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WHY ARE PEOPLE WORKING LONGER IN THE NETHERLANDS?

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Working Paper 24636
http://www.nber.org/papers/w24636

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 2018

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NBER Working Paper No. 24636
May 2018
JEL No. J14,J18,J26

ABSTRACT

Labor force participation at older ages has been rising in the Netherlands since the mid-nineteen-nineties. Reforms of the social security and pension systems have often been put forward as main explanations for this rise. However, participation rates above the normal retirement age of 65 have almost tripled for men and quadrupled for women despite the fact that at those ages reforms are unlikely to have had much impact. This suggests other factors may have played an important role in this rise as well. In addition to the effects of reforms in social security and pension systems, this chapter examines the importance for men's labor force participation at older ages of improved health, increased levels of education, and differences in skills across cohorts, as the older cohorts moved into retirement, such that workers' characteristics better matched labor demand. These changes on the labor supply side are likely to have contributed to the success of the reforms since the mid-nineteen-nineties and to have had a large independent impact on men's labor force participation at older ages.

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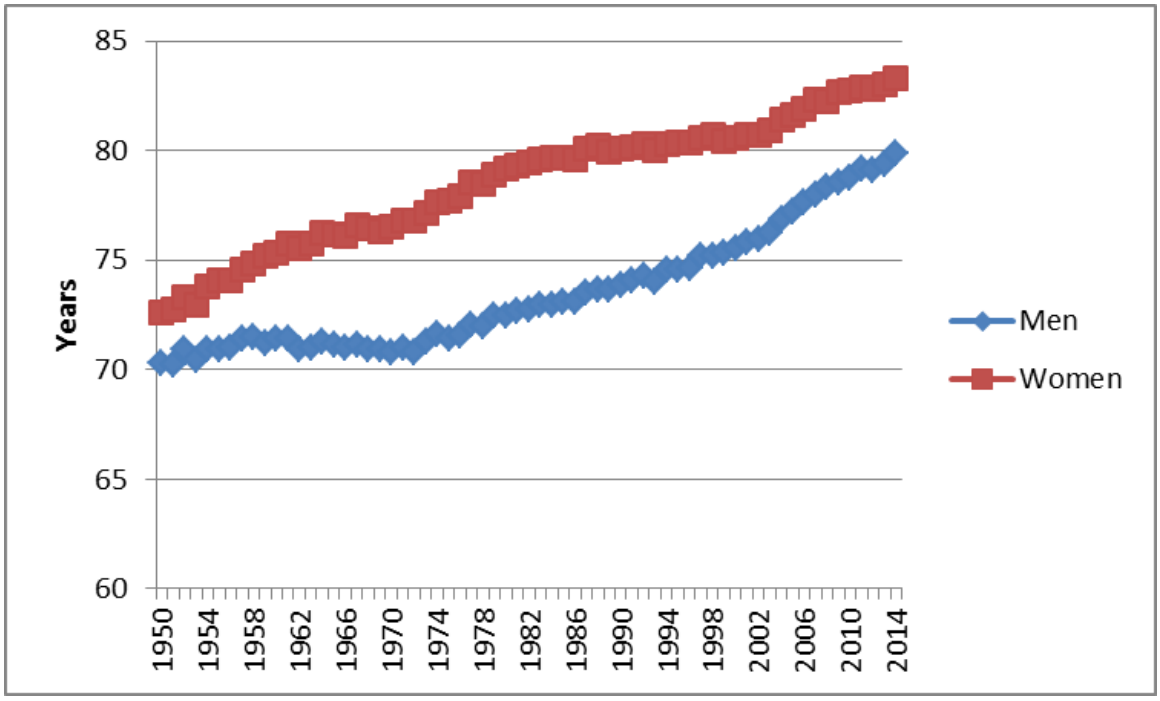
1. Introduction

Over the last two decades, social security programs and pension schemes around the world have been redesigned to create stronger incentives for continued work at older ages (Gruber and Wise, 2004; Wise, 2012, 2016). These reforms have for a large part been triggered by the rapidly declining labor force participation of men at older ages since the nineteen-seventies while life expectancy continued to rise (Figures 1 and 2). For the Netherlands, this rise in life expectancy has been just under two months per year on average since 1950. For women, since the end of the nineteen-seventies, labor force participation has risen at ages 55-59 but has notably dropped at ages 60-64 from over 11 percent in the mid-nineteen seventies to around 8 percent in the mid-nineteen-nineties (Figure 3). Apart from people living longer, a strong decline in fertility rates has amplified the aging of Dutch society. Completed fertility has dropped during the second half of the twentieth century from around three children per woman during the mid-nineteen-fifties to around 1.7 in 2014 (Figure 4). Increased life expectancy and decreased fertility have initially caused the total dependency ratio, i.e. the number of people under 20 and over 64 as a percentage of the number of people aged 20-64, to decrease from 1971 onward as there were relatively fewer children. Since the mid-nineteen-nineties the total dependency ratio started rising again due to a continuing increase in the share of the population aged 65 and over (Figure 5). The aged dependency ratio, i.e. the number of people over 64 as a percentage of the number of people aged 20-64, has increased from about 19 percent in 1971 to 29 percent in 2014. The aging of Dutch society gained momentum after 2011 as the baby boom generation began to reach the normal retirement age of 65 and the aged dependency ratio is predicted to further increase to about 50 percent in 2050 (Statistics Netherlands**;** statline.cbs.nl). The aging of the Dutch population has raised concerns about the burden on public finances as it increases public expenditures on, for instance, long-term care and retirement pensions (OECD, 2011; Van Ewijk

et al., 2006).[1] One way to alleviate this burden is to increase labor force participation at older ages as it will increase tax revenues and, when stimulated by an increased normal retirement age, reduce public pension expenditures.

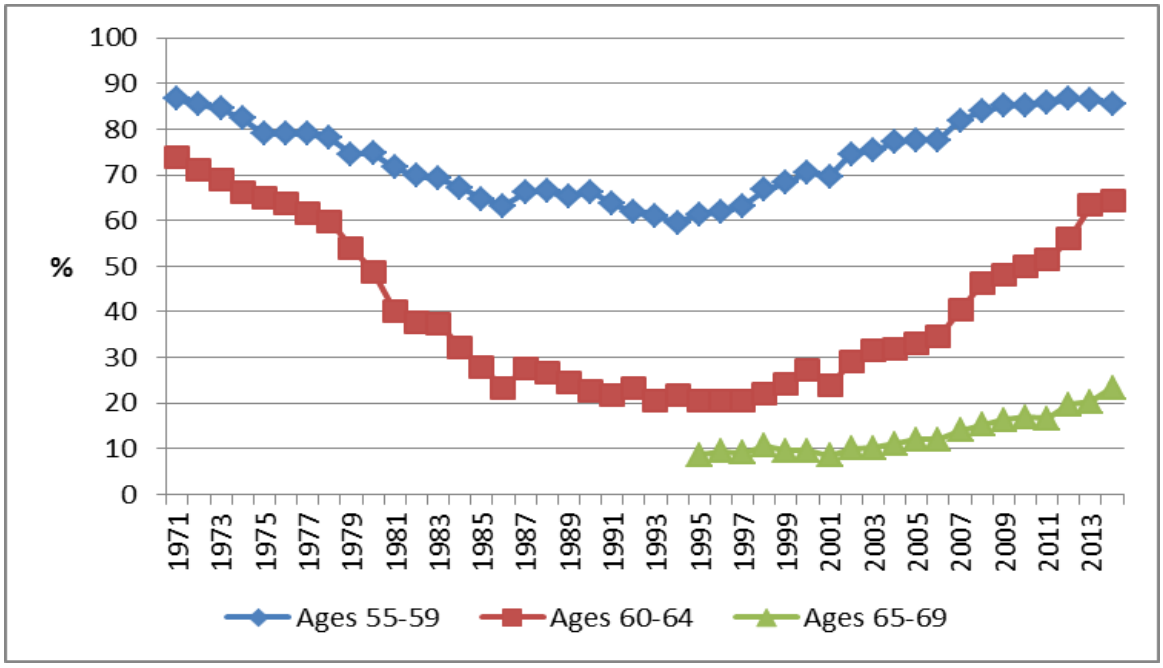
Figure 1: Life expectancy at birth over the years 1950-2014



