Journal of Health Economics 45 (2016) 91–102

Contents lists available at ScienceDirect

Journal of Health Economics

journal homepage: www.elsevier.com/locate/econbase

Time to burn (calories)? The impact of retirement on physical activity among mature Americans

Fabrice Kämpfen[a,*], Jürgen Maurer[a,b]

[a] Institute of Health Economics and Management, Department of Economics, University of Lausanne, 1015 Lausanne, Switzerland
[b] RAND Corporation, Arlington, VA, USA

ARTICLE INFO

Article history:
Received 23 July 2014
Received in revised form 8 August 2015
Accepted 3 December 2015
Available online 23 December 2015

JEL classification:
C26
J26

Keywords:
Physical activity
Retirement
Instrument variable

ABSTRACT

Physical activity is crucial for maintaining and improving health, especially at advanced ages. While retirement increases the amount of time available for physical activity, there is only limited evidence regarding the causal effect of retirement on recommended levels of physical activity. Addressing this gap in the literature, we use data from the U.S. Health and Retirement Study to estimate the causal impact of retirement on meeting the federal government's 2008 Physical Activity Guidelines for Americans. Using official early and normal retirement ages as instruments for retirement, our causal IV analyses suggest significant positive effects of retirement on meeting the Guidelines. These effects are robust with regard to the treatment of unobserved individual-specific heterogeneity, the measurement of guideline compliance, the definition of retirement and respondents' health insurance status. We also show that the effects of retirement on physical activity are larger for persons with higher levels of education and wealth.

1. Introduction

Physical activity has many health benefits, especially for older persons (Vogel et al., 2009). Regular physical activity not only improves weight management, physical fitness, balance and functional capacity, but also helps prevent many chronic diseases such as coronary heart disease, stroke, diabetes, depression, and cancer (Physical Activity Guidelines Advisory Committee, 2008). For older persons, regular exercise also significantly reduces the risk of falls (Centers for Disease Control and Prevention, 2013). As a result, persons with physically active lifestyles have lower levels of premature mortality than persons who remain physically inactive (Centers for Disease Control and Prevention, 2012; Physical Activity Guidelines Advisory Committee, 2008; Ballard-Barbash et al., 2012).

Reflecting the substantial health benefits of physical activity, the U.S. government released its first Physical Activity Guidelines for Americans in 2008 (U.S. Department of Health and Human Services, 2008). These Guidelines recommend regular, medium- or high-intensity physical activities for all persons irrespective of age. Yet, despite the substantial health benefits of regular, medium- or high-intensity physical activity and corresponding government recommendations, more than two-thirds of U.S. adults (U.S. Department of Health and Human Services, 2013) and an even larger fraction of older adults do not meet the federal government's Guidelines (U.S. Department of Health and Human Services, 2008), often reporting "lack of time" as a main reason for why they are not exercising (Wolin et al., 2008; Brownson et al., 2001).

Retirement is a major life event that affects many aspects of life, including disposable income, social networks, personal aspirations and daily routines. In particular, one of the most important changes at retirement is its large impact on time use (Stancanelli and Soest, 2012). Eliminating job-related time demands, retirement results in a considerable increase in time available for other activities such as home production, community services and leisure to name but a few. By easing individuals' time constraints, retirement provides new opportunities for adopting more physically active lifestyles and increasing the frequency and duration of leisure-time physical exercise. At the same time, however, retirement may also reduce occupational physical activity, making the expected causal effect of retirement on physical activity theoretically ambiguous (Chung et al., 2009).

Given the central importance of regular physical exercise for maintaining and improving health at advanced ages and the theoretical ambiguity of the relationship between retirement and overall levels of physical activity, there is a surprising paucity of studies that aim to estimate causal effects of retirement on physical activity. Somewhat less ambitiously, several studies have examined the partial association between retirement and physical activity

* Corresponding author. Tel.: +41 21 692 33 20.
E-mail address: Fabrice.Kaempfen@unil.ch (F. Kämpfen).

http://dx.doi.org/10.1016/j.jhealeco.2015.12.001
0167-6296/

based on a variety of datasets and methods, but obtained mixed results. For example, using cross-sectional data from the 1991 U.S. National Health Interview Survey, Caspersen et al. (2000) found stable or slightly increasing levels of physical activity around retirement age. Following U.S. adults over time, Evenson et al. (2002) obtained similar findings based on 6-year longitudinal data from the Atherosclerosis Risk in Communities Studies, showing a positive association between retirement and exercise. Comparable associations were also documented for other countries, such as France (Touvier et al., 2010) or Great Britain (Mein et al., 2005). By contrast, recent work by Chung et al. (2009) did not find a significant overall association of retirement with physical activity based on data from four waves of the U.S. Health and Retirement Study (HRS), once they incorporated unobserved heterogeneity into their analysis using panel data models with individual-specific fixed effects. They did, however, detect significant heterogeneity in the partial association between retirement and physical activity by occupation and wealth: Retirement was associated with lower levels of overall physical activity for persons who were retiring from physically demanding job, while the reverse pattern was found for persons with sedentary jobs prior to retirement. Moreover, higher wealth also increased the positive association between retirement and overall physical activity both individually and when interacted with respondents' physical job demands pre-retirement.

