

How Does Delayed Retirement Affect Mortality?

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Introduction

Labor force participation rates among older Americans have been rising over the last couple of decades (e.g., Coile 2018). Several reasons exist for this increase, including the shift from defined benefit pensions to defined contribution retirement plans, the decline in the availability of retiree health insurance, and changes to Social Security that have made working longer more attractive. What are the implications of this trend for workers mortality?¹

Answering this question is complicated, because work and health are jointly determined – e.g., healthy people with lower mortality tend to work longer. To deal with this issue, the literature has applied instrumental variable techniques to uncover the causal relationship between work and mortality, but in doing so have found mixed results – some find that retirement improves health (e.g. Hallberg, Johansson, and Josephson 2015; Bloemen, Hochguertel, and Zweerink 2017), while others find that it is detrimental to health (e.g., Kuhn, Wuellrich, and Zweimueller 2010; Fitzpatrick and Moore 2018).² Moreover, the studies have not been well-suited to answer the question of how *delayed* retirement affects mortality, because they have focused on the effects of policies that induce *early* retirement on mortality. A simple assumption would be that the relationship is symmetric – but it is unclear that assumption is correct. After all, people who decide to keep working are likely a healthier group than those who stop early. Furthermore, prior studies have tended to focus on a specific sector or birth cohort, not the general population, making it difficult to extend results to the broad population of workers affected by changes to Social Security. In other words, the literature does not offer much insight into what will happen to Social Security recipients should they end up working longer.

This project seeks to shed light on this topic by exploiting a policy that induced *delayed* retirement among early Baby Boomers in the Netherlands. Specifically, this paper uses a confidential, administrative panel dataset showing how the mortality of workers in the Netherlands changed after the introduction of the “Doorwerkbonus” (DWB), a tax-reduction program that encourages Dutch workers to delay retirement. The analysis estimates the causal effect of delayed retirement on mortality by using the exogenous variation in the timing of this policy and its known effect of delaying retirement.³

¹ A future draft of this paper will consider the effect of longer careers on health by examining the use of prescription drugs. The authors recently received final approval to use those data.

² Coe and Lindeboom (2008) and Hernaes et al. (2013) find no effect of early retirement on mortality.

³ See Zulkarnain (2015).

Background

Low labor force participation among older workers in the Netherlands had been a concern since the 1980s and 1990s (e.g., Kalwij, Kapteyn, and de Vos 2018). For example, in 2006, only 34.6 percent of Dutch men and 19.2 percent of Dutch women in between the ages of 60-64 were working (OECD 2018). In response, the Netherlands introduced several policies such as the “Doorwerkbonus,” (DWB) which is the policy exploited in this paper.

In January 2009, the DWB was introduced and offered a reduction in taxes on labor income for each year in which a person worked after age 62 – effectively, a temporary wage increase for working at older ages.⁴ The DWB has proven effective at encouraging work among people in their 60s – Zulkarnain (2015) found that it increased male labor force participation for men aged 62-64 by about 4.5 percentage points on average, with smaller effects found for women (about a 1 to 1.5 percentage point increase in labor force participation). This paper explores the effect of this policy-induced delay in retirement on mortality.

Data and Methodology

This paper uses a confidential administrative longitudinal dataset, collected by *Statistics Netherlands*, covering the entire population of the Netherlands from 1999-2016. The data consists of high-quality administrative records on labor market outcomes, income and benefit receipt, marital status, and importantly dates of death, linked together by a personal identifier. The study focuses on the effects of the DWB policy on cohorts born between 1946 and 1949, over the period 2009-2011 and includes men and women born between 1943 and 1945 as controls, since they were not affected by the policy.^{5,6}

The paper first assesses the relationship between continued work and the probability of dying within the next five years by using a linear regression model. The regression includes age and industry fixed effects and additionally controls for other factors that may be associated with mortality, such as a person’s marital status, income in 1999, and calendar year. However, a simple model is unlikely to capture the causal relationship between work and mortality, because work and health are jointly determined.

⁴ At age 62, workers are eligible for a bonus of 5 percent of their taxable income, up to a maximum amount (EUR 2,296 in 2009). The DWB percentage is 7 percent at age 63, 10 percent at age 64, 2 percent at age 65 and 66, and 1 percent for ages 67 and up.