Source: Statistics Netherlands, statline.cbs.nl

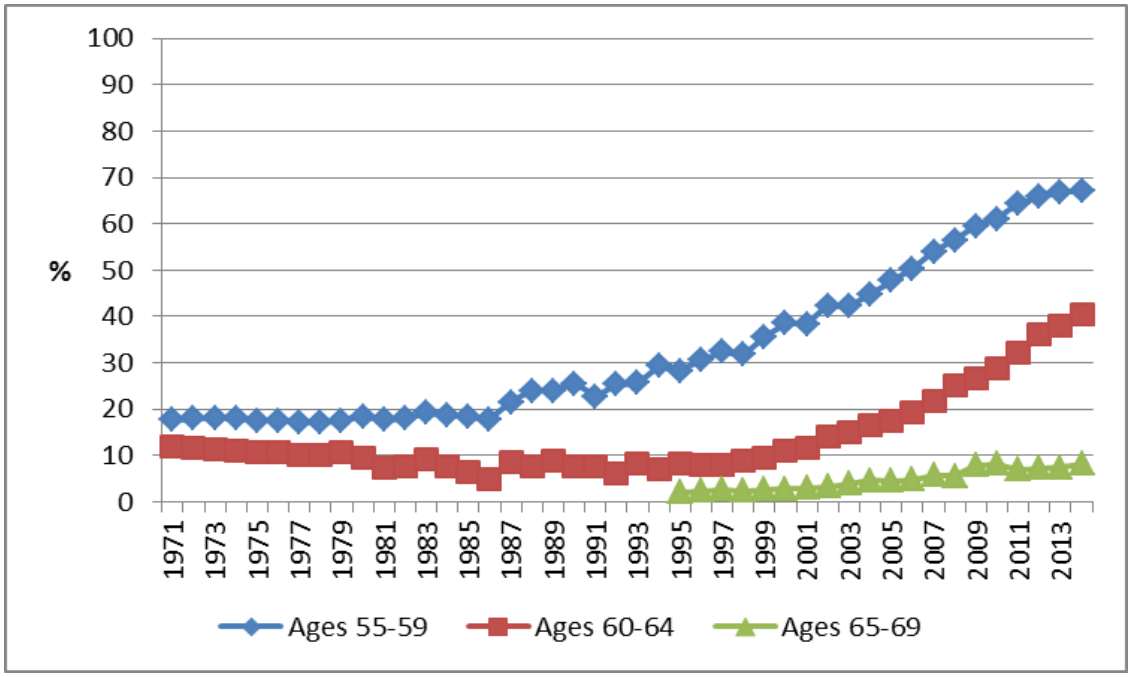
[1] Reforms aimed at a reduction of public health care expenditures such as decreased coverage of health care and long-term care insurance, are unlikely to have impacted labor force participation and a discussion of these are beyond the scope of this chapter.

Figure 2: Men's labor force participation by age for the period 1971-2014



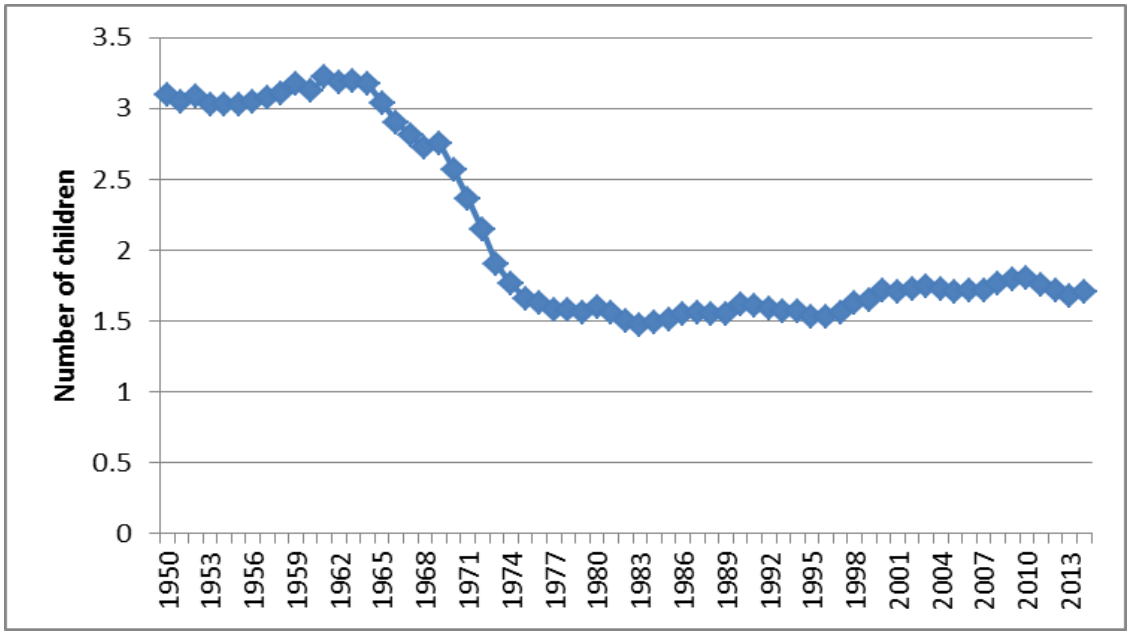
Source: OECD, **http://stats.oecd.org/**

