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Timing to retire – timing to die?

A prospective cohort study on the effects of early retirement and long term survival.

Objective
To assess the selective and protective impact of early retirement on life.
Design
Long term prospective cohort study.
Subjects
Results are based on 88,941 men and 41,762 women, all members of Gmünder Ersatzkasse (GEK), a German compulsory health insurance with approximately 1.5 million insured persons, who retired at the age 50-65 between January 1990 and December 2004.
Main outcome measures
Hazard ratio for death adjusted for age, age at retirement, year of observation, sex, socioeconomic status, and form of retirement scheme.
Results
Selection: We find significantly higher mortality risks among pensioners with reduced earning capacities than among old-age pensioners who either exited from the labour market at 56-60 or 61-65 for both sexes ($P < 0.001$, log rank test). After 7.2 years 2 out of 10 male pensioners with reduced earning capacities who retired between 56 and 60 had died while men of the same age group who receive an old-age pension lived on average 5.8 years longer. This difference is 4 years for pensioners who retire at 61-65. There is also a survival gap between women with different retirement schemes despite their higher general life expectancy. Strikingly, the youngest male and female pensioners who leave the labour market at the age of 51-55 because of their reduced earning capacity face the highest mortality risks. Protection: People who retire early and have no health problems do not experience lower long term survival than people who retire late. For women, early retirement even lowers their mortality risks significantly by 25% (0.75, 59 to 95).
Conclusion
With respect to mortality, early retirement triggers both, selective and protective processes. On the one hand, people in ill-health with lower survival chances are selected out of the labour market. On the other hand, healthy pensioners are protected by a less demanding and less stressful life style during retirement. For the former, early retirement is essential, for the latter it is an asset. Pension reformer should take this difference into consideration when cutting back pension programs and increasing retirement age.

Introduction

Population aging puts pressure on pay-as-you-go pension schemes world wide (1). Reforms therefore aim for cutbacks in early retirement programs. Financial consequences are widely discussed. The health effects of these reforms receive much less attention. And the few studies which do evaluate the impact of early retirement on survival show mixed outcomes (2–5,19) Some findings demonstrate that men and women who retire early tend to life longer. Protective mechanisms may result from less day-to-day stress and a healthier life style during retirement (6 7). Several longitudinal analyses, however, demonstrate the opposite. This may be because illness and frailty lead to a negative selection into early retirement. (2 4) Yet in most studies health status at retirement is not measured at all since population data is not readily available for many countries.

For our prospective cohort analysis we were able to make use of a comprehensive and compulsory German health insurance data set. It allows us to test for age and overall health status at retirement. We follow 130 703 insured members since their exit from the labour market and assess the impact of selective and protective retirement mechanisms on survival.

Subjects and methods

Our study population encompasses all insured (n= 130 703) from Gmünder Ersatzkasse (GEK), a German compulsory health insurance company, who retired at age 50 to 65 between January 1990 and December 2004. Nearly 81% (n=105 833) exit from the labour market due to old age, roughly 6 out of 10 of them between age 60 and 65. People with ill-health

qualifying for a pension with reduced earning capacity retire 5 to 10 years earlier in our age-restricted population. The figures conform with official German retirement statistics (21). With approximately 1.5 million individuals insured, the GEK is the fifth larges compulsory health insurance in Germany. Traditionally, male employees from the metalworking industry and their families in Southwest Germany are overrepresented. Until recently, only White collar workers earning more than a legally defined income limit and since 1989 also high-income blue collar workers had a right to change their health insurance any time. All other white and certain blue collar workers however were able to choose only upon enteringthe labour market or changing jobs. This latter group increased strongly over time. In the early 1990s roughly 50% of the population had at least a partial choice. In 1996, the choice of insurance was liberalized. Now, almost all Germans can choose their health insurance fund freely. As a rule, insured persons change during their working life but not after retirement when contributions sink. Today, 85% of the total German population is covered by compulsory sickness funds, and the composition of the membership is converging. The study population is a reliable basis for representative studies of the German population (22 23). At present, GEK is the only German health insurance that has access to longitudinal individual-level data base since 1990.

