Work capacity and longer working lives in Belgium

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Abstract

We explore the link between health indicators and employment rates of the population aged 55 or more. Our focus lies on work capacity as a key determinant of employment. Using cohort mortality information as a proxy for overall health outcomes, we establish a substantial untapped work capacity in the population 55+. Even stronger results are obtained when relying on individual-level objective and subjective health and socioeconomic parameters as predictors.

Keywords: Employment, retirement, work capacity

JEL codes: J14, J21, J26

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1. Introduction

Previous waves of this project studied the effect of financial incentives created by formal and de facto (early) retirement programs on an individual's decision to retire, the fiscal impact of such behavior and reforms' impact thereon. Furthermore, the impact of (early) exits on youth employment and the respective roles of health and program rules as determinants of disability program enrolment have been studied. (Dellis et al, 2004; Desmet et al 2007, Jousten et al 2010, 2012, 2014)

One aspect that most of these papers have essentially bypassed are work-capacity issues. This neglect is all the more striking in a country like Belgium where the public–sphere pension reform debate is to a large degree dominated by such aspects. For example, one often voiced concern in the debate on prolonging working life of Belgian workers is that numerous workers don't have the capacity to work longer (even if they wanted or were pushed to) because of physical or mental health and exhaustion problems, or because psychological or material limitations render continued work impossible.

The most extreme incarnation of this concern is the so-called « arduous jobs » discussion that has been raging with particular emphasis since the current coalition government – in power since the middle of 2014 – has embarked on a broader pension reform project targeting longer effective working lives. This is achieved by closing or delaying early retirement options, and working towards a convergence between the various public pension schemes for wage-earners, civil servants and self-employed. While the government strategy's main thrust mirrors recommendations of a report published by an Expert Committee on Pension Reform 2020-2040 (Expert Committee, 2014), individual policy measures show differences between the expert committee and the government proposals.

The broader literature provides some evidence on the link between health and work capacity.[2] For example, relying on indicators of self-assessed health, Van Looy et al (2014) note that subjective health levels are not any different between those who reduced their working time and those who did not. In contrast, Desmette and Vendramin (2014) find that "positive evaluations on 'general health', 'physical health' (backache, muscular pain in the upper body, muscular pan in the lower body) and 'psychological health' (depression or anxiety, fatigue and insomnia) are at the highest levels for those who think their current job is sustainable." Similarly, Jousten and Lefebvre (2013) estimate a retirement model for Belgium including health as an explanatory variable and find that it plays a statistically significant role in the individual retirement decision.

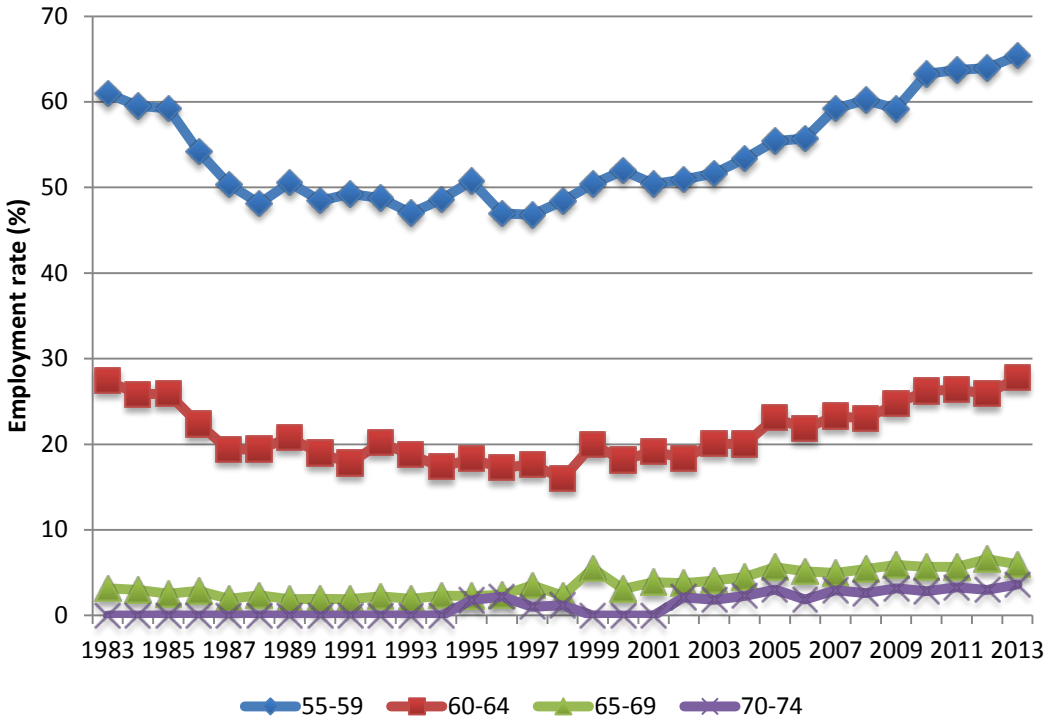
The literature however also cautions that work ability is only one – though very important – step in the process of keeping individuals at work. Schreurs et al. (2011) argues that "good health may be a necessary but not sufficient condition for retaining older workers", and

[2] See Jousten and Salanauskaite (2015) for a survey of work determinants including motivation, finances, and legislation, as well as domestic, workplace and work ability factors.

hence “creating and sustaining a healthy workforce by no means guarantees that older employees will continue working until their official retirement age” as workplace, domestic or other factors may also influence individual’s effective labor market attachment.

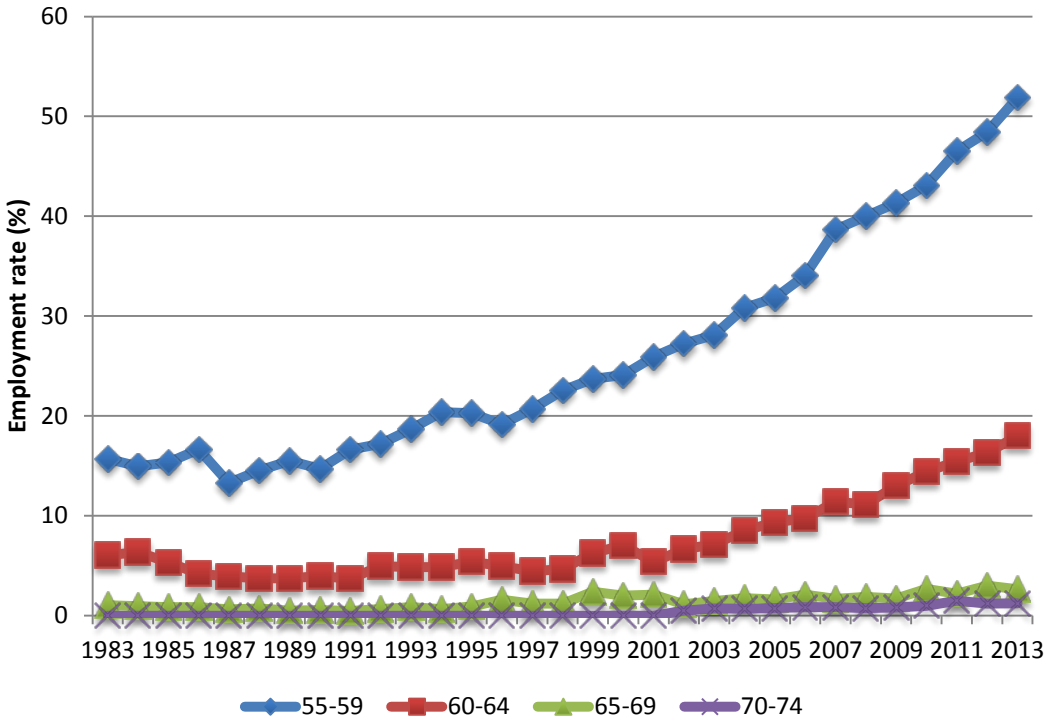
The present chapter focuses on the “necessary condition”: good work ability as a precondition for higher employment. In our approach, we focus on the outcome indicator “employment rate” (see Figures 1 and 2) and link it to general indicators of the healthiness of the older population as measured by mortality and self-assessed health (SAH) of Figure 3. These Figures demonstrate that as we move up across age cohorts at any given point in time, employment rates fall substantially for both sexes - and this despite a generalized upward trend since the mid-1990’s. While this decline is part age, part cohort effect, the question remains as to what the impact of health on these trends is.

