(3): 361-377.

Bound, John and Timothy Waidmann. 2007. “Estimating the Health Effects of Retirement.” Working Paper 2007-168. Ann Arbor, MI: University of Michigan Retirement Research Center.

Burkhauser, Richard V. 1979. “The Pension Acceptance Decision of Older Workers.” *Journal of Human Resources* 14(1): 63-75.

Carp, Francis M. 1967. “Retirement Crisis.” *Science* 157(3784): 102-103.

Charles, Kerwin Kofi. 2004. “Is Retirement Depressing? Labor Force Inactivity and Psychological Well-Being in Later Life.” In *Research in Labor Economics, Volume 23: Accounting for Worker Well-Being*, edited by Solomon W. Polacheck, 269-299. New York: Emerald Group Publishing.

Chung, Sukyung, Barry M. Popkin, Marisa E. Domino, and Sally C. Sterns. 2007. “Effect of Retirement on Eating Out and Weight Change: An Analysis of Gender Differences.” *Obesity* 15(4): 1053-1060.

Coe, Norma B. and Maarten Lindeboom. 2008. “Does Retirement Kill You? Evidence from Early Retirement Windows.” Discussion Paper 3817. Bonn, Germany: Institute for the Study of Labor.

Coe, Norma B., Hans-Martin von Gaudecker, Maarten Lindeboom, and Jürgen Maurer. 2012. “The Effect of Retirement on Cognitive Functioning.” *Health Economics* 21(8): 913-927.

Coe, Norma B. and Gema Zamarro. 2011. "Retirement Effects on Health in Europe." *Journal of Health Economics* 30(1): 77-86.

Coe, Norma B. and Gema Zamarro. 2015. "How does Retirement Impact Health Behaviors? An International Comparison." Manuscript.

Ekerdt, David J., Lorraine O. De Labry, Robert J. Glynn, and Richard W. Davis. 1989. "Change in Drinking Behaviors with Retirement. Findings from the Normative Aging Study." *Journal of the Study of Alcohol* 50(4): 347-353.

Eisdorfer, Carl and Frances Wilkie. 1977. "Stress, Disease, Aging and Behavior." In *Handbook of the Psychology of Aging*, edited by James E. Birren and K. Warner Schaie, 251-275. New York: Van Nostrand Reinhold.

Evenson, Kelly R., Wayne D. Rosamond, Jianwen Cai, Ana V. Diez-Roux, and Frederick L. Brancati. 2002. "Influence of Retirement on Leisure Time Physical Activity. The Atherosclerosis Risk in Communities Study." *American Journal of Epidemiology* 155(8): 692-699.

Finkelstein, Amy, Erzo F.P. Luttmer, and Matthew J. Notowidigdo. 2008. "What Good is Wealth Without Health? The Effect of Health on the Marginal Utility of Consumption." Working Paper 14089. Cambridge, MA: National Bureau of Economic Research.

Gallo, William T., Elizabeth H. Bradley, Michele Siegel, and Stanislav V. Kasl. 2001. "The Impact of Involuntary Job Loss on Subsequent Alcohol Consumption by Older Workers: Findings from the Health and Retirement Survey." *Journals of Gerontology: Series B – Psychological Sciences &Social Sciences* 56(1): S3-S9.

Grossman, Michael. 1972. "On the Concept of Health Capital and the Demand for Health." *Journal of Political Economy* 80(2): 223-255.

Gruber, Jonathan and David A. Wise, eds. 1999. *Social Security and Retirement around the World*. Chicago, IL: University Of Chicago Press.

Gruber, Jonathan and David A. Wise, eds. 2004. *Social Security Programs and Retirement around the World: Micro-Estimation*. Chicago, IL: University of Chicago Press.

Hurd, Michael. 1990. "Research on the Elderly: Economic Status, Retirement, and Consumption and Saving." *Journal of Economic Literature* 28(2): 565-637.

Insler, Michael. 2014. "The Health Consequences of Retirement." *Journal of Human Resources* 49(1):195-233.

Johnston, D.W. and W.S. Lee. 2009. “Retiring to the good life? The short-term effects of retirement on health.” *Economic Letters,* 103(1):8-11.