Figure 3: Women's labor force participation by age for the period 1971-2014



Source: OECD, http://stats.oecd.org/

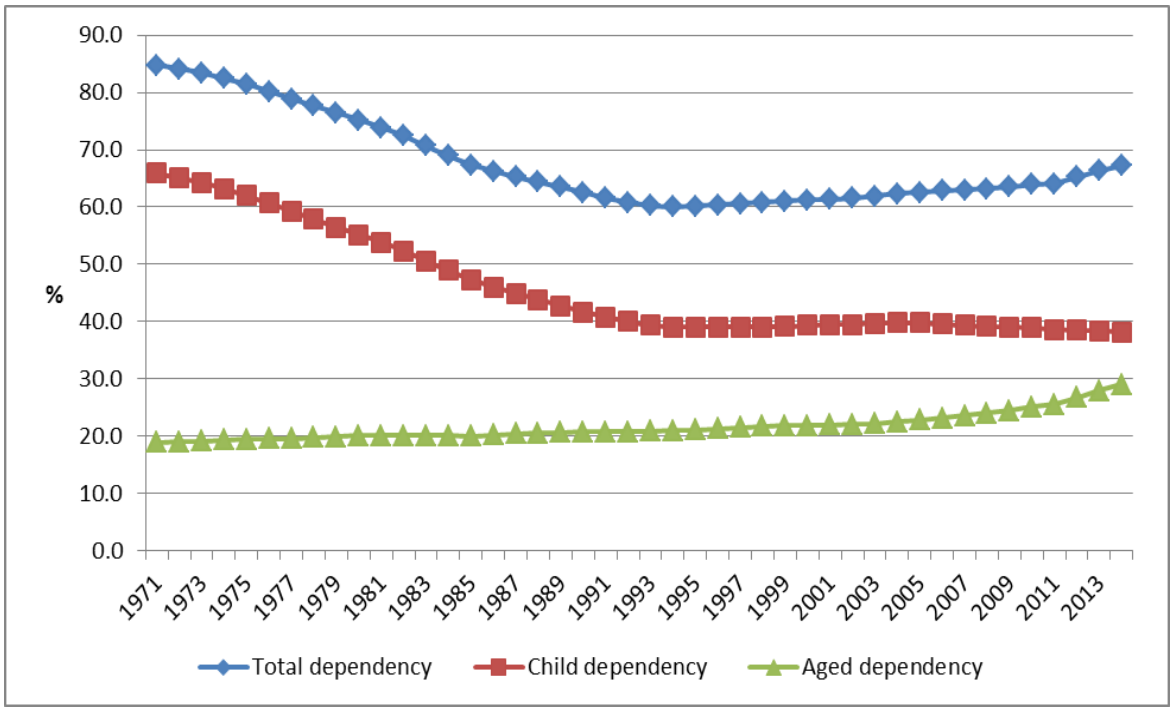
Figure 4: Completed fertility*



Source: Statistics Netherlands, statline.cbs.nl

* The predicted number of children of women born in the years 1950-2014 given the age specific fertility rates in those years.

Figure 5: Dependency ratios for the years 1971-2014*



Source: Statistics Netherlands (downloaded March 2, 2016; http://statline.cbs.nl**).**

* The total dependency ratio is defined as the number of people under 20 or over 64 as a percentage of the number of people aged 20-64, the child dependency ratio as the number of people under 20 as a percentage of the number of people aged 20-64, and the aged dependency ratio as the number of people over 64 as a percentage of the number of people aged 20-64.

This chapter discusses explanations that have been suggested in the literature for the strong rise in men's labor force participation since the mid-nineteen-nineties (Figure 2). The reason for restricting our discussion to this period is that 1995 (or about) turns out to be a pivotal year for many countries, including the Netherlands, after which labor force participation rates of older workers increased sharply after a long period of decline.[2] Two important necessary conditions for an individual to keep on working at older ages are being in good health and having the skills to remain attractive to employers. These conditions are discussed in Sections 2 and 3, respectively. Next, Section 4 discusses the role institutions may have played in the rise of labor force participation rates of older workers. Section 5 discusses the overall findings, the restrictions of the underlying analyses, and implications for future labor market participation of older workers.

2. Health and Labor Force Participation

Staying healthy is necessary to keep on working at older ages. In this section we take first mortality and healthy life expectancy, and next the percentage of people receiving Disability Insurance as measures for the health of older workers.

2.1 Health and mortality

When looking at mortality data one can conclude that health at all ages has improved over long periods of time. Life expectancy at birth in the Netherlands has doubled from around 40 years in 1850 (the earliest records available) to currently around 80 years (Human Mortality Database**;** http://www.mortality.org). Although initially reductions in infant mortality caused this increase, at older ages health has improved significantly as well. The mortality rate at age 60 (men and women

[2] The roles early retirement schemes and Disability Insurance have played in the declining men's labour force participation during the nineteen eighties are discussed in, respectively, Kapteyn and de Vos (1999) and Koning and Lindeboom (2015).

combined), for instance, has declined from around 3 percent in 1850, to 2.5 percent in 1900 and 1.2 percent in 1950. Currently it is about 0.6 percent. Figure 6 shows a stronger decline in men's than in women's mortality at age 60 in recent decades. These declines in mortality rates are a global phenomenon and can be attributed to (interrelated) factors such as a decline in infectious diseases, medical innovations, improved living standards, better nutrition and public health and social policies (Cutler, Deaton and Lleras-Muney 2006).

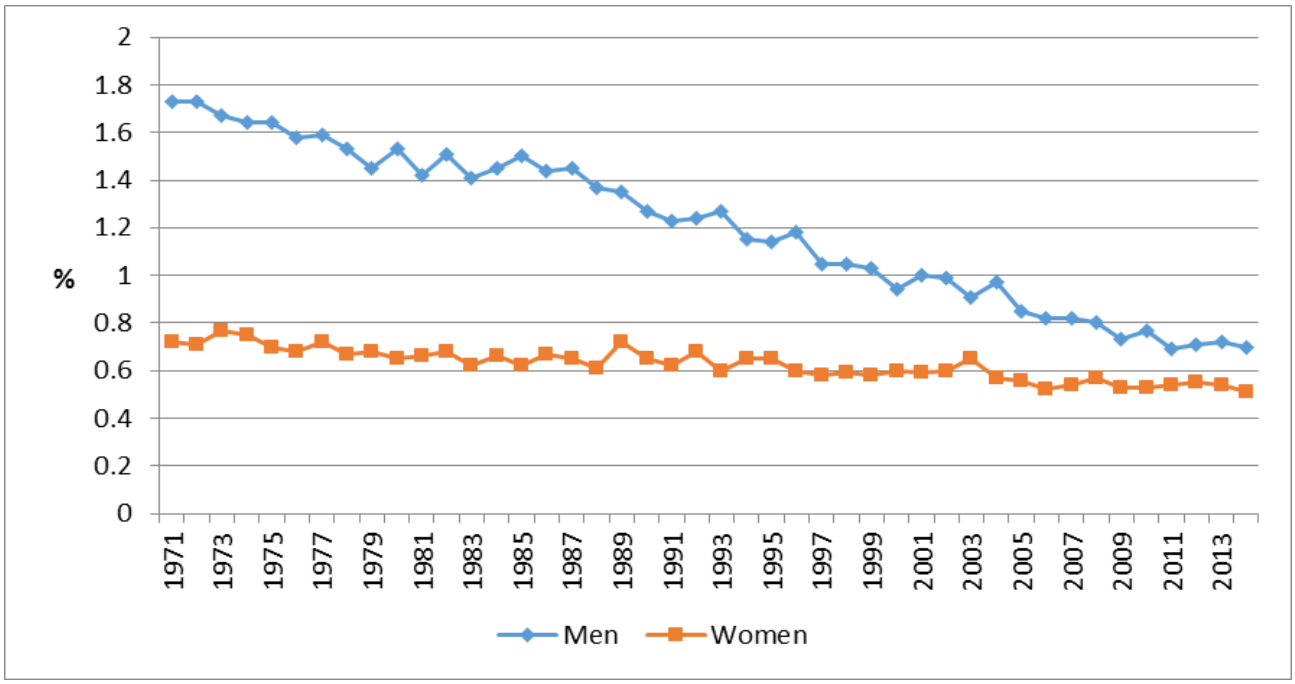
Increases in life expectancy are not always accompanied by an equal rise in expected healthy life years. For this reason, Statistics Netherlands has computed healthy life expectancy; an adjustment of life expectancy for the actual health status of individuals.[3] A visual inspection of the trends in figures 7 and 8 of men's and women's life expectancy and healthy life expectancy at different ages suggests that life expectancy and healthy life expectancy are closely related. Using the numbers on which these figures are based, we find that, on average over the past 25 years, healthy life expectancy as a share of total life expectancy is about 0.60 to 0.63 for men and 0.55 to 0.59 for women. These shares reveal that while women live longer, they spend relatively more years in bad health than men. Noteworthy is that, for instance at age 65, healthy life expectancies of men and women have converged. The difference was about two years in the early nineteen-eighties and is nowadays close to zero. Almost all of the additional years of life expectancy for women aged 65 have gained since the early nineteen-eighties are spent in bad health, and as a result the remaining healthy life expectancies at age 65 of men and women are nowadays about equal. This suggests a stronger improvement in men's health than in women's health at age 65.