Figure 1: Men’s employment rate, ages 55-59 to 70-74



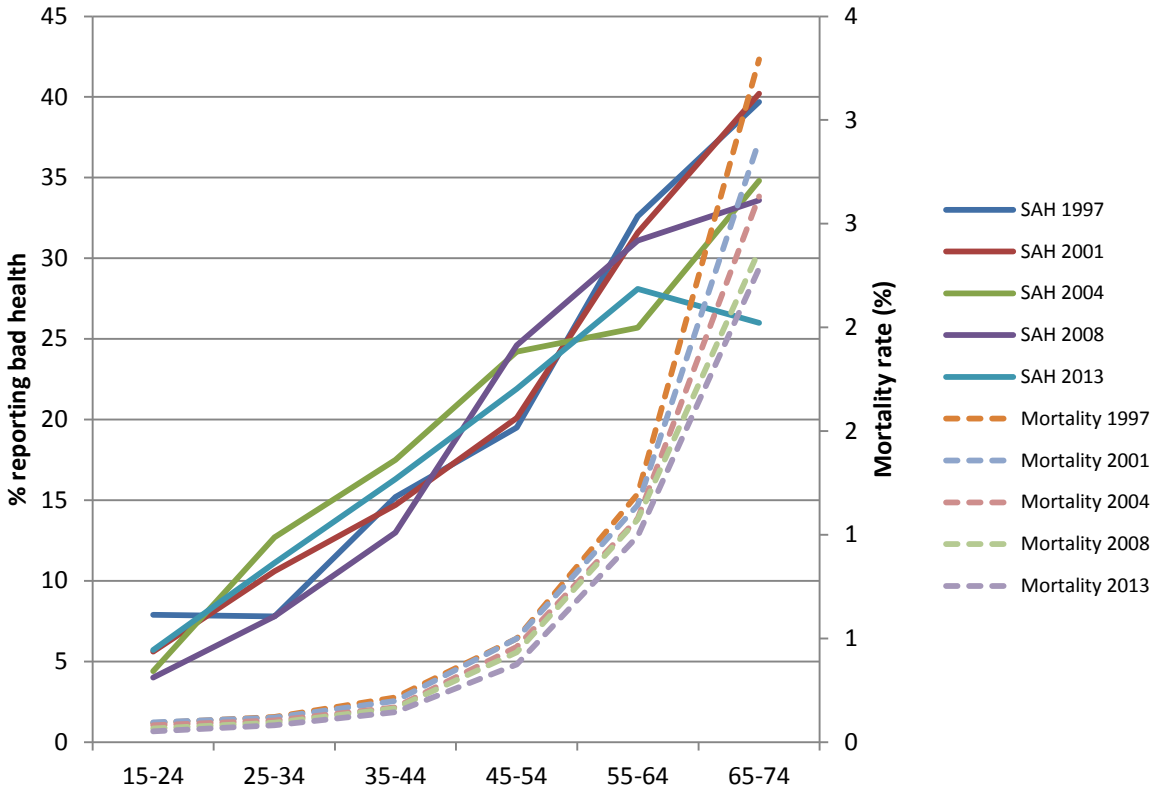
Source: EU-LFS

Figure 2: Women's employment rate, ages 55-59 to 70-74



Source: EU-LFS

Figure 3: SAH and mortality for men by age group, 1997 to 2013



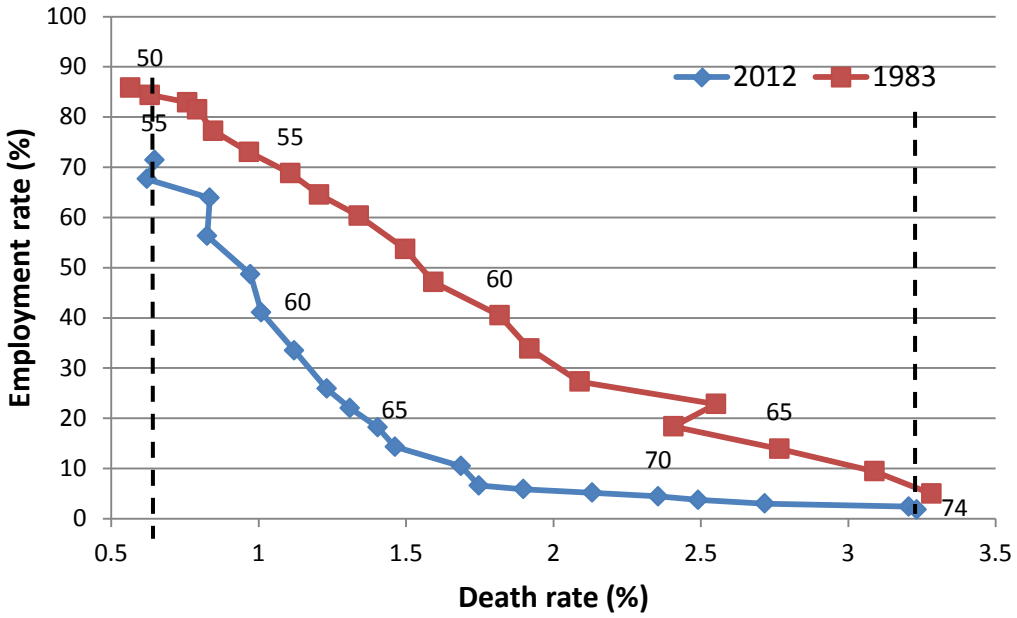
Source: Human Mortality Database and Belgian Health Survey

Section 2 proposes an analysis using the Milligan and Wise (2015) methodology, essentially linking mortality and employment across time for those aged 55+. Section 3 replaces mortality by a series of health conditions and explores the link between these factors and employment rate at younger ages (50-54) in a first step. In a second step, it proposes a simulation of employment potential at higher ages based on these first-step parameters. Section 4 concludes.

2. Milligan-Wise method

Figure 4 is a good starting point both for exploring the facts about mortality across time in Belgium, as well as the methodology of Milligan and Wise (2015). The figure plots the instantaneous mortality rate of the Belgian male population as extracted from the Human Mortality Database against the male employment rate in the country as extracted from the EU Labour Force Survey (EU-LFS). We focus on the male population, as Belgian females have experienced a seminal trend towards higher levels of employment and labor force participation over the last decades, hence rendering an isolation of the health from the structural effects hard to implement. The plot of Figure 4 is done for two years: the recent year 2012 and a latest possible reference year in the past 1983.[3] The two outstanding – though unsurprising – facts are: (i) a strong negative relation between mortality and employment rate as age increases, and (ii) a seminal trend in mortality rates at equal ages as represented by a leftward shift of the curve across time.

Figure 4: Employment versus mortality rates men, 2012 versus 1983



Note: Mortality rates from Human Mortality Database; employment rate from EU-LFS. Employment rates correspond to linear interpolation as data are only available for 5-year age groups.

[3] No LFS data available before that date.

For the purpose of the present section, the focus lies on exploring work capacity for the older population aged 55-74, i.e., those that are either below the normal retirement age just a few years above. Leaving from the plot of Figure 4 corresponding to the year 2012, we draw two vertical dotted lines at two bounds of the age interval of interest: one corresponds to the mortality rate observed at age 55 in the year 2012 of approx. 0.6%; the other one to the mortality rate of 3.2% at age 74 in 2012.