We trace each individual from the day of retirement until death (n= 12 708) or until the end of the study period, as far as 15 years. Insured persons with a reduced earning capacity pension have a higher mortality. They account for nearly 4 out of 10 observed deaths (n=4989) while they only represent 19% of the overall study population.

To assess the impact of health and age at retirement on survival, we contrast old-age pensioners who retire at the age of 55-60 (n=41 201) and 60-65 (n=64 632) with pensioners receiving a reduced earning capacity pension and retiring at 50-55 (n=8 907), 56-60 (n=13 665) or 61-65 (n= 2 298). Complete and partial reductions in earning capacity are pooled due to legal changes during the study period.

Unadjusted survival curves are based on Kaplan-Meier estimates and are graphically displayed. The log rank test for the equality of survivor functions verify whether there are significant differences ($P < 0.05$) between the survival curves of early and old-age pensioners. We use Cox proportional hazard models to further estimate the hazard ratios of survival between male and female pensioners with reduced earning capacity and old-age pensioners (12) and adjust also for age, calendar year of entry into the study, and socioeconomic differences. Calendar time captures declining mortality over the study period. The distinction between blue and white-collar workers is a meaningful proxy for socioeconomic status. A Wald Test proves the significance of the hazard ratios. All statistical analyses are carried out with TDA version 6.4f (20).

Results

Women (n=37 359) account for one third of the study population. Nearly 90% of them leave the labour market with an old-age pension while only 77% of the male population retire due to old age. Particularly blue-collar workers are less likely to leave the labour market at old age (78%) than white collar workers (87%). Reduced earning capacity pensions are nearly twice as frequent among the former than the latter. More than 50% of blue collar workers exit before they turn 60 compared to only 44% of white collar workers (table 1).

Kaplan-Meier survival curves show highly significant differences in life expectancy between employees who retire because of reduced earning capacity (4989 deaths) and because of old-age (7719 deaths; $P < 0.001$, log rank test; figure 1). Broken down by sex and age groups, we find significantly higher mortality risks among pensioners with reduced earning capacity than among old-age pensioners exiting the labour market at either 56-60 or 61-65 for both sexes ($P < 0.001$, log rank test). After 7.2 years 2 out of 10 male pensioners with reduced earning

capacities and retiring between 56 and 60 had died. In contrast, men of the same age group receiving an old-age pension lived on average 5.8 years longer before 20% of their population had died. The difference is 4 years for pensioners who exited from the labour market at 61-65. Likewise, the survival gap between women with different retirement schemes is similar despite their higher general life expectancy. Eight out of 10 female pensioners with a reduced earning capacity survive 11.6 years after retiring at the age of 61-65. This is 3 years shorter than women of the same age receiving an old-age pension. The same comparison for female pensioners who retired at 56-60 is not possible as 86% of the old age pensioners are still alive after 15 years. However, the difference between this group and female pensioners with a reduced earning capacity is in any case larger than 3 years as 80% of the latter population had died after 11.6 years. Strikingly, the youngest male and female pensioners who leave the labour market at the age of 51-55 because of their reduced earning capacity face the highest mortality risks.

Early and reduced earning capacity pensions tend to select frailer people out of the labour market than old-age pension schemes do. In addition, mortality differences among old age pensioners reveal further mortality risks. If we trace a retirement group over 10 or 15 years and compare its survival chances with old age pensioners of the same age who exited from the labour market 5 or 10 years later, we see consistent survival advantages of men and women with a higher retirement age. For example, roughly 85% of male old-age pensioners retiring at 61-65 survived the next 10 years, while only 75% of those pensioners who retired at 56-60 reached the same age 15 years later. For women the difference between both these groups is much smaller.