[3] statline.cbs.nl**.** Healthy life expectancy is defined as the number of years an individual of a particular age can expect to live in good health, assuming the current risks of death and bad health apply. Taken into account are if a person perceives to be in good health (self-assessed health), is without physical limitations (no long-term limitations in mobility, sight and hearing) and without chronic diseases (heart condition and/or myocardial infarction, asthma, chronic bronchitis, pulmonary emphysema or chronic non-specific pulmonary disease, cancer, stroke, diabetes, serious or chronic gastrointestinal disorders, chronic arthritis (Bechterew's disease, chronic rheumatism, rheumatoid arthritis), serious or chronic backache (including slipped disk), degenerative arthritis in hips or knees, hypertension (high blood pressure), migraine or recurring serious fits of headache), and is in good mental health (based on the Mental Health Inventory (MHI-5) determined by the balance of positive and negative feelings).

2.2 Health and Disability Insurance

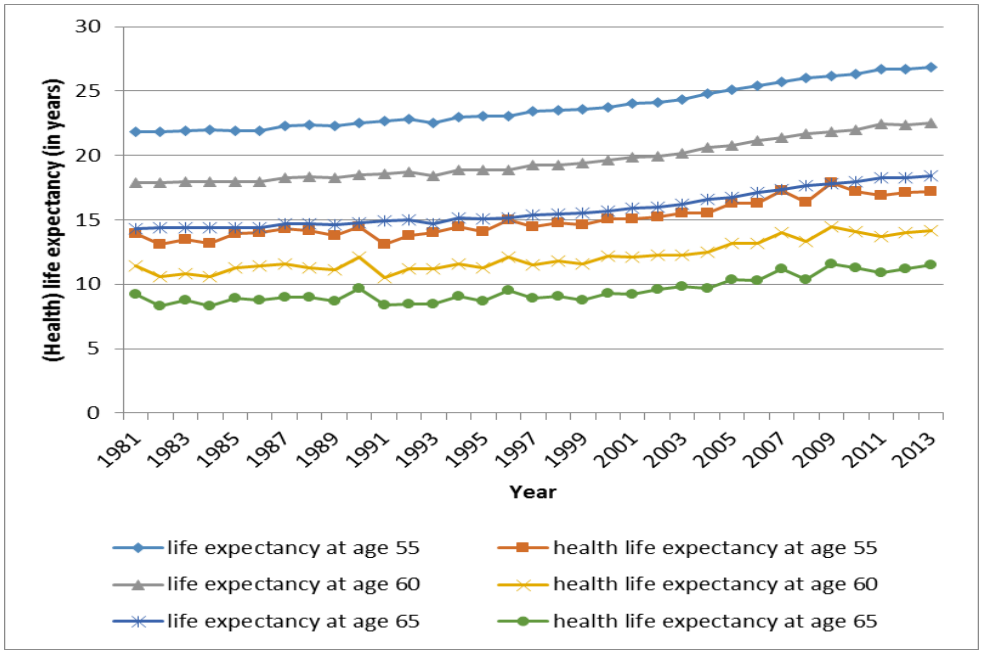
The Disability Insurance (DI) scheme in the Netherlands mandates social insurance for all workers against earnings loss due to adverse health events. In principle, therefore, the percentage of people receiving DI measures the health of older workers. Koning and Lindeboom (2015) show that there is a decline in DI recipients from about 1992 onward for the entire Dutch working population. Figure 9 shows that for older men the percentages of people receiving DI have been steadily declining since 1989. Over the years 1989-1993 this decline is most pronounced for men aged 50-54. A similar decline is observed for these cohorts five years later over the years 1994-1998 (at ages 55-59) and ten years later over the years 1999-2003 (at ages 60-64). If the percentage of people receiving DI were to measure the health of older workers, it would suggest, in line with the observations based on mortality rates in section 2.1, that the younger cohorts are relatively healthier than the older cohorts (for a given age). Figure 10 shows that for women the DI rates are relatively stable, despite the strong increase in women's employment rates (Figure 3) which may also suggest an improvement in health of older female workers. DI rates are not just a function of health, but also of institutions governing flows into an out of the DI-system. At least part of the observed changes is also affected by institutional changes as will be argued below.

Figure 6: Mortality rate at age 60 by year and gender



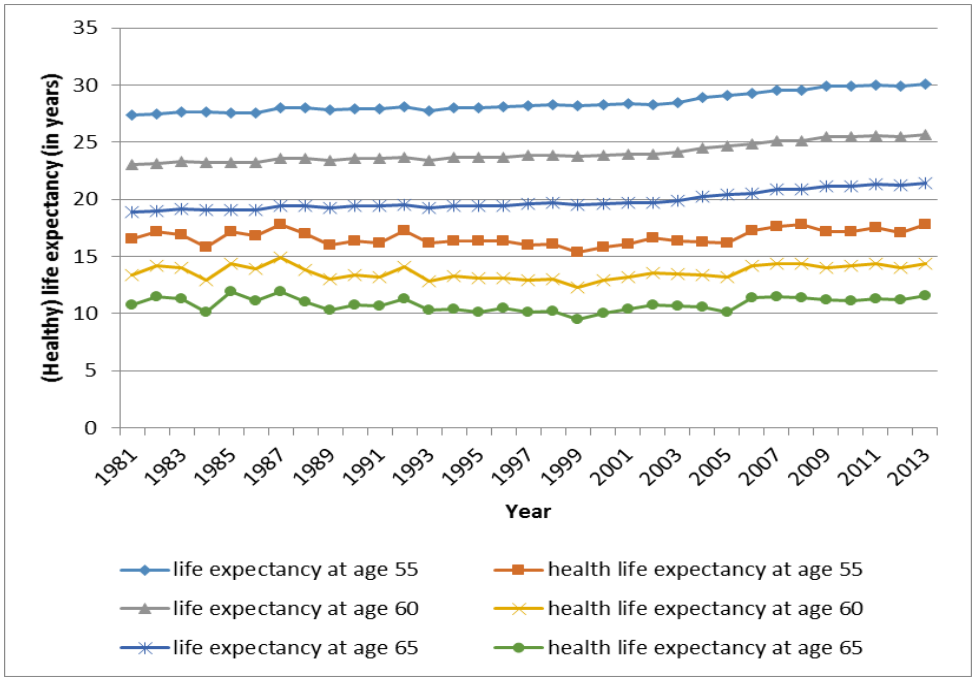
Source: Statistics Netherlands, statline.cbs.nl