Milligan and Wise (2015) approach is then to explore employment rates at equal mortality rates across time, rather than at equal ages. For example, the mortality rate of 0.6% as observed for 55 year-old in 2012 corresponds to an employment level of 71%, while in 1983 the same mortality rate was observed for 50 year-old with a corresponding employment rate of 89%. Thus if men had the same employment rate as their equal-mortality peers in 1983, this would lead to an 18 percentage points larger employment rate in 2012. Expressed differently, 18 percent of men aged 55 could have worked one more year, corresponding to an average gap of 0.18 years of work for that specific age group.[4]

Similar calculations were done for all ages in the relevant range 55-74 in 2012 and results are reported in Table 1. They indicate that if employment rates at equal mortality would have stayed constant, then the sum of the age-specific average gains of working years would add up to an additional employment capacity for the male population under study of 4.3 “years of work”. This number is derived as the simple arithmetic sum of average year-of-work gains for each age cohort.

To understand the meaning and significance of this result of an extra 4.8 potential “years of work”, three important elements need to be considered. First of all, the equivalence between extra employment potential (e.g. the 18 percentage points for 55 year-old in 2012) and “years of work” implicitly assumes that these extra workers would work the same hours/days/months than those that actually work. If this were to be different – either because those that currently work or those that could join work significantly less or more than the others – the equivalence would no longer hold.

Second, the total gain in “years of work” is a theoretical construct and has to be understood as such. For example, as the above number of 4.8 is the simple sum of potential “year of work” gains by age in the relevant range from 55 to 74 – it ignores any size and compositional differences between the various age cohorts. Also, and more substantially, the number is hard to interpret in a meaningful way unless one compares it to the theoretical maximum and/or currently observed “years of work”. As the maximum work potential by age is 100 percent (corresponding to an average year of work for that age group of 1) – the total maximum “years of work” for the entire 55-74 cohort is 20 years. Expressed differently, the extra potential work capacity represents approximately 25 percent of total

[4] Notice that results would be substantially different when merely comparing employment rates for the same age group across time but ignoring mortality improvements: for 55 year-olds, the employment rate actually increased from 1983 to 2012 from 69% to 71%, with mortality however strongly decreasing from 1.1% to 0.6%.

employment capacity, and is slightly less than the currently observed "years of work" of 5.1 that one can derive from the age-specific employment rates using the same methodology. In sum, or results controlling for mortality improvements indicate that there is unused work capacity that could be activated to achieve almost a doubling of current levels of employment.

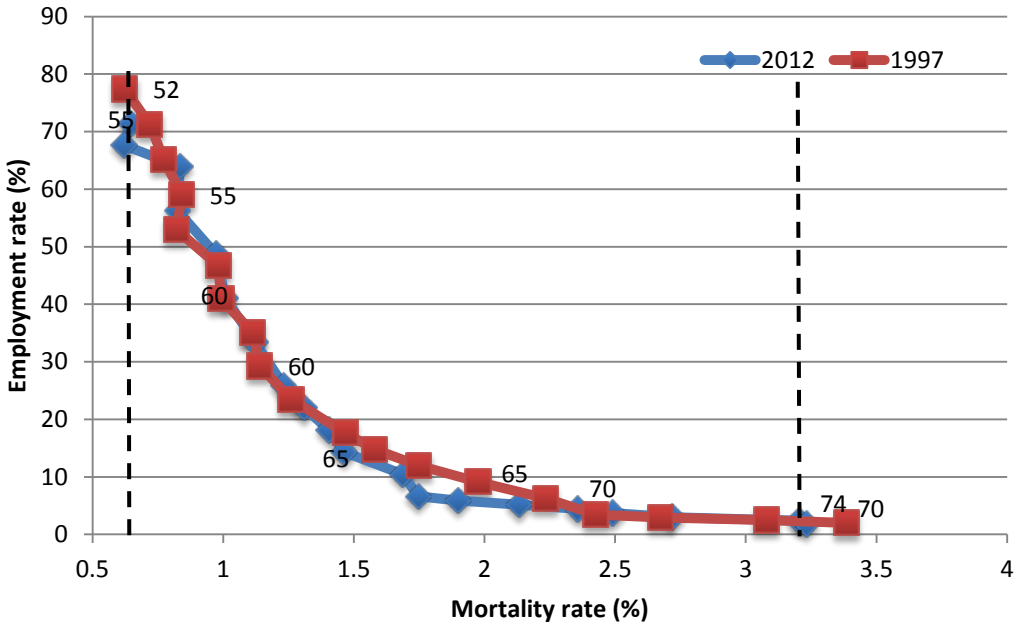
Table 1: Additional Employment Capacity in 2012 using the 1983 employment-mortality relationship

Age	Mortality rate in 2012	Employment rate in 2012	Employment rate in 1983 at same death rate	Additional Employment Capacity
55	0.65%	71.4%	84.2%	12.8%
56	0.62%	67.7%	84.6%	17.0%
57	0.83%	63.9%	78.2%	14.3%
58	0.82%	56.3%	78.9%	22.6%
59	0.97%	48.7%	72.9%	24.2%
60	1.01%	41.1%	71.8%	30.7%
61	1.12%	33.5%	68.2%	34.7%
62	1.23%	25.9%	63.7%	37.8%
63	1.31%	22.0%	61.3%	39.2%
64	1.40%	18.2%	57.6%	39.5%
65	1.46%	14.3%	55.2%	40.9%
66	1.69%	10.5%	44.4%	33.9%
67	1.75%	6.6%	42.6%	36.0%
68	1.90%	5.9%	35.3%	29.4%
69	2.13%	5.2%	26.9%	21.7%
70	2,36%	4,4%	24,7%	20,3%
71	2,49%	3,7%	17,3%	13,6%
72	2,72%	3,0%	14,5%	11,5%
73	3,21%	2,4%	6,8%	4,4%
74	3,23%	1,8%	6,1%	4,3%
Total years		5.1		4.8

Note: Authors' calculations using Human Mortality Database and EU-LFS

Third, the structure of employment and mortality rates the chosen reference year has a strong impact on the outcome of the simulation. For example, no fundamental mechanism ensures a systematic leftward shift of the employment-mortality relation when moving across time. Furthermore, even a lack of a visible leftward shift does not mean that there was no change… In fact, situations may arise where negative extra employment capacity is derived, i.e. where workers work more in 2012 than in the reference year considered be it for a specific age or for the whole 55-74 cohort.

Figure 5: Employment versus mortality rates, 2012 versus 1997

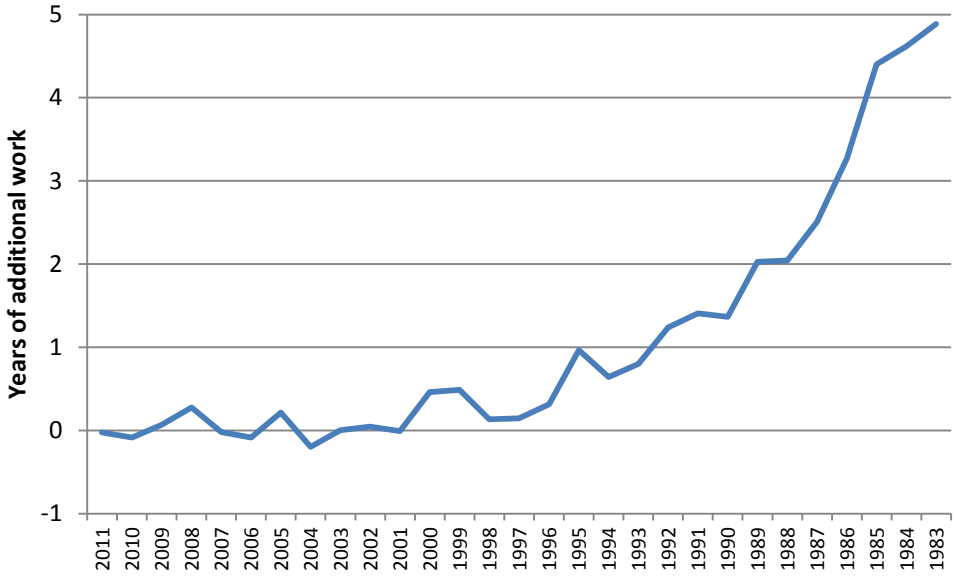


Note: Mortality rates from Human Mortality Database; employment rate from EU-LFS. Employment rates correspond to linear interpolation as data are only available for 5-year age groups.