To explore how the timing of retirement influences mortality, we adjust for calendar year of retirement and socioeconomic status. For both men and women, we do not find a calendar effect. However, our hazard models reveal that white collar workers have significantly lower mortality than blue collar workers. Women in the high socioeconomic category (white collar)

face an 18% lower risk of dying than women in the low category (blue collar) (hazard ratio 0.82, 0.73 to 0.93; table 2). Male white collar workers have 14% lower mortality (0.86, 0.81 to 0.91). After controlling for age and socioeconomic differences, filing for an old-age pension at 56 to 60 does not lower survival chances. For men, timing of old-age retirement turns out to be insignificant. For women, the effect on mortality reverses: If they exit from the labour market between 56 and 60, their mortality risk declines significantly by 25% (0.75, 59 to 95).

Timing and early entry into old-age retirement may stimulate protective mechanism at least for women. An early exit from the labour market due to reduced earning capacity is triggered by poor health and indicates a negative selection process. Men who receive a reduced earning capacity pension at 51 to 55 have more than a threefold higher mortality (3.18, 2.59 to 3.92) than old age pensioners who retire at 61 to 65. Filing later for reduced earning capacity pensions reduces the mortality risk remarkably, but even pensioners at 61 to 65 have a 209% higher risk to die than old age pensioners of the same age group (2.09, 1.84 to 2.38). Mortality between female retirement groups follows a similar pattern but differences are even larger. Women leaving the labour market at 51 to 55 and receiving a reduced earning capacity pension have nearly a five times higher mortality risk than female old age pensioners retiring at 61 to 65 (4.96, 2.94 to 8.37).

Discussion

Early retirement has a significant impact on the long term survival of people. We find lower survival chances for persons with a poor health status at early retirement compared to pensioners who retire later. However, employees who exit the labour market age 56 to 60 early and healthy may experience better survival chances than people retiring at 61 to 65. The

effect is significant for women. At first glance, both findings seem contradictory even though both of them have been separately detected in other studies (2-7, 19). Based on a prospective cohort design and 130 703 cases, however, we are able to discern two processes that operate at the same time. Firstly, we discover negative selection. People in ill-health with lower survival chances are selected out of the labour market and retire early with reduced earning capacity. The earlier they are exposed to ill-health and retirement the higher is their mortality. Secondly, healthy pensioners may also exit early from the labour market, because they want to benefit from a less demanding and less stressful life style. The earlier they are exposed to this privileged protective life style the longer are their survival chances. Since selection and protection occur simultaneously, mixed survival outcomes of early retirement can be detected. To conclude, early retirement is essential for people in ill-health and an asset for healthy people leaving the labour market early. Pension reformer should take this vital difference into consideration when increasing retirement age and cutting back on early retirement programs. Future research should disentangle the interrelation of selection and protection through early retirement in more detail, should explain why women benefit more from early retirement than men, and be more specific about how to optimize the timing of retirement.