Figure 7: Men's (healthy) life expectancy by year and age



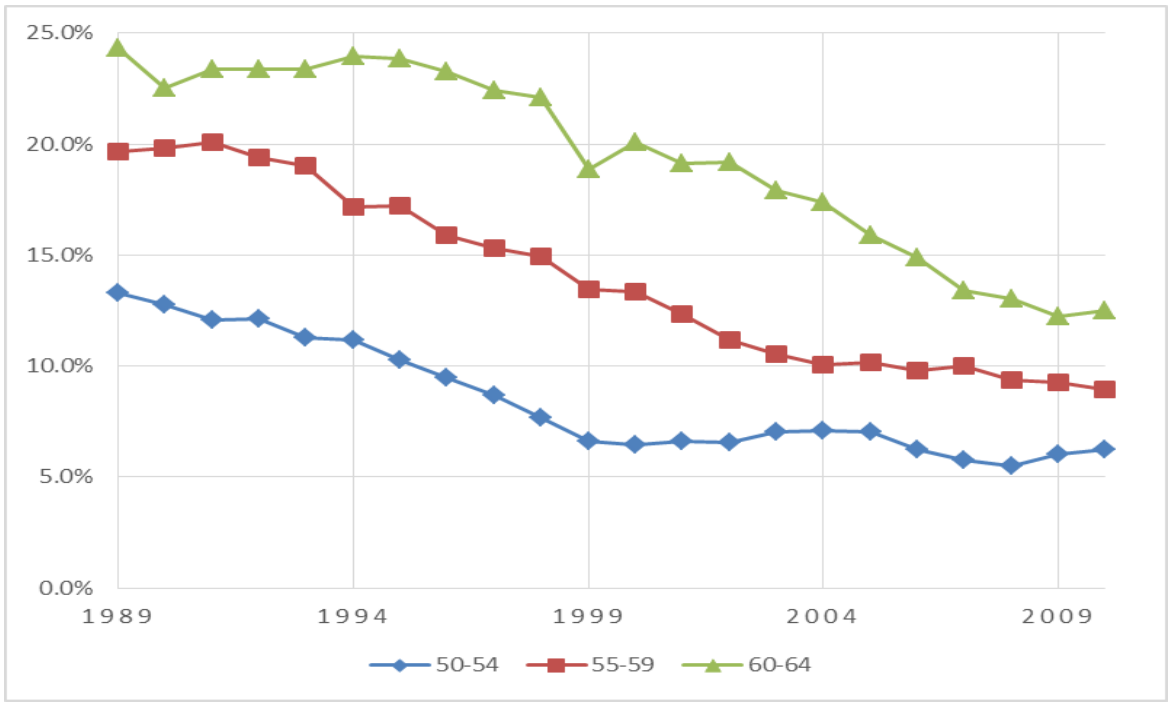
Source: Statistics Netherlands, statline.cbs.nl

Figure 8: Women's (healthy) life expectancy by year and age



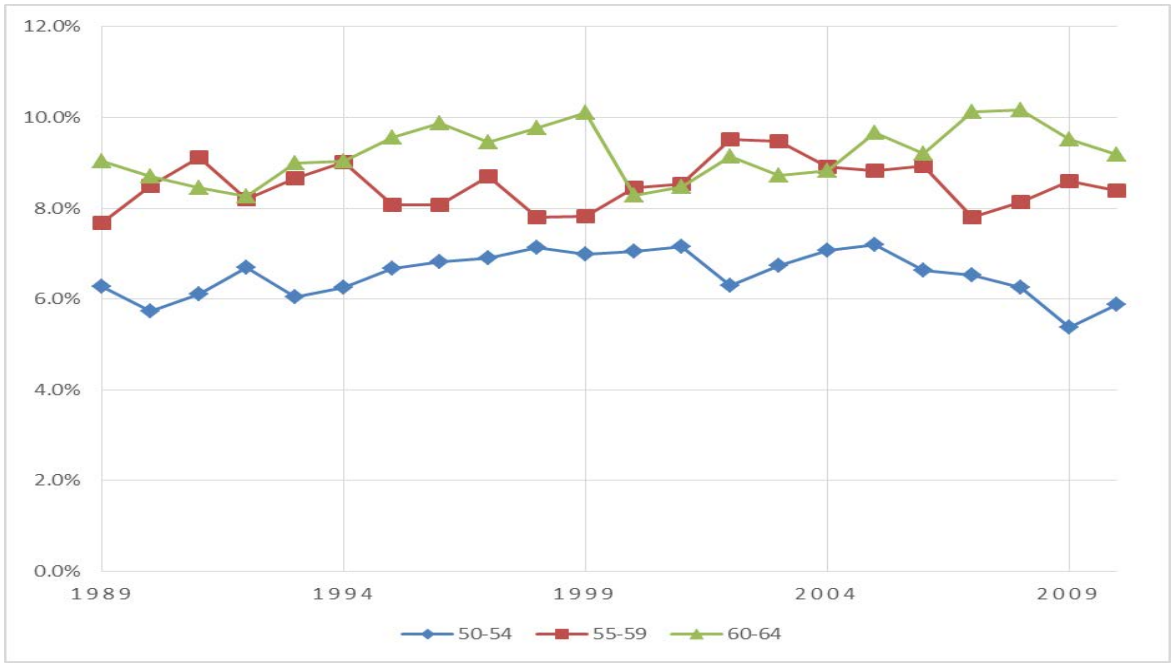
Source: Statistics Netherlands, statline.cbs.nl

Figure 9: Men's Disability Insurance rate by year and age



Source: Statistics Netherlands, Income Panel Study (IPO). DI rates: the percentage of people receiving DI

Figure 10: Women's Disability Insurance rate by year and age



Source: Statistics Netherlands, Income Panel Study (IPO). DI rates: the percentage of people receiving DI

3. Skills

Part of the explanation for the rapidly declining labor force participation of older workers since the mid-nineteen-seventies may be skill-biased technological change (SBTC; Autor and Katz 1999). SBTC has increased the demand for higher educated workers at the expense of lower educated workers. Many of the skills of lower educated older workers have become obsolete and are no longer in demand. The occupations that demanded these skills often included manual and physically demanding tasks that have been replaced by capital intensive equipment such as machines. In addition, and especially since the nineteen-nineties, automation, i.e. a shift to capital intensive equipment that makes use of computers, has taken over routine based tasks that happen to be relatively more often performed by (older) workers with median levels of education (Autor and Dorn 2009; Goos, Manning and Salomons 2015).[4] One of the explanations for the rapid rise in labor force participation from the mid-nineteen-nineties may, therefore, be related to shifts in the composition

[4] Often referred to as Routine-Biased Technological Change (RBTC).

of employers' demand toward non-routine occupations and high skilled workers. To investigate the plausibility of that explanation we consider the change in the educational and occupational distributions among older workers.

Levels of education are defined according to the 1997 International Standard Classification of Education (ISCED)[5]. ISCED 1-2 will be referred to as a low level of education, ISCED 3 as a medium level of education and ISCED 4-5 as a high level of education. Figure 11 shows that the percentage of higher educated men aged 55-64 has doubled over the period 1989-2012. Over the same period the percentage of lower educated men aged 55-64 has decreased by almost 20 percentage points. These trends have resulted in a continuous increase in the level of education of older workers. Figure 12 shows similar trends for women in this age range, with even stronger increases in the percentage of higher and median educated women and a stronger decrease in the percentage of lower educated women. While the levels of education for men are higher than for women, the figures show convergence as women in the younger cohorts are closing this gap. In addition, Kalwij, De Vos and Kapteyn (2016) find that the level of education is one of the important determinants of employment at older ages and that the exit rates from employment are largest for the lower educated. Taking these findings together suggests that the increased labor force participation rates of older workers can at least partly be explained by increased levels of education of older workers, which made them more attractive to employers.

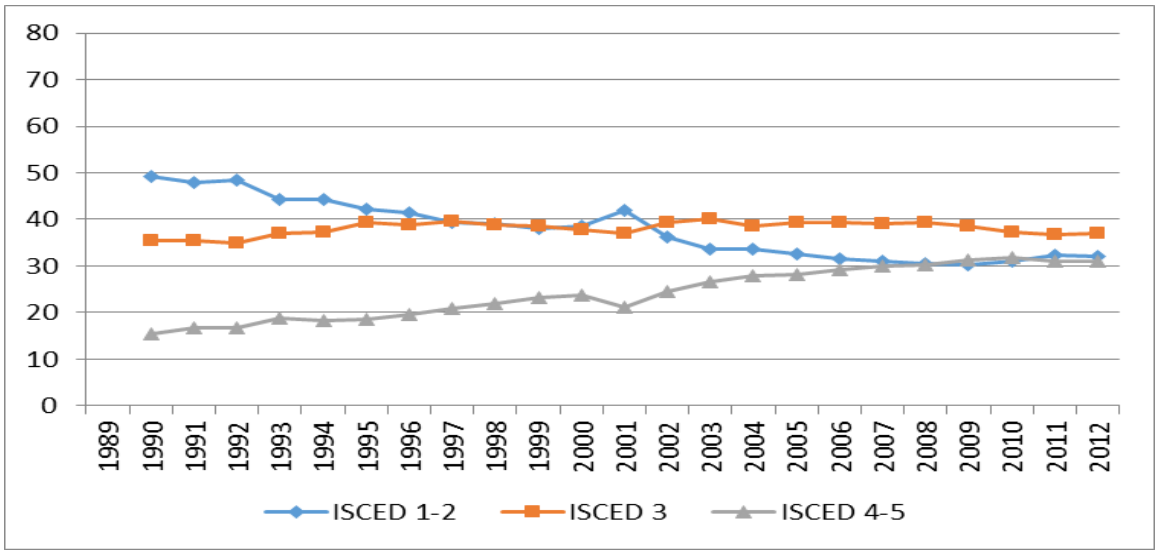
Figure 13 shows that in particular median skilled jobs have been disappearing for men, an 11 percentage points drop over the 1990-2011 period, while the high and academic skilled jobs have gained (together about a 10 percentages point increase). The percentages low skilled and elementary jobs remain relatively constant between 1990 and 2011. For women, Figure 14 shows a slightly different picture. Although (relative) job growth for women has also been mainly in high and