Kajitani S, K Sakata, and C. McKenzie. 2013. “Occupation, retirement and cognitive functioning.” Keio University, Jount Research Center for Panel Studies DP 2012-002.

Lang, Iain A., Neil E. Rice, Robert B. Wallace, Jack M. Guralnik, and David Melzer. 2007. “Smoking Cessation and Transition into Retirement: Analyses from the English Longitudinal Study of Ageing.” *Age and Ageing* 36(6): 638-643.

Lee, Jinkook. 2010. “Data Set for Pension and Health: Data Collection and Sharing for Policy Design.” *International Social Security Review* 63(3-4): 197-222.

Lumsdaine, Rober. L and Olivia S. Mitchell. 1999. “New Developments in the Economic Analysis of Retirement.” In *Handbook of Labor Economics, Vol. 3C*, edited by Orley C. Ashenfelter and David Card, 3261-3307. Amsterdam, The Netherlands: Elsevier Ltd.

MacBride, Arlene. 1976. “Retirement as a Life Crisis: Myth or Reality?” *Canadian Psychiatric Association Journal* 21(8), 547-556.

Majo, Maria Cristina. 2010. “A Microeconometric Analysis of Health Care Utilization in Europe.” Dissertation. Tilburg, Netherlands: Open Access Publications from Tilburg University.

Mazzonna, Fabrizio and Franco Peracchi. 2012. “Ageing, cognitive abilities and retirement.” *European Economic Review,* 56:691-710.

Minkler, Meredith. 1981. “Research on the Health Effects of Retirement: An Uncertain Legacy” *Journal of Health and Social Behavior* 22(2): 117-130.

Natali, D., 2004. The Pension System Observatoire Social Européen Research Project: LA METHODE OUVERTE DE COORDINATION (MOC) EN MATIERE DES PENSIONS ET DE L’INTEGRATION EUROPEENNE. Service Public Fédéral Sécurité Sociale.

Neuman, Kevin. 2008. “Quit Your Job and Get Healthier? The Effect of Retirement on Health.” *Journal of Labor Research* 29(2): 177-201.

Neve, RudyJ.M., Paul H. Lemmens, and Maria J. Drop. 2000. “Changes in Alcohol Use and Drinking Problems in Relation to Role Transitions in Different Stages of the Life Course.” *Substance Abuse* 21(3):163-178.

OECD, 2003. Economic Survey of Austria. http://www.oecd.org/dataoecd/5/16/27424371.pdf.

OECD, 2005. Vieillissement et politiques de l’emploi. Ageing and Employment Policies, France. http://www.oecd.org/dataoecd/52/58/34591763.pdf.

Perreira, Krista M. and Frank A. Sloan. 2001. "Life Events and Alcohol Consumption among Mature Adults: A Longitudinal Analysis." *Journal of the Study of Alcohol* 62(4): 501-508.

Poterba, James M. and Steven F. Venti. 2004. "The Transition to Personal Accounts and Increasing Retirement Wealth." In *Perspectives on the Economics of Aging*, edited by David A. Wise, 17-79. Chicago, IL: University of Chicago Press.

Preesman, L., 2006. Dutch to Abolish Civil Service Retirement Age. IPE International Publishers Ltd, Netherlands.

Rohwedder, Susann and Robert J. Willis. 2010. "Mental Retirement." *Journal of Economic Perspectives* 24(1): 119-138.

Roman, Paul M. and J. Aaron Johnson. 1996. "Alcohol's Role in Work-force Entry and Retirement." *Alcohol, Health, & Research World* 20(3): 162-169.

Samwick, Andrew A. 1998. "New Evidence on Pensions, Social Security and the Timing of Retirement." *Journal of Public Economics* 70(2): 207-236.

Sheppard, Harold L. 1976. "Work and Retirement." In *Handbook of Aging and the Social Sciences*, edited by Robert H. Binstock and Ethel Shanas, 286-306. New York: Van Nostrand, Reinhold.