Figure 5 illustrates this point. It provides the same information as Figure 4, but this time for the different baseline year 1997 – chosen because it corresponds to the year where the employment rate for the age cohort considered was historically at a low point before increasing again since then. Even though the curve barely moved in the employment-mortality rate space, there is a shift of the corresponding points for any given age up "along the curve" towards the north-west. Expressed differently, at any given age the mortality rate in 2012 is lower than in 1997, and the corresponding employment rate higher.

Figure 6 summarizes the findings in terms of extra years of work for the entire 55-74 age cohort for all possible reference years from 1983 to 2011. The graph shows that the additional employment capacity is close to 0 when referencing across the last 10 years, given increases in employment and decreases in mortality essentially cancelling each other out. The sharpest changes could be derived if we take as reference the years furthest in the past, where both factors compound.

Figure 6: Estimated additional employment capacity in 2012 by reference year



Note: Authors' calculations using Human Mortality Database and EU-LFS

3. Cutler, Meara and Richards-Shubik method

The second method we employ for exploring the potential for additional employment of the older population 55-74 is the method pioneered by Cutler et al (2012). The basic idea of this approach is to estimate a labor force participation model at a lower age (e.g., those aged 50-54) that includes demographic, health and other socio-economic variables as explanatory variables. The coefficients thus obtained are then applied to the realizations of these very same variables for the older cohort 55-74 to "predict" their labor force participation, this way controlling for the effect of health or other controlled-for differences between older and younger cohorts.

Our technical approach slightly deviates from Cutler et al (2012) in that we focus on employment as the key dependent variable instead of labor force participation. The slightly different angle can be rationalized by the fact that the in countries like Belgium, where early retirement by means of unemployment benefits is prevalent (be it technically as an early retiree or an unemployed) employment likely is the better outcome indicator.

We use (and pool) data from the Survey on Health, Ageing and Retirement in Europe (SHARE), waves 1, 2, 4 and 5 collected between 2004 and 2013. The survey is a cross-national panel database of micro data on health, socio-economic status and social and family networks of European individuals aged 50 and over conducted since 2004-05. It covers a broad range of variables of special interest for this study such as objective information of health, self-assessed health and occupational status.

Table 2: Summary Statistics SHARE Waves 1, 2, 4 and 5, Men

	Age Group				
	50-54	**55-59**	**60-64**	**65-69**	**70-74**
In labor force	0,872	0,666	0,265	0,033	0,007
Subjective health					
Excellent	0,112	0,101	0,105	0,090	0,082
Very good	0,303	0,246	0,233	0,232	0,199
Good	0,399	0,430	0,428	0,439	0,433
Fair	0,150	0,171	0,188	0,192	0,223
Poor	0,036	0,052	0,045	0,047	0,062
Objective health					
ADL any	0,063	0,092	0,091	0,117	0,130
IADL any	0,071	0,096	0,102	0,108	0,160
One physical limit	0,130	0,165	0,177	0,184	0,184
More than one physical limit	0,153	0,200	0,212	0,235	0,300
Heart disease	0,065	0,078	0,100	0,158	0,186
Lung disease	0,036	0,046	0,062	0,078	0,094
Stroke	0,015	0,021	0,035	0,035	0,036
Cancer	0,018	0,038	0,050	0,057	0,085
Hypertension	0,250	0,276	0,333	0,329	0,362
Arthritis	0,089	0,123	0,130	0,165	0,176
Diabetes	0,077	0,077	0,112	0,114	0,127
Back problems	0,469	0,497	0,478	0,428	0,419
Depression	2,104	1,994	1,865	1,831	1,975
Psychological disorder	0,053	0,054	0,060	0,039	0,041
Smoking currently	0,304	0,264	0,198	0,155	0,122
Smoking formerly	0,632	0,716	0,727	0,699	0,724
Underweight	0,009	0,003	0,003	0,002	0,007
Overweight	0,423	0,317	0,333	0,342	0,337
Obese	0,174	0,167	0,157	0,173	0,127
Education					
Primary education	0,076	0,100	0,094	0,135	0,164
Secondary education	0,487	0,327	0,267	0,251	0,257
Tertiary education	0,437	0,573	0,639	0,613	0,579
Marital status					
Married	0,687	0,749	0,742	0,770	0,777
Scheme					
Wage earners	0,759	0,741	0,771	0,783	0,808
Self-employed	0,095	0,089	0,101	0,102	0,097
Civil servant	0,146	0,171	0,129	0,119	0,095
Skill					
Low skill	0,074	0,038	0,033	0,032	0,022
Medium skill	0,268	0,161	0,137	0,125	0,087
High skill	0,162	0,093	0,085	0,085	0,074
# Obs	*1226*	*1442*	*1282*	*1049*	*795*

Note: Authors' calculations using SHARE data

Table 3: Summary Statistics SHARE Waves 1, 2, 4 and 5, Women

	Age Group				
	50-54	**55-59**	**60-64**	**65-69**	**70-74**
In labor force	0,746	0,564	0,242	0,022	0,006
Subjective health					
Excellent	0,134	0,084	0,078	0,062	0,035
Very good	0,258	0,249	0,238	0,186	0,167
Good	0,394	0,449	0,425	0,474	0,434
Fair	0,158	0,166	0,204	0,230	0,286
Poor	0,055	0,052	0,055	0,048	0,078
Objective health					
ADL any	0,069	0,085	0,113	0,113	0,207
IADL any	0,128	0,141	0,172	0,162	0,249
One physical limit	0,163	0,170	0,194	0,176	0,171
More than one physical limit	0,247	0,315	0,349	0,406	0,511
Heart disease	0,032	0,052	0,064	0,083	0,127
Lung disease	0,044	0,042	0,057	0,064	0,055
Stroke	0,018	0,018	0,017	0,028	0,042
Cancer	0,043	0,050	0,052	0,074	0,068
Hypertension	0,229	0,268	0,330	0,394	0,439
Arthritis	0,170	0,177	0,229	0,251	0,313
Diabetes	0,045	0,077	0,090	0,115	0,122
Back problems	0,524	0,531	0,551	0,548	0,596
Depression	2,923	2,866	2,614	2,762	2,887
Psychological disorder	0,109	0,106	0,109	0,082	0,089
Smoking currently	0,247	0,210	0,142	0,085	0,077
Smoking formerly	0,476	0,529	0,515	0,428	0,391
Underweight	0,023	0,023	0,013	0,013	0,016
Overweight	0,267	0,240	0,238	0,291	0,279
Obese	0,142	0,139	0,152	0,142	0,149
Education					
Primary education	0,080	0,082	0,121	0,153	0,174
Secondary education	0,441	0,336	0,263	0,265	0,276
Tertiary education	0,478	0,582	0,615	0,582	0,550
Marital status					
Married	0,688	0,692	0,653	0,639	0,583
Scheme					
Wage earners	0,786	0,802	0,825	0,853	0,887
Self-employed	0,062	0,061	0,064	0,061	0,059
Civil servant	0,153	0,137	0,111	0,086	0,055
Skill					
Low skill	0,068	0,051	0,038	0,026	0,038
Medium skill	0,306	0,182	0,131	0,122	0,094
High skill	0,110	0,056	0,061	0,039	0,035
# Obs	*1558*	*1565*	*1325*	*1118*	*962*

Note: Authors' calculations using SHARE data

Our empirical approach is to estimate (OLS regression) the employment model for the "young" age group 50-54 of men and women separately, and then apply its predictions to the older cohorts 55-74. We have a sample of 1226 male and 1558 female observation aged between 50-54 that we rely upon for the regressions, and apply the simulations to almost 9000 observations at older ages. Summary statistics of the survey population are provided in Tables 2 and 3 for the various 5-year age cohorts and by sex.