⁵ The bonus was amended in 2012. The policy was repealed in 2013 and replaced by a less generous bonus aimed at people aged 61 through 64.

⁶ Mortality in the 5 year period after observation is of key interest. While the sample includes observations over the period 1999 to 2011, mortality is observed through 2016.

To address the issue of endogeneity in the OLS model, the project exploits the introduction of the DWB policy in an instrumental-variable, using a two-stage least squares (2SLS) framework to estimate the causal effect of continued work between age 62 and 65 on the five-year mortality risk. In the first stage, an indicator for whether a person worked is regressed on a binary indicator for whether the person was eligible for the DWB. Results from Zulkarnain (2015) suggest that coefficient on DWB eligibility is positive – that is, that the policy exogenously increased working.

In the second stage, mortality is regressed on the predicted working status from the first stage. The coefficient on the predicted working status gives the local average treatment effect (LATE) of continued work on health and mortality – that is, the effect of delayed retirement on mortality among those who were induced to work longer by the DWB policy.⁷

Results

Table 1 shows the main results from OLS and 2SLS models for men and women separately. Column (1) and (3) show that in the OLS regression working longer is associated with a 2.1 percentage point lower five year mortality rate for men, and a 1.1 percentage point lower mortality rate for women. Columns (2) and (4) show the results from the 2SLS models, which control for the fact that those who work longer may also live longer for other reasons that are unobserved in the data. For men, the 2SLS suggests working longer reduces the probability of dying in the next 5 years by a significant 1.6 percentage points. For women, the effect is small and not statistically significant.⁸

While the 1.6 percentage point reduction represents a fairly large 23-percent reduction in mortality relative to non-working men, the result is actually smaller than other estimates from the literature.⁹ To put these estimates into better context, a 23-percent reduction in the five-year mortality risk at these ages would only increase life expectancy at age 60 from 21.5 to 21.7 – an increase of about 2 months.¹⁰ Of course, if the effect instead would last beyond these ages, the increase in life expectancy would be larger.

⁷ The models are estimated with robust standard errors to correct for potential heteroskedasticity in the error terms, and are clustered at the birth cohort – year level to control for serial correlation of the error terms.

⁸ The first stage F-statistic of suggest that weakness of the instrument is not an issue for men. For women, F-statistic is 4, suggesting that the instrument is weak.

⁹ The average 5-year mortality risk of non-working men at these ages is 7 percent.

¹⁰ Based on authors' calculations from the 2009 life table for Dutch men (WHO 2018).

Table 1. *OLS and 2SLS Estimates of the effect of Working Status on the Five Year Mortality Risk*

	Men		Women	
	(1)	(2)	(3)	(4)
	OLS	2SLS	OLS	2SLS
<i>Working</i>	-0.021*** (0.001)	-0.016*** (0.004)	-0.011*** (0.000)	-0.001 (0.021)
R2	0.016	0.016	0.007	0.006
Observations	10,437,307	10,437,307	10,143,975	10,143,975
<i>First stage</i>				
F statistic		23		4
DWB coefficient		0.057*** (0.012)		0.011 (0.006)

Note: All models include controls for income in 1999, marital status, a linear year control, age, and industry fixed effects. Robust standard errors clustered at the birth cohort – year level in parentheses. *** p<0.01.

Source: Authors' calculations from non-public microdata from Statistics Netherlands, 1999-2016.

Conclusion

The literature has found mixed evidence on the relationship between early retirement and mortality, has tended not to study the effects of delaying retirement, and has tended to focus on small segments of the population. This study contributes to the literature by exploiting a policy that induces delayed retirement, and by estimating the causal effect of continued work in one's early 60s among a broad cohort of Dutch early Baby Boomers. The project indicates that while an OLS regression does overstate the effect of working on mortality, even after using the DWB as an instrument, delaying retirement reduces the five-year mortality risk by 1.6 percentage points, or 23 percent, for men.

These results contribute to the discussion on the fiscal balance. If retiring later results in reduced mortality, then it would lengthen the period in which benefits are paid out increasing program costs. Still, a back-of-the-envelope calculation suggests that a temporary 23-percent reduction in the five-year mortality during the ages studied increases life expectancy at age 60 by only 2 months, which suggests limited financial effects on the program. These results shed light on the potential effects of changes to the economy or to policies that lead to delayed retirement, a relationship that policymakers may want to consider going forward.

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