[5] Reference: http://www.uis.unesco.org/Education/Pages/international-standard-classification-of-education.aspx

academic skilled jobs (together about a 12 percentage points increase), the percentage median skilled jobs has also increased by about 8 percentage points. At the same time there has been a very large drop in low skilled and elementary jobs by, respectively, 11 and 8 percentage points. The Dutch situation of a relative rise in medium skilled jobs for women, as opposed to the relative drop for men, appears to be in contrast to the empirical evidence provided for the U.S. that computerization of tasks reduces employment in routine task-intensive occupations for male and female workers (Autor, Dorn and Hanson 2015).

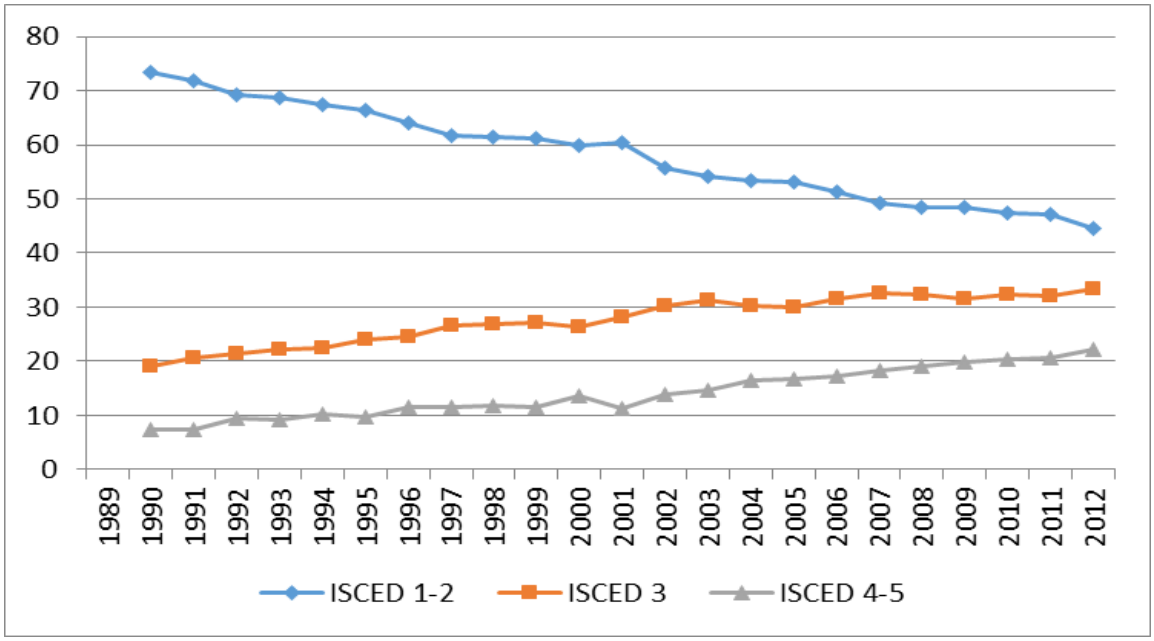
To sum up, the shifts in the level of education and skill composition of older male workers (Figures 11 and 13) are likely to have contributed to the rise of labor force participation rates among older men from the mid-nineteen-nineties onward as the entering cohorts more often had the skills demanded than the retiring cohorts.

Figure 11: Levels of education of men aged 55-65 by year



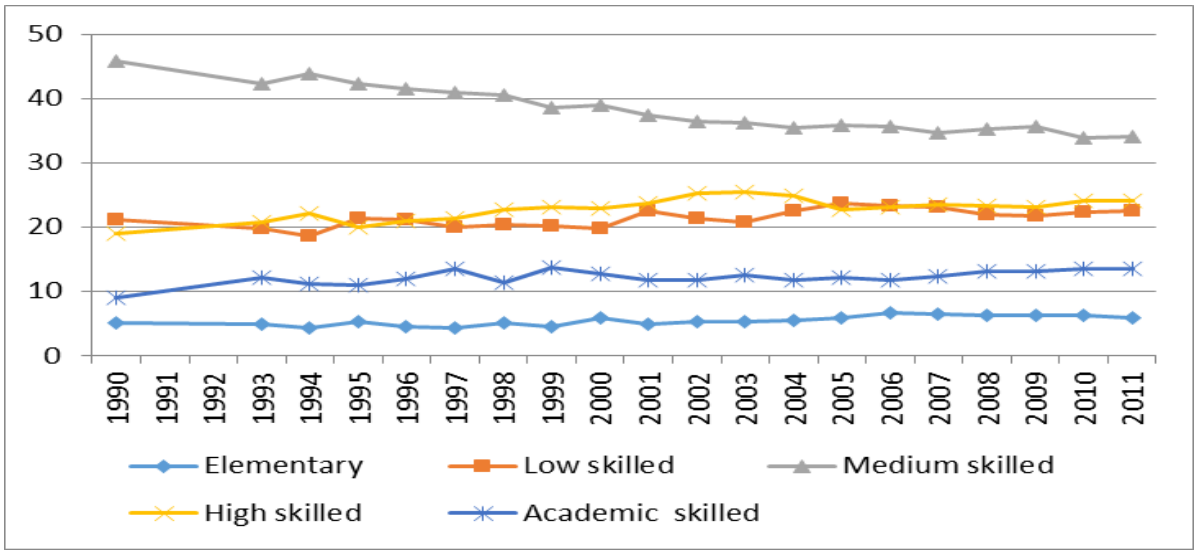
Source: Statistics Netherlands, Labor Force Study (Enquete Beroepsbevolking; EBB). ISCED: 1997 International Standard Classification of Education (ISCED).