In the regressions reported in Table 4, we use a single health measure: the PVW health index, as introduced and defined in Poterba et al (2013). The idea behind the PVW is simple: apply the principal components technique to the 24 objective and subjective health measures reported in Tables 2 and 3. These include self-assessed health, various health conditions, as well as the prevalence of physical limitations, etc. In a second step, use the first principal component to predict a health score of the individual. Finally, the individual's score is positioned in a given percentile of the overall population used in the estimation. The score of an individual thus generally varies for across survey waves because the health outcomes and perceptions likely vary across time. Poterba et al (2013) show that the indicator traces mortality trends rather well at the individual level.

Table 4: Employment Regressions, PVW Health Index (age group 50-54)

	Men		Women	
Variable	**Coefficient**	**Std Error**	**Coefficient**	**Std Error**
PVW Index	0.004***	0.000	0.004***	0.000
Education				
Primary	Ref.	Ref.	Ref.	Ref.
Secondary	0.077*	0.041	0.099**	0.044
Tertiary	0.096**	0.043	0.186***	0.045
Marital status				
Married	0.112***	0.022	-0.063***	0.024
Scheme				
Salaried	Ref.	Ref.	Ref.	Ref.
Self employed	0.018	0.035	0.113**	0.047
Civil servant	0.095***	0.030	0.179***	0.032
Skill				
Medium skill	Ref.	Ref.	Ref.	Ref.
Low skill	-0.211***	0.041	0.027	0.046
High skill	0.102***	0.030	0.092**	0.038
Constant	0.377***	0.045	0.306***	0.047
# Obs	*1226*		*1 558*	

Note: OLS regression based on SHARE data waves 1, 2, 4 and 5.

Results of Table 4 suggest that the PVW index plays a substantial and positive role, i.e. a better health score leads to more employment. Marital status plays substantially for men and women, though in opposite direction – likely the result of the primary versus secondary earner status. Higher educated, as well as civil servants are more likely to be employed for both sexes, while the required skill level for a job only seems to play significantly differently for men and women in high qualifying jobs, whereas a significant difference can only be observed for their male low educated counterparts. [5]

Table 5 uses the estimates of Table 4 and applies them to the older cohorts to predict work capacity based on the exogenous variables of the regressions. The table indicates that when controlling for health, work capacity clearly decreases with age, but in a rather unspectacular manner. Predicted work capacity at age 70-74 is simulated to be around 77 percent for men and 58 percent for women. These numbers are orders of magnitude larger than the ones corresponding to the actual observed employment rate in the country. [6] Figures 7a and 7b display the same information in a more visual manner, essentially showing the large potential for extra employment that one would predict using this method. To compare these results to the ones from Table 1, we again apply a simple "synthetic" indicator of gains in "years of work" derived by adding up the additional work capacity across the entire age range 55-74. We obtain indicators of 11.6 and 9.3 years of extra work for men and women respectively, hinting at a much stronger projected potential for this forward-looking method rather than the "backward-looking" Milligan-Wise methodology.

Table 5: Simulations of Work Capacity, PVW health index

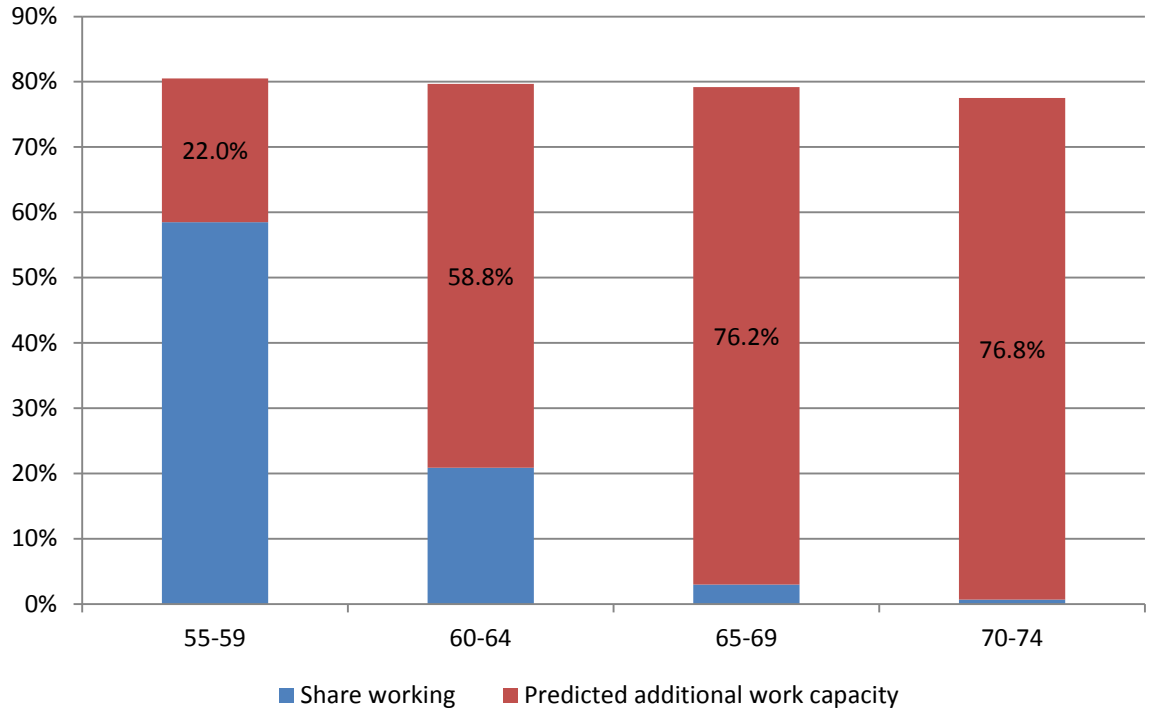
Age Group	# Obs	Actual % Working	Predicted % Working	Additional Work Capacity
Men				
55-59	*1442*	58.5%	80.5%	22.0%
60-64	*1282*	20.9%	79.7%	58.8%
65-69	*1049*	3.0%	79.2%	76.2%
70-74	*795*	0.7%	77.5%	76.8%
Women				
55-59	*1565*	45.6%	65.9%	20.3%
60-64	*1325*	16.3%	64.7%	48.4%
65-69	*1118*	1.8%	62.5%	60.7%
70-74	*962*	0.6%	58.8%	58.2%

Note: Simulations based on estimates of Table 4.

[5] The appendix Table A.1 provides the regression results where we replace the synthetic PVW index by the explicit battery of subjective and objective health (and physical limitation) indicators. The results are overall broadly similar, though individual parameter estimates for some of the health conditions may be influenced by underlying issues of co-variation. Robustness checks excluding the scheme dummies further confirmed the results and are available upon request from the authors.