Slingerland, Annabelle S., Frank J. van Lenthe, J. Wouter Jukema, Carlijn B.M. Kamphuis, Casper Looman, Katrina Giskes, Martijn Huisman, K.M. Venkat Narayan, Johan P. Mackenbach, and Johannes Brug. 2007. "Aging, Retirement and Changes in Physical Activity: Prospective Cohort Findings from the GLOBE Study." *American Journal of Epidemiology* 165(12): 1356-1363.

Staiger, Douglas and James H. Stock. 1997. "Instrumental Variables Regression with Weak Instruments." *Econometrica*. 65(3): 557-586.

Sundén, A., 2004. The Future of Retirement in Sweden. Pension Research Council Working Paper 2004-16.

The Bartelsmann Foundation, International Reform Monitor, Country info. http://www.reformmonitor.org/index.php3?mode=status.

Zantinge, EM, M van den Berg, HA Smit, and HS Picavet. 2014. "Retirement and a healthy lifestyle: Opportunity or Pitfall? A narrative review of the literature." *European Journal of Public Health.* 24:433-9.

Zheng, Yuhui, Dana Goldman, and Darius Lakdawalla. 2008. "Retirement and Weight." In *Economic Determinants of Obesity Among Older Americans* Santa Monica, CA: Pardee RAND Graduate School.

Zissimopoulos, Julie M., Lynn A. Karoly, and Nicole Maestas. 2007. "Retirement Transitions of the Self-Employed in the United States and England." Working Paper WP2007-155. Ann Arbor, MI: University of Michigan Retirement Research Center.

Table 1: Statutory Retirement Ages and Institutional Factors

Country	Early Retirement Age	Full Retirement Age	Physician is a Gatekeeper
Austria	60	65	No
Belgium	60	65	No
Denmark	N/A	65	Yes
France	57	60	No
Germany	63	65	No
Greece	57	65	No
Italy	57	65	Yes
Netherlands	60	65	Yes
Spain	60	65	Yes
Sweden	61	65	Yes
Switzerland	63	65	No
US	62	65[1]	N/A[2]

Source: Natali (2004), but was supplemented with information from OECD (2003), the Bartelsmann Foundation, Sundén (2004), Preesman (2006), and OECD (2005). Slight differences can be found between our retirement ages and those from other OECD publications (for example, OECD, 2005), due to the differences between current law and the law that was in place when these individuals were facing the retirement decision.

Notes:

(1) Full retirement age is not used in the US because of the correlation between that and Medicare eligibility for the majority of the sample.

(2) Physician as a Gatekeeper is unavailable for the HRS since it is health insurance plan specific.

Table 2: Descriptive Statistics

		HRS	SHARE
Demographics			
	retired	60.2%	61.9%
	age	66.4	64.5
	years of education	12.4	10.7
	married	68.5%	49.8%
	White	82.0%	N.A
	African American	14.2%	N.A
	Other race	3.8%	N.A
	Hispanic ethnicity	7.4%	N.A
Wealth			
	HH income	28,787	42,057
	HH net worth	106,357	209,059
Medical Treatment			
	Total Dr. Visits	8.6	5.9
	hospital nights	1.9	1.5
	flu shot	58.7%	N.A
	cholesterol	80.0%	N.A
	prostate check	72.4%	N.A

Table 3: First Stage Results

	HRS	SHARE
Early retirement age	0.299***	0.2147***
	(0.008)	(0.0123)
Full retirement age		0.1763***
		(0.0106)
F-Statistic	2673.55	300.68
(p-value)	(0.000)	(0.000)
N	51110	22056