A common limitation of the above studies is that they do not account for the likely endogeneity of retirement status in econometric models for physical activity and do therefore not identify causal effects of retirement on regular physical exercise. For example, health shocks or the retirement status of one's spouse or partner are likely to affect both retirement decisions and engagement in physical activity, giving rise to endogeneity bias if not properly accounted for. In particular, since both of these examples for potential confounders are time-varying individual characteristics, it is unlikely that prospective studies of within individual changes in retirement status or longitudinal analyses with individual-specific fixed effects deliver appropriate fixes to address these issues of endogeneity. Rather, identifying the causal effect of retirement on physical activity requires exogenous variation in individuals' retirement status as, e.g., induced by instrumental variables (IV) that influence retirement decisions, but do not directly affect physical activity. While the above studies are good examples of efforts exploring the association between retirement and physical activity using different econometric methods and data, none of these studies treats retirement as endogenous in their statistical models for physical activity and employs a corresponding IV framework. As a result, a causal interpretation of the aforementioned evidence concerning the relationship between retirement and physical activity remains highly problematic.

Contrary to the above association studies, Kämpfen (2013) employs an instrumental variables approach based on age discontinuities in social security incentives across different European countries to assess the causal effect of retirement on physical activity based on data from the Survey of Health, Ageing and Retirement in Europe (SHARE). While retirement and physical activity are generally negatively associated in the SHARE countries, corresponding IV analyses result in positive estimates for the causal effects of retirement on physical activity, even if these are not always statistically significant. Besides this previous work, we only know of one recent parallel study for Germany that takes into account the likely endogeneity of retirement status in econometric models for physical activity to investigate causal effects of retirement on regular leisure-time physical exercises using instrument variables (Eibich, 2015). Specifically, exploiting early and normal retirement ages as instrument variables in a fuzzy regression discontinuity design, Eibich (2015) documents a significantly positive causal effect of about ten percentage points of retirement on regular leisure-time physical activity.

To further expand the evidence based on the causal impact of retirement on physical activity participation, our paper estimates causal effects of retirement on meeting the 2008 Physical Activity Guidelines for Americans based on rich longitudinal data from the U.S. Health and Retirement Study (HRS), 2004–2010. Similar to the studies by Kämpfen (2013) and Eibich (2015), we employ individual eligibility ages for early and normal retirement as instrumental variables for retirement status to account for the likely endogeneity of retirement in an econometric model of physical activity due to, say, unobserved health shocks or unaccounted leisure-time complementarities between spouses/partners that may affect both retirement and physical activity. This general approach follows a substantial literature exploring causal effects of retirement on various other outcomes such as consumption (Battistin et al., 2009), home production (Stancanelli and Soest, 2012), health (Coe and Zamarro, 2011; Behncke, 2011; Bound and Waidmann, 2007; Neuman, 2007) and wellbeing (Charles, 2004; Calvo et al., 2011) to name but a few. Our results indicate statistically significant large positive causal effects of retirement on meeting the 2008 Physical Activity Guidelines. These positive causal effects are robust with regard to the treatment of unobserved individual-specific heterogeneity, the measurement of compliance with the government's Guidelines, the definition of retirement and the treatment of respondents' health insurance status. We also show that the causal effects of retirement on physical activity are larger for persons with higher levels of education and wealth.

2. Data, measures and models

2.1. Data source

We use longitudinal data from the U.S. Health and Retirement Study (HRS), a nationally representative biennial panel study of Americans aged 50 years and older. Launched in 1992, the HRS is a general-purpose aging survey that collects information on health, financial and housing wealth, income, social security, pension, health insurance, retirement plans, employment histories and other later-life outcomes. We employ data from the RAND HRS Data Files Version L[1] (RAND Center for the Study of Aging, 2011), which provide cleaned and consistently coded individual-level information from the HRS interviews. The design of the HRS and a comprehensive documentation of the data files can be found elsewhere (Heeringa and Connor, 1995; RAND Center for the Study of Aging, 2011).

We limit our study to data from waves 7 to 10 (2004–2010), which corresponds to the most recent subsequent waves with identical, and thus directly comparable measurements of physical activity across waves. We also only retained information on individuals aged 50–80 years and eliminated observations with missing information on any survey item used in our analysis.

Out of the 15,486 respondents aged between 50 and 80, 1995 respondents were dropped because no two consecutive observations were available as required for some of our analysis using panel data methods. We chose to impose this requirement in our initial sample selection strategy to ensure that all econometric models are estimated on the same data. While this sample selection strategy results in some loss of data and potential selection, it also facilitates comparisons of results across model specifications considerably by isolating the impact of differences in model specification for

[1] The RAND HRS Data file is an easy to use longitudinal data set based on the HRS data. It was developed at RAND with funding from the National Institute on Aging and the Social Security Administration.