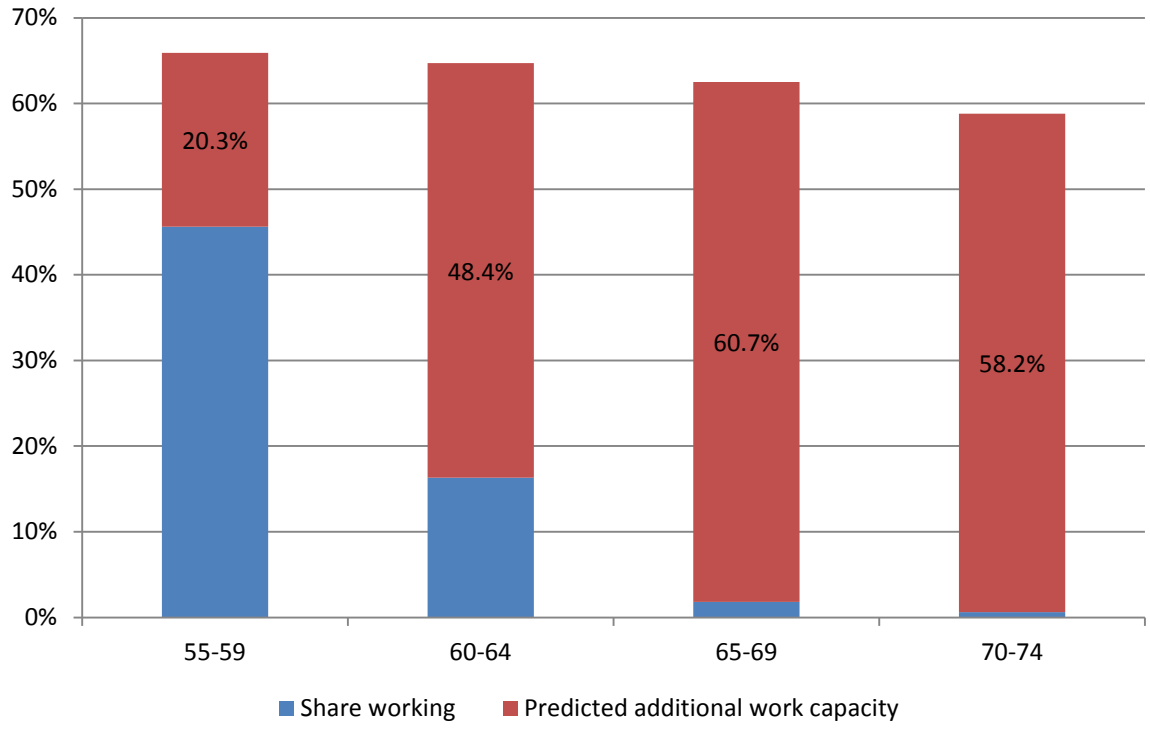
[6] Appendix Table A.2 provides simulation results when the initial estimation is obtained for the full set of health and limitation variables. The results are similar.

Figure 7a: Share of SHARE Men Working and Additional Work Capacity, By Age (PVW health index)



Note: Simulations based on estimates of Table 4.

Figure 7b: Share of SHARE Women Working and Additional Work Capacity, By Age (PVW health index)



Note: Simulations based on estimates of Table 4.

Given the generally large differences in employment outcomes observed in Belgium, we also applied the same approach by splitting the population along the education dimension.[7] Results of the regressions are reported in Table 6. They reveal some interesting differences, with those presented in Table 5. First, the positive and significant (surprising) coefficient for male civil servants disappears. While Table 5 might have been interpreted that civil servants behavior actually differs, be it because of the completely different social protection environment than their salaried counterparts or for some other reason, the Table 6 indicates that this specific finding was more likely the result of interactions between the different explanatory variables education, scheme and skill.[8]

Table 6: Employment Regressions, by education - PVW Health Index (age group 50-54)

	Men						Women					
	Primary		Secondary		Tertiary		Primary		Secondary		Tertiary	
Variable	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
PVW Index	0.004**	0.002	0.005***	0.001	0.003***	0.001	0.002	0.002	0.005***	0.001	0.004***	0.001
Marital status												
Married	0.134	0.108	0.136***	0.034	0.083***	0.030	0.166*	0.098	-0.132***	0.039	-0.037	0.032
Scheme												
Salaried												
Self-employed	0.218	0.256	0.032	0.057	-0.004	0.043	-0.044	0.351	0.083	0.079	0.132**	0.057
Civil-servant	0.552	0.487	0.058	0.047	0.113***	0.036	0.649**	0.300	0.243***	0.059	0.144***	0.037
Skill												
Medium skill												
Low skill	-0.176	0.116	-0.219***	0.053	-0.232**	0.107	0.174	0.109	-0.016	0.058	-0.033	0.168
High skill	-0.013	0.290	0.124**	0.062	0.102***	0.031	-0.009	0.260	0.321***	0.107	0.062	0.038
Constant	0.359***	0.119	0.402***	0.044	0.541***	0.044	0.212**	0.099	0.412***	0.048	0.500***	0.043
# Obs	93		596		537		123		688		747	

Note: OLS regression based on SHARE data waves 1, 2, 4 and 5.

Health, by means of the PVW index, has no significant effect for low educated people, a distinguishing feature as compared to their better educated counterparts. Different interpretations are again possible, two of which are the following: (i) low educated might have less flexibility in determining their retirement from the labor force, (ii) the health indicators contained in the PVW index (or the full set of health indicators of Appendix Tables

[7] Similar splits can be performed by scheme or skill level.

[8] The similarly surprising lack of a distinctly positive effect of self-employment subsists when running regressions by education. Given that self-employed are excluded from many early exit routes and given that they have a substantially higher effective retirement age, one would expect the contrary. However, one has to keep in mind that the regression is done on a relatively young cohort aged 50-54 and that it is well before the main early retirement options of wage-earners open up during the survey period.

A.1 and A2) do not necessarily contain employment-determining conditions, particularly for workers with lower education who are already less likely to work to start with.

Table 7 as well as the accompanying Figures 8a and 8b show the results of simulations based on the OLS coefficients by education of Table 6. It reveals a picture broadly consistent with the pooled simulation results of Table 5 – namely one of substantial additional work capacity in the population. It however also allows extra insights beyond the pooled approach. First, it shows that the share of the population currently working at the age of 55-59 has a strong education gradient – with an employment rate close to 75 percent higher for men with tertiary education than those with primary education, and a whopping 200 percent higher for women of the same age group. These findings are in line with those of Aliaj et al (2015) who show that it is less-educated Belgian females that stand out as having an unusually low employment rate both when comparing within the country and with the neighboring countries of France, Germany and the Netherlands. Second, as of age 60-64 these employment rates drop dramatically for all education groups for both sexes. Almost insignificant levels are attained as of age 65, where employment is more anecdotal than systematic – if only because of the strong focus of numerous social protection programs on 65 as a pivotal age.[9]

Though the results indicate that predicted work capacity is substantially lower for those with primary education only at all ages considered, their additional work capacity is actually the highest of all education levels at age 55-59, indicating large employment potential when considering the health, education, scheme and skill characteristics as in our analysis.

Table 7: Simulations of Work Capacity, by education group and sex - PVW health index