Table 4: Health Care Utilization Effects

	HRS				SHARE	
Specification	*OLS*	*IV*	*FE*	*IV FE*	*OLS*	*IV*
Panel A: Total Doctor Visits						
Retired	2.6968***	1.857**	0.519*	-2.547*	1.3344***	-1.1637
	(0.198)	(0.881)	(0.298)	(1.453)	(1.8009)	(0.7632)
Panel B: GP Doctor Visits						
Retired					0.5411***	-2.2707***
					(0.1393)	(0.8274)
Panel C: Nights in Hospital						
Retired	1.179***	0.785*	0.492***	-0.242	0.5471**	-0.6059
	(0.097)		(0.016)	(0.599)	(0.2211)	(0.7391)
Panel D: Flu Shots						
Retired	0.0926***	0.173***	0.0260***	0.0955*		
	(0.009)	(0.040)	(0.009)	(0.050)		
Panel E: Prostate Check						
Retired	0.0496***	-0.00499	0.00765	0.0224		
	(0.008)	(0.036)	(0.010)	(0.052)		
Panel F: Cholesterol Check						
Retired	0.06366***	0.00049	0.00497	0.0391		
	(0.007)	(0.035)	(0.009)	(0.047)		

Note: all regressions also include all covariates indicated in Table 2.

Table 5: Heterogeneous Effects with Health Systems, SHARE

Specification		SHARE *OLS*	SHARE *IV*
Panel A: Total Doctor Visits			
Baseline:	retired	1.3344***	-1.1637
		(1.8009)	(0.7632)
Gatekeeper Interaction	retired	1.6208***	-0.6456
		(0.2071)	(0.7589)
	retired*GK	-0.6059***	-0.8148**
		(0.2186)	(0.3238)
	Gatekeeper	0.3087	-3.3776***
		(0.3767)	(0.3340)
Panel B: GP Doctor Visits			
Baseline:	retired	0.5411***	-2.2707***
		(0.1393)	(0.8274)
Gatekeeper Interaction	retired	0.6334***	-1.6266***
		(0.1522)	(0.5996)
	retired*GK	-0.3359*	-0.5299*
		(0.1734)	(0.2711)
	Gatekeeper	-0.2108	-1.9395***
		(0.2639)	(0.2803)
Panel C: Nights in Hospital			
Baseline:	retired	0.5471**	-0.6059
		(0.2211)	(0.7391)
Gatekeeper Interaction	retired	0.8091***	-0.7680
		(0.2644)	(0.7395)
	retired*GK	-0.5543***	-0.1719
		(0.1837)	(0.2834)
	Gatekeeper	-0.4440*	-1.3847***
		(0.2680)	(0.2808)

Note: all regressions also include all covariates indicated in Appendix Table A.
Individual clustered standard errors in parenthesis.

Endnotes

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[1] In the US, retirement is potentially associated with a change in health insurance coverage as well, potentially changing the explicit price of health care services.

[2] This paper uses data from SHARE release 2.5.0, as of May 24th 2011. The SHARE data collection has been primarily funded by the European Commission through the 5th framework programme (project QLK6-CT-2001- 00360 in the thematic programme Quality of Life), through the 6th framework programme (projects SHARE-I3, RII-CT- 2006-062193, COMPARE, CIT5-CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812) and through the 7th framework programme (SHARE-PREP, 211909 and SHARE-LEAP, 227822). Additional funding from the U.S. National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-AG-4553-01 and OGHA 04-064, IAG BSR06-11, R21 AG025169) as well as from various national sources is gratefully acknowledged (see www.share-project.org for a full list of funding institutions).

[3] Note that because age 65 is also the Medicare eligibility age, when most Americans change the source of their health insurance, we do not use age 65 as an instrument since we do not believe it is valid. Thus for the US, we only identify the effect of retirement at age 62 on health care utilization.

[4] Differences in the components of total household income among HRS and SHARE are document in https://mmicdata.rand.org/meta/codebooks/RH_SHARE_Codebook.pdf.

[5] Differences in the components of net worth among HRS and SHARE are document in https://mmicdata.rand.org/meta/codebooks/RH_SHARE_Codebook.pdf.

[6] For SHARE, where only two waves of data are available, we only present results for OLS and IV methods.

[7] Note that simpler OLS methods make the stronger assumption that retirement decisions are not correlated with the unobservables.

[8] Similar results were obtained using count models for the variable related to doctor visits. Results are available from the authors upon request.

[9] For binary outcomes we also estimated non-linear probability models (i.e. probit and logit) and obtained similar results to the ones presented here using linear probability models. Results are available from the authors upon request.

[10] See Appendix Table A for detailed results of the first stage regressions.