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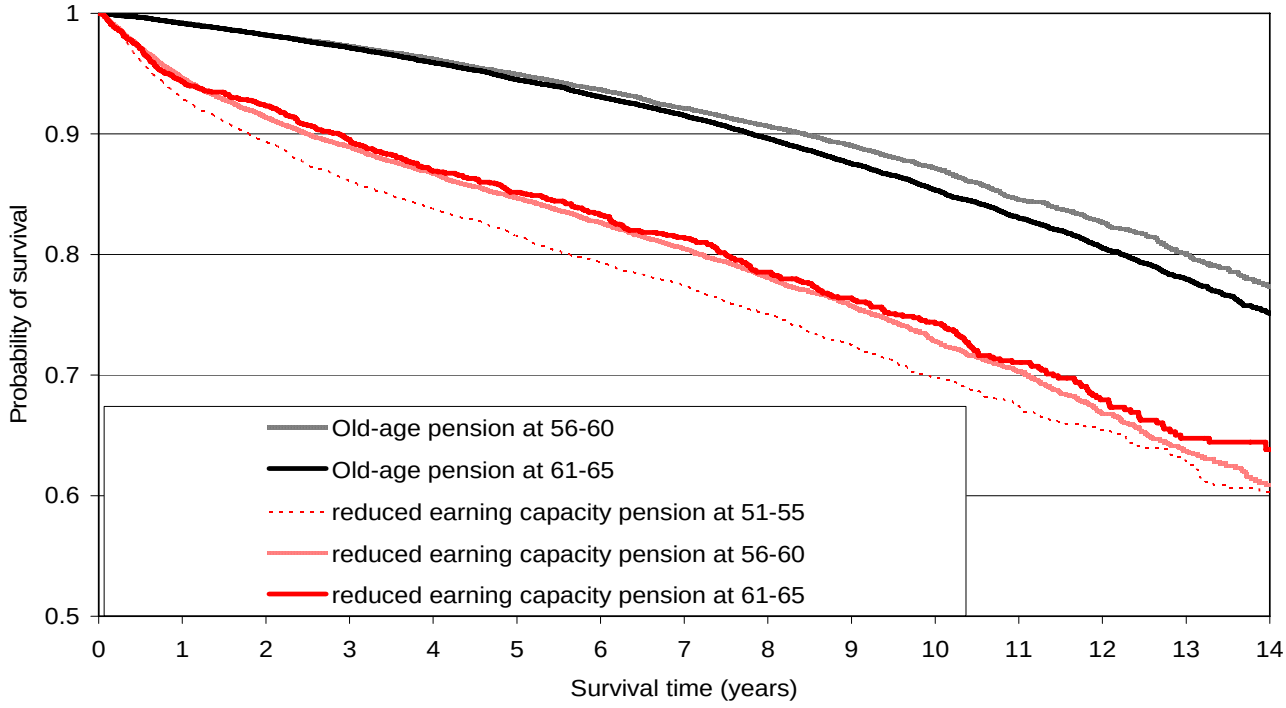
Table 1 Characteristics of the persons who held a statutory health insurance at GEK and retired at ages 51-65 from January 1990 to December 2004. Values are numbers of persons (numbers of observed deaths)

Characteristic	Men		Women		Blue colour		White colour		Total No	
Old-age retired at 56-60	26784	(2244)	14417	(488)	26797	(1934)	14404	(798)	41201	(2732)
Old-age retired at 61-65	41690	(3624)	22942	(1363)	40504	(3188)	24128	(1799)	64632	(4987)
Reduced earning capacity pension at 61-65	2065	(466)	233	(28)	1697	(339)	601	(155)	2298	(494)
Reduced earning capacity pension at 56-60	11339	(2429)	2326	(236)	10636	(2086)	3029	(579)	13665	(2665)
Reduced earning capacity pension at 51-55	7063	(1593)	1844	(237)	6957	(1428)	1950	(402)	8907	(1830)