Figure 12: Levels of education of women aged 55-65 by year



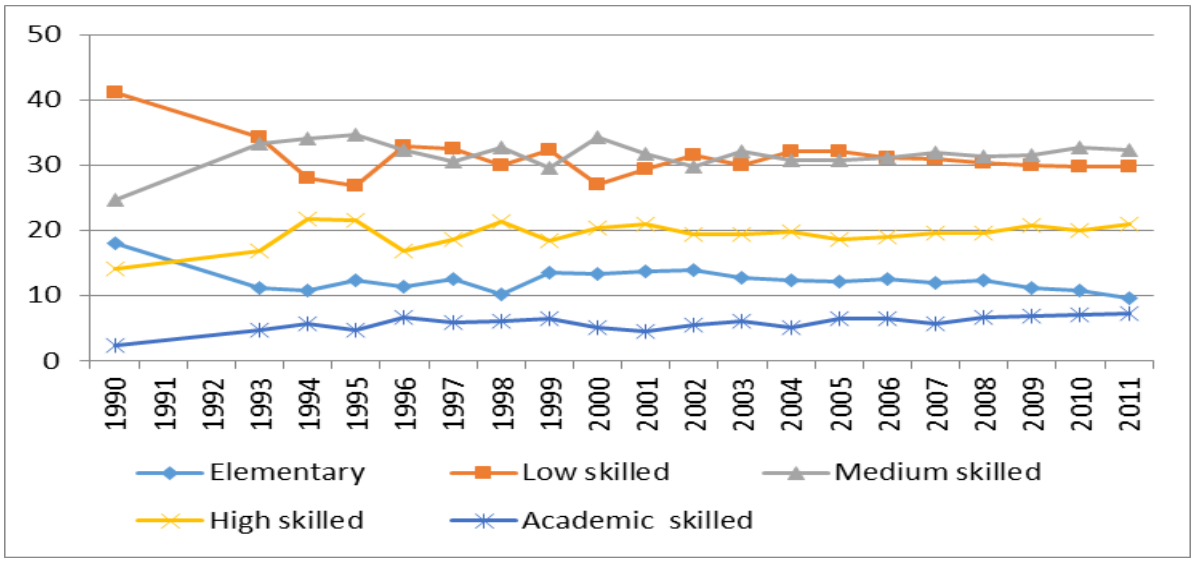
Source: Statistics Netherlands, Labor Force Study (Enquete Beroepsbevolking; EBB). ISCED: 1997 International Standard Classification of Education (ISCED).

Figure 13 Men aged 55-64; type of jobs (skill levels) by year



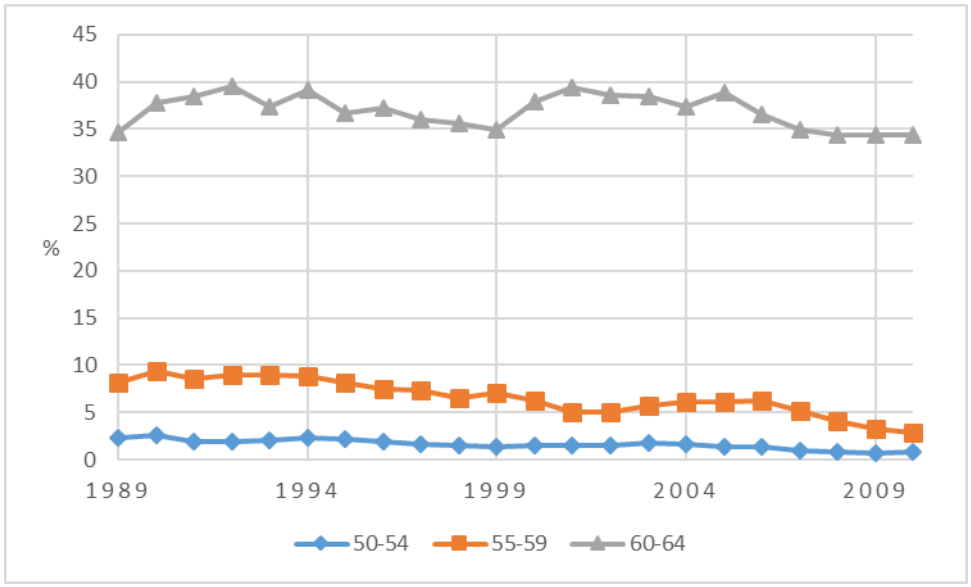
Source: Statistics Netherlands, Labor Force Survey (Enquete Beroepsbevolking; EBB). Skills levels are defined based on the SBC 1992 classification (http://www.cbs.nl/nl-NL/menu/methoden/classificaties/overzicht/sbc/1992/default.htm).

Figure 14 Women aged 55-64; type of jobs (skill levels) by year



Source: Statistics Netherlands, Labor Force Survey (Enquete Beroepsbevolking; EBB). Skills levels are defined based on the SBC 1992 classification (**http://www.cbs.nl/nl-NL/menu/methoden/classificaties/overzicht/sbc/1992/default.htm**).

Figure 15 Early retirement (ER) rates for men aged 50-64



Source: Statistics Netherlands, Income Panel Study (IPO). ER rates: the percentage of people receiving ER pensions.

4. Institutions and labor force participation

From the end of the nineteen-seventies onward generous early retirement schemes were introduced. Early on these were often called Young-for-Old programs. As this name suggests, the main idea was that if older workers would leave the workforce, younger people would take their places. The introduction of these early retirement schemes was a policy reaction to very high youth unemployment and relatively unhealthy older male workers (section 2) of whom many had jobs that were becoming obsolete (section 3). This, together with the fact that the benefits were quite generous, made these schemes very attractive for both employees and employers. Net replacement rates were high and the programs were mainly financed by the current workforce. As shown in Figure 15, the ER option has been taken by over one-third of the people aged 60-64. ER rates rapidly declined since the mid-nineteen-nineties among people under 60 but ER rates among 60-64 year old people remained high for many more years and started to decline somewhat after about 2006. As it turns out, empirical evidence suggests that the early retirement schemes did not create additional employment for the young (Kapteyn, de Vos, and Kalwij 2010). One explanation for this is that, as mentioned earlier, many jobs that were left behind by early retirees involved obsolete tasks. Support for this explanation is given by Kalwij, Kapteyn and de Vos (2010) who find that employment of the young and old are not substitutes and may even be complements. As described in the introduction, the popularity of the early retirement schemes has led to rapidly declining labor market participation rates of older workers from the late nineteen-seventies onward, reaching a historical low in the early nineteen-nineties (Kapteyn and de Vos, 1999).

At the end of nineteen-eighties Dutch policymakers' reactions to the historically low labor market participation rates of older workers, in combination with the aging of the Dutch population, involved a series of reforms implemented from the early nineteen-nineties onward such as making early retirement benefits less generous, and imposing stricter eligibility rules for disability and unemployment insurances (see Appendix A). The necessity of the reforms has been amplified by a

series of crises such as the dotcom crash in 2000-2001, the 2007-2008 financial crisis, and housing market and Euro crises in its aftermath, which have shown the financial vulnerability of the Dutch social security and pension system (e.g. Kalwij, Alessie, Gardner and Ali 2018). The latter sequence of events created the momentum for increasing the normal retirement age in the Netherlands. The normal retirement age is the age at which people start receiving a public old age pension. Up until 2012 the normal retirement age was 65. It will increase gradually to 66 in 2018 and 67 in 2021. After that it will be further raised in line with increases in population life expectancy, up to age 70 and three months.

The labor force participation rates shown in Figures 2 and 3 suggest that the reforms of the past two decades may have been successful as these rates have strongly risen from the onset of the reforms in the mid-nineteen-nineties. Men's labor force participation at ages 60-64 has tripled over this period from 20 percent in 1995 to over 60 percent in 2014. For men aged 55-59 the labor force participation has substantially increased from 61 percent in 1995 to 86 percent in 2014 (Figure 2). Figure 3 shows, from the mid-nineteen-nineties onward, similar trends for women as for men but at lower levels. Previous empirical studies of the impact of less generous early retirement schemes also suggest that these reforms have contributed to the increase in the labor force participation (LFP) of the 55–64 population from less than 30% in the mid-1990s to 45% in 2007 (Euwals, de Mooij and van Vuuren 2009; Kapteyn and de Vos 1999; Van Oorschot 2007).