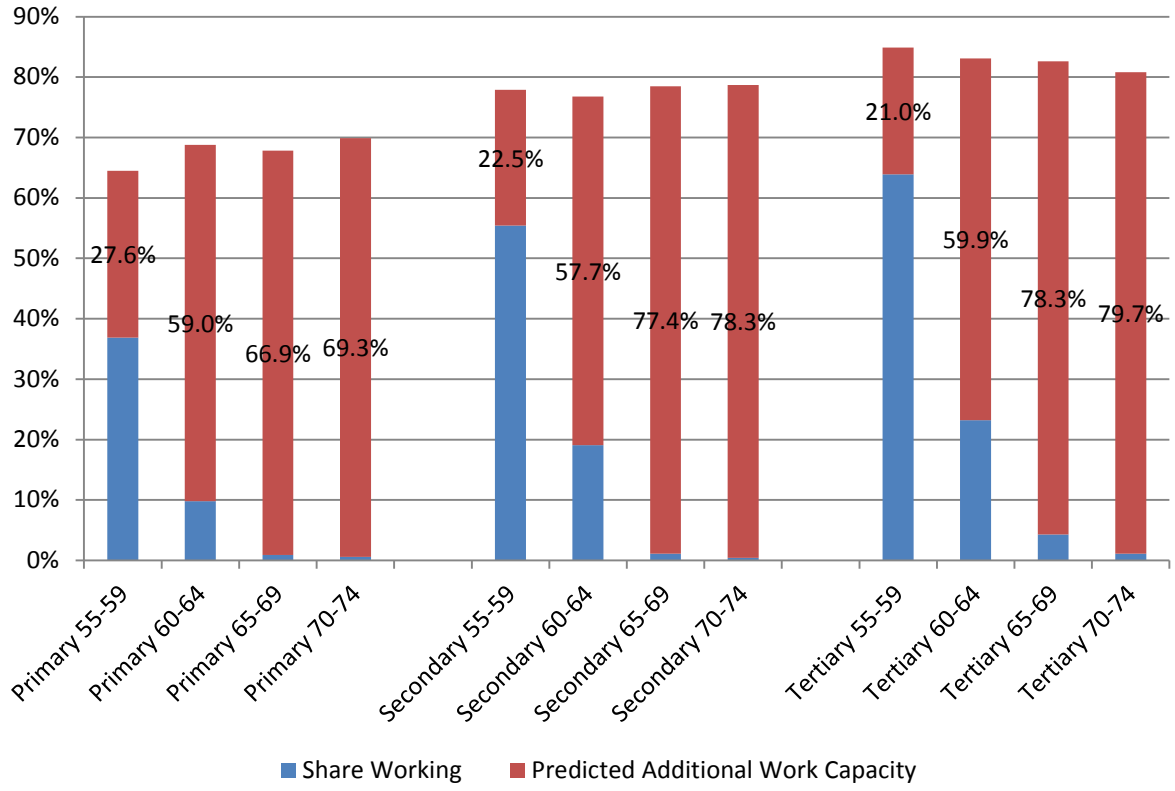
Education	Men. PVW Model			Women. PVW Model		
	Actual % Working	Predicted % Working	Additional Work Capacity	Actual % Working	Predicted % Working	Additional Work Capacity
Age 55-59						
Primary	36.9%	64.5%	27.6%	17.8%	43.4%	25.6%
Secondary	55.4%	77.9%	22.5%	37.3%	59.2%	21.9%
Tertiary	63.9%	84.9%	21.0%	54.3%	72.7%	18.4%
Age 60-64						
Primary	9.8%	68.8%	59.0%	8.0%	43.3%	35.3%
Secondary	19.1%	76.8%	57.7%	11.1%	61.2%	50.1%
Tertiary	23.2%	83.1%	59.9%	20.1%	71.2%	51.1%
Age 65-69						
Primary	0.9%	67.8%	66.9%	0.0%	41.3%	41.3%
Secondary	1.1%	78.5%	77.4%	2.0%	59.8%	57.8%
Tertiary	4.3%	82.6%	78.3%	2.1%	69.3%	67.2%
Age 70-74						
Primary	0.6%	69.9%	69.3%	0.0%	39.7%	39.7%
Secondary	0.4%	78.7%	78.3%	0.0%	56.5%	56.5%
Tertiary	1.1%	80.8%	79.7%	1.1%	65.7%	64.6%

Note: Simulations based on estimates of Table 6.

[9] While retirement at a maximum age 65 is by and large history, workers continue to face discontinuities at 65. For example, they loose their layoff protection and also continue to be rolled over from other social protection programs into the pension system at this very age.

Similar exercises can be performed by splitting the population along the "scheme" dimension, rather than education.[10] Tables 8 and 9 summarize the results of these regressions, as well as the corresponding simulated effects. They show substantial differences between the 3 main schemes. Table 9 indicates that self-employed have a much higher actual employment level than both wage-earners and civil servants, for women and men alike. Also, the simulations reveal that the age gradient of extra employment capacity is steepest for self-employed women and men. In terms of the prediction of people working, civil servants stand out as the most able to work when controlling for the health and socio-demographic variables of Table 8. Expressed differently, while their level of actual employment is the lowest of all three schemes, their additional employment potential is by far the largest, and this for all but one of the age-sex groups considered.

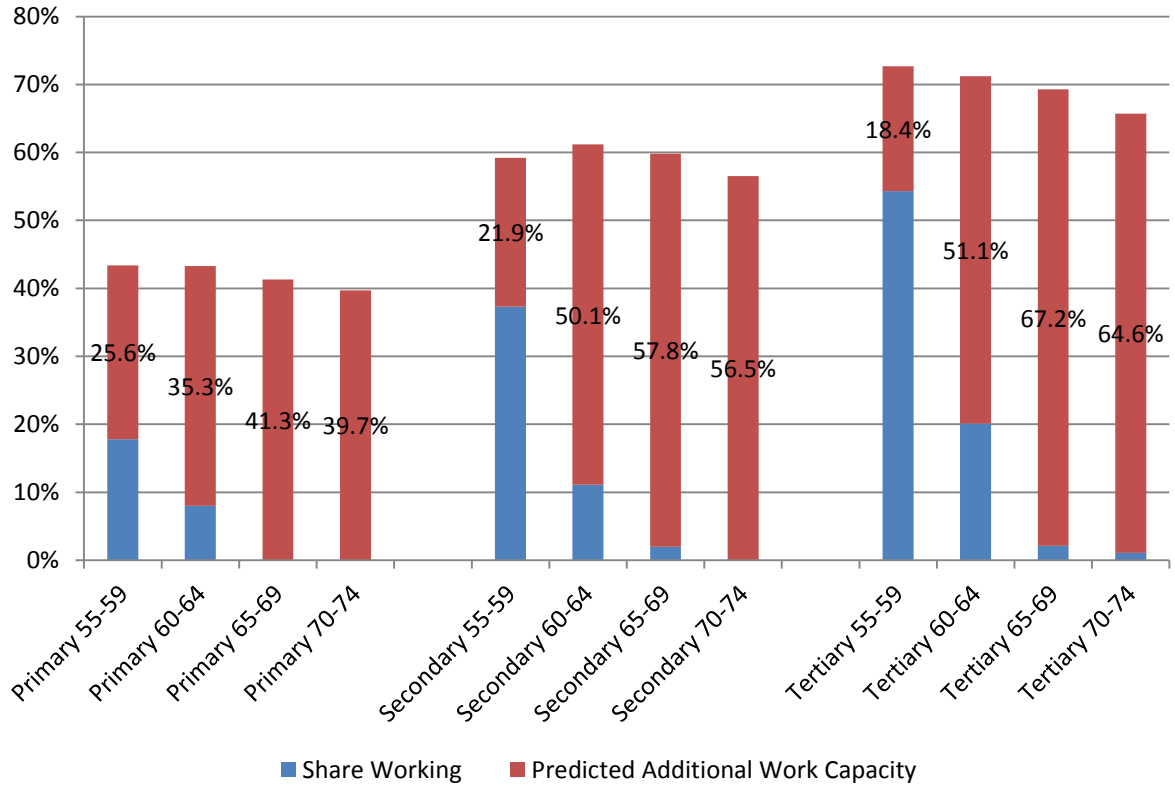
Figure 8a: Share of SHARE Men Working and Additional Work Capacity, by Age and Education (PVW health index)



Note: Simulations based on estimates of Table 6.

[10] We deterministically allocate people to the three schemes based on a decision tree reflecting the Belgian social security environment. For those in employment in SHARE waves 1, 2 4 and 5 we directly observe the scheme they belong to. For those who have worked in the past, the survey provides the same information. For example, a retired civil servant would thus be classified as belonging to the civil servant scheme. All individuals where no such employment information is available are classified into the wage-earner scheme –which corresponds to the effective default option in the real world. We validate our classification using SHARELIFE. The data show that 75 percent of individuals declare a pure career in one of the three systems, with the residual is dominated by people with partial wage-earner careers – a group with little end-of-working-life incentives and/or options for changing scheme.

Figure 8b: Share of SHARE Women Working and Additional Work Capacity, by Age and Education (PVW health index)



Note: Simulations based on estimates of Table 6.