Fig 1 Kaplan-Meier survival curves since retirement

Men



Women

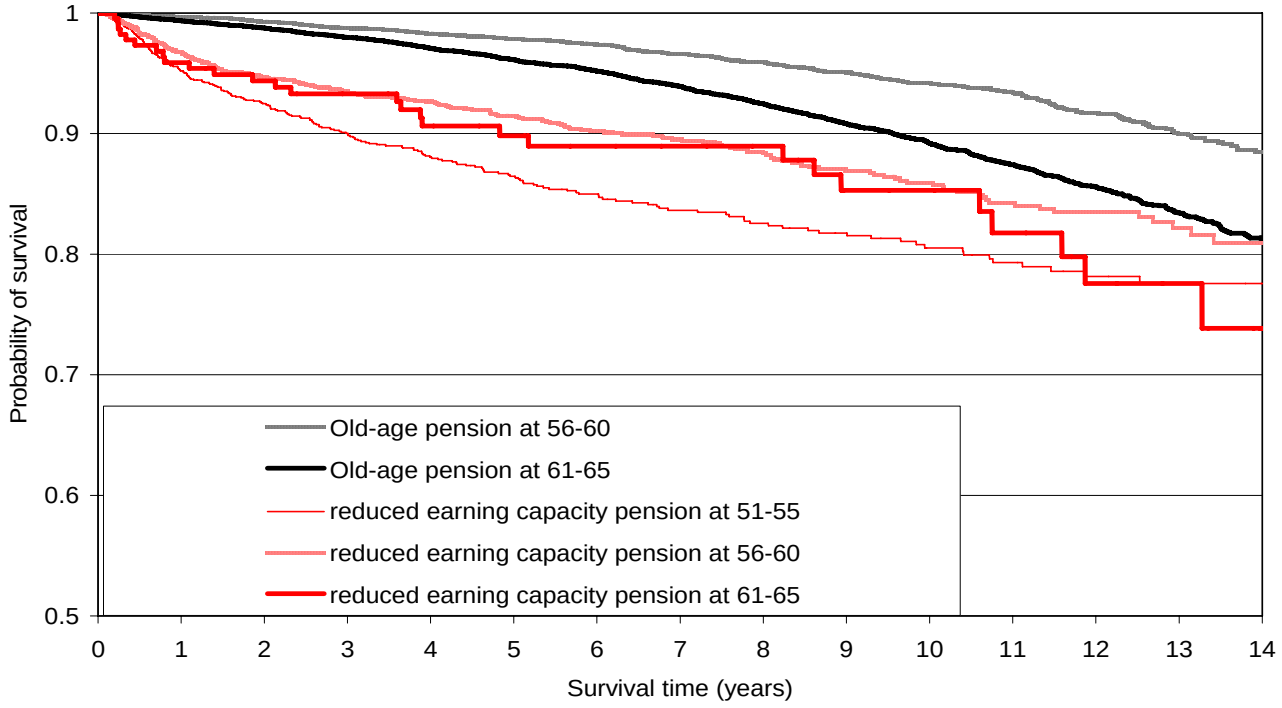


Table 2 Adjusted hazard ratios (99% confidence intervals) by explanatory variables for persons holding a statutory health insurance in Germany, who retired at ages 51-65 between January 1990 and December 2004

Men

Explanatory variables	No of subjects	No of events	Adjusted hazard ratios	(99% CI)
Year	88,941	10,356	0.98	(0.98 to 0.99)
Age	88,941	10,356	1.02	(1.00 to 1.04)
Socioeconomic status:				
Blue collar worker	61,342	7,547	1.00	
White collar worker	27,599	2,809	0.86	(0.81 to 0.91)
Retirement group:				
Old-age 61-65	41,690	3,624	1.00	
Old-age 56-60	26,784	2,244	0.95	(0.87 to 1.04)
Reduced earning capacity 61-65	2,065	466	2.09	(1.84 to 2.38)
Reduced earning capacity 56-60	11,339	2,429	2.45	(2.18 to 2.76)
Reduced earning capacity 51-55	7,063	1,593	3.18	(2.58 to 3.92)

Women

Explanatory variables	No of subjects	No of events	Adjusted hazard ratios	(99% CI)
Year	41,762	2,352	1.00	(0.99 to 1.02)
Age	41,762	2,352	1.07	(1.02 to 1.11)
Socioeconomic status:				
Blue colour worker	27,094	1,727	1.00	
White colour worker	14,668	625	0.82	(0.73 to 0.93)
Retirement group:				
Old-age 61-65	22,942	1,363	1.00	
Old-age 56-60	14,417	488	0.75	(0.59 to 0.95)
Reduced earning capacity 61-65	233	28	2.19	(1.32 to 3.62)
Reduced earning capacity 56-60	2,326	236	2.43	(1.72 to 3.42)
Reduced earning capacity 51-55	1,844	237	4.96	(2.94 to 8.37)