Table 8: Employment Regressions, by scheme - PVW Health Index (age group 50-54)

	Men						Women					
	Wage earners		Civil servant		Self-employed		Wage earners		Civil servant		Self-employed	
Variable	**Coefficient**	**Std Error**	**Coefficient**	**Std Error**	**Coefficient**	**Std Error**	**Coefficient**	**Std Error**	**Coefficient**	**Std Error**	**Coefficient**	**Std Error**
PVW Index	0.005***	0.000	0.001	0.001	0.005***	0.001	0.005***	0.000	0.004***	0.001	0.002	0.002
Marital status												
Married	0.116***	0.027	0.058	0.040	0.112*	0.062	-0.087***	0.029	0.019	0.045	-0.107	0.097
Skill												
Medium skill	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Low skill	-0.208***	0.043	-0.620***	0.133	-1.141***	0.318	-0.005	0.048	-0.185	0.236	-0.737*	0.418
High skill	0.138***	0.039	0.037	0.037	0.139**	0.065	0.194***	0.052	0.069	0.048	-0.098	0.104
Constant	0.413***	0.035	0.839***	0.057	0.409***	0.090	0.416***	0.035	0.599***	0.059	0.764***	0.123
# Obs	932		178		116		1222		239		97	

Note: OLS regression based on SHARE data waves 1, 2, 4 and 5.

All these results have to be read with a sufficient caution, keeping in mind the fact that this is only a partial analysis of health and socioeconomic determinants on an individual's ability to work. Clearly, it would be highly premature to claim that such higher employment ability should immediately lead to more employment as a policy strategy. As already indicated in the introduction, this analysis ignores many factors: household characteristics beyond marital status; workplace or system characteristics beyond the simple dummies for scheme and skill.

In sum, the analysis should be seen as a first step into the direction of a better understanding of what employment potential there is, in light of an ever-increasing need for financial resources to sustain our pension systems, and social protection more generally.

Table 9: Simulations of Work Capacity, by scheme and sex - PVW health index

Education	Men. PVW Model			Women. PVW Model		
	Actual % Working	Predicted % Working	Additional Work Capacity	Actual % Working	Predicted % Working	Additional Work Capacity
Age 55-59						
Wage earners	51.4%	77.1%	25.7%	38.8%	60.3%	21.5%
Civil servant	75.2%	92.9%	17.7%	73.6%	83.3%	9.7%
Self employed	83.8%	83.6%	-0.2%	72.2%	78.8%	6.6%
Age 60-64						
Wage earners	14.0%	76.4%	62.4%	12.5%	59.4%	46.9%
Civil servant	33.5%	92.4%	58.9%	25.7%	84.6%	58.9%
Self employed	56.4%	80.6%	24.2%	47.7%	78.5%	30.8%
Age 65-69						
Wage earners	1.2%	76.1%	74.9%	0.9%	58.6%	57.7%
Civil servant	0.4%	93.5%	93.1%	1.0%	81.2%	80.2%
Self employed	15.7%	81.1%	65.4%	14.5%	77.5%	63.0%
Age 70-74						
Wage earners	0.2%	75.2%	75.0%	0.0%	55.5%	55.5%
Civil servant	0%	91.5%	91.5%	0.0%	78.3%	78.3%
Self employed	6.4%	80.8%	74.4%	10.5%	74.1%	63.6%

Note: Simulations based on estimates of Table 8.

4. Conclusion

The paper explores a dimension that has often been bypassed in the Belgian retirement literature, namely the one of an individuals' work ability. Work ability is however increasingly recognized as a key determinant of retirement, as discussed in Jousten and Salanauskaite (2015). We employ two methodologies to explore the link between changes in the health characteristics of the population and their work ability. To be more specific, the paper uses employment as a proxy for work ability, hence focusing exclusively on the extensive margin of the link between improved health and work capacity.

Using the Milligan and Wise methodology (2015) linking mortality improvements to employment, we establish a significant employment potential in the Belgian population – corresponding to potential doubling of employment rates. Similarly, using a richer set of health indicators instead of mortality, the Cutler et al (2012) methodology identifies even more substantial employment potential. When separating the analysis by education level and employment scheme, we derive substantial

differences in the population, highlighting the importance of institutional and workplace characteristics.

Clearly, both results should be seen as indicative rather than conclusive, in the sense that they show that improvements in health across time have left the country with a healthier population, hence harboring some degree of unused employment potential. We expressly warrant against a shortcut-logic which would claim that the results are evidence of a need of massive activation. Our reading is more prudent: while substantial employment potential seems to exist, other factors such as system, workplace and household factors are equally important determinants of the ultimate desirability of increased employment. Furthermore, our study of employment as a proxy for work ability can only be seen as a useful first step into a richer investigation of the topic – including the intensive margin of the impact on hours of work – leading us to conclude in the need for further scientific investigation of the subject.

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Appendix

Table A.1: Employment Regressions, All Health Variables

	Men		Women	
Variable	**Coefficient**	**Std Error**	**Coefficient**	**Std Error**
Subjective health				
Excellent	Ref.	Ref.	Ref.	Ref.
Very good	0.048	0.034	-0.017	0.037
Good	0.048	0.034	-0.024	0.036
Fair	-0.121***	0.044	-0.150***	0.047
Poor	-0.275***	0.072	-0.336***	0.067
Objective health				
ADL any	0.101**	0.047	-0.051	0.052
IADL any	-0.115**	0.045	-0.096**	0.040
One physical limit	0.043	0.031	0.001	0.032
More than one physical limit	-0.102***	0.035	-0.080**	0.034
Heart disease	-0.048	0.042	-0.036	0.066
Lung disease	-0.082	0.055	-0.108*	0.056
Stroke	-0.132	0.081	-0.186**	0.085
Cancer	-0.173**	0.079	-0.041	0.055
Hyper tension	0.015	0.024	0.036	0.028
Arthritis	0.012	0.038	-0.123**	0.055
Diabetes	0.058	0.049	-0.094	0.065
Back problems	-0.009	0.026	-0.027	0.030
Depression	-0.020***	0.005	-0.004	0.005
Psychological disorder	-0.048	0.045	-0.043	0.038
Smoking currently	-0.029	0.025	0.009	0.032
Smoking formerly	-0.024	0.024	0.001	0.027
Underweight	-0.265**	0.106	-0.010	0.076
Overweight	0.002	0.022	-0.032	0.026
Obese	-0.019	0.030	-0.009	0.035
Education				
Primary	Ref.	Ref.	Ref.	Ref.
Secondary	0.060	0.039	0.060	0.043
Tertiary	0.071*	0.041	0.143***	0.045
Marital status				
Married	0.090***	0.022	-0.074***	0.024
Scheme				
Wage earners	Ref.	Ref.	Ref.	Ref.
Self-employed	0.026	0.034	0.107**	0.046
Civil servant	0.075***	0.029	0.174***	0.032
Skill				
Low	Ref.	Ref.	Ref.	Ref.
Medium	-0.188***	0.039	0.046	0.046
High	0.080***	0.029	0.098***	0.037
Constant	0.758***	0.055	0.701***	0.057
# Obs	*1226*		*1 558*	

Note: OLS regression based on SHARE data waves 1, 2, 4 and 5.

Table A.2: Simulations of Work Capacity, All health variables

Age Group	# Obs	Actual % Working	Predicted % Working	Additional Work Capacity
Men				
55-59	*1442*	58.5%	80.2%	21.7%
60-64	*1282*	20.9%	79.6%	58.7%
65-69	*1049*	3.0%	79.3%	76,3%
70-74	*795*	0.7%	75.9%	75,2%
Women				
55-59	*1565*	45.6%	65.8%	20.2%
60-64	*1325*	16.3%	64.4%	28.1%
65-69	*1118*	1,7%	62.0%	60,3%
70-74	*962*	0,6%	57.3%	56.7%

Note: Simulations based on estimates of Table A.1.