As shown by Burkhauser and Daly (2011), the number of DI beneficiaries per worker in the Netherlands, which for a long time was among the highest in the developing world, decreased below the comparable figure for the US, which suggests that DI reforms may also have had considerable impact. Findings of de Jong, Lindeboom and van der Klaauw (2011) suggest that stricter screening of disability insurance applications has reduced long-term sickness absenteeism and disability insurance applications. In line with these latter results, Kalwij, de Vos and Kapteyn (2016) show that the reduction over the last decades in the percentage of older workers that have exited the labor market

through DI has mainly been achieved by restricting access to the Disability Insurance scheme and is not due to a reduction in the generosity of disability benefits.

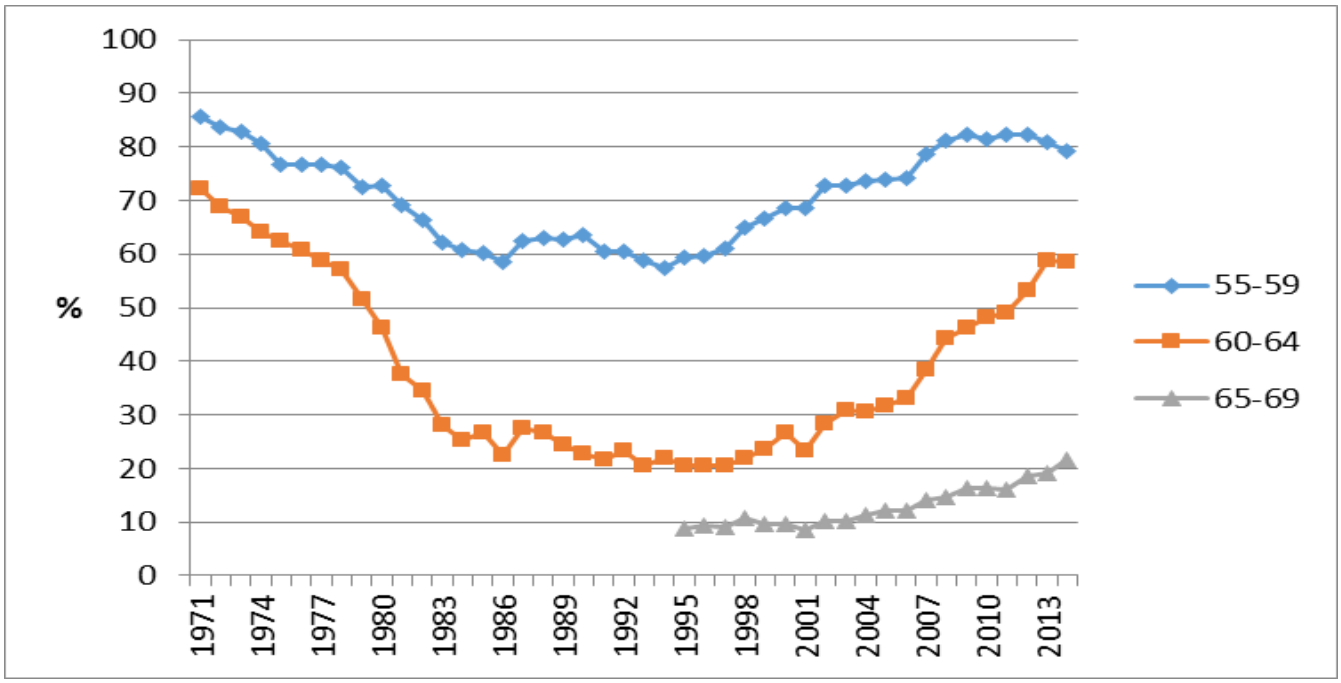
Pathways

One way in which adverse labor market effects of the DI and ER reforms could manifest themselves is that older workers who lose their job end up unemployed if stricter criteria make them no longer eligible for early retirement or disability insurance. Figure 16, however, shows that men's employment rates have followed similar trends as the participation rates of Figure 2 and unemployment rates have in fact decreased substantially to about 2 percent just before the dotcom crisis of 2001 (Figure 17). Since then, unemployment rates have been rising, following the business cycle, also among older workers to around 7 to 8 percent. Similar patterns are observed for women's employment and unemployment rates (Figures 18 and 19).

Older workers are more likely to have job protection than young workers (as it is based on tenure), to be relatively expensive, and may have obsolete skills (Section 3). These features, together with the fact that employers and employees bear little of the costs, made DI and ER schemes attractive pathways to retirement during the nineteen-eighties and nineties. Koning and Lindeboom (2015) make a convincing case that the DI system provided incentives to use DI as an alternative for unemployment or early retirement. Figures 17 and 19 show that during the nineteen-eighties and nineties the unemployment rates for older workers were relatively low compared to those for all workers and that this relative difference gradually diminished since the mid-nineteen-nineties when stricter eligibility rules for ER and DI benefits were introduced. These observations suggest that as long as the eligibility criteria were lenient, ER and DI schemes were used to lay off redundant workers. Nevertheless, it appears that restricting the ER and DI pathways has not resulted in a substantially increased use of the UI pathway. As discussed in Appendix A, the various institutional

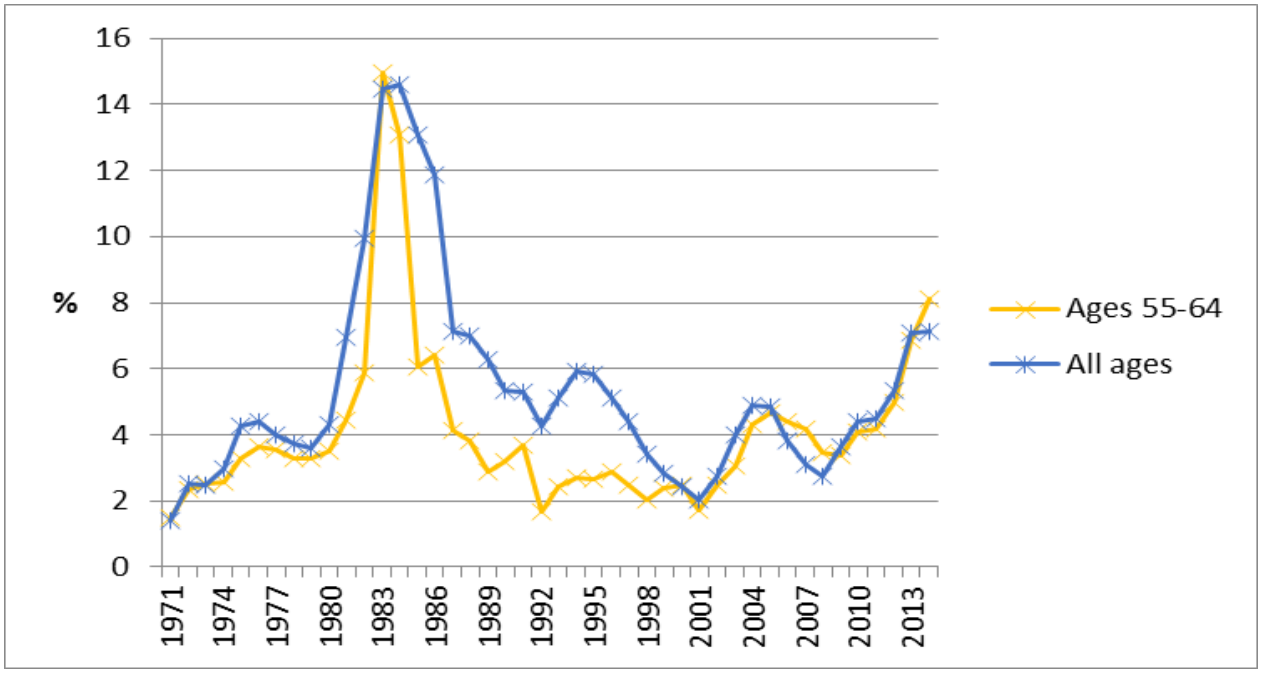
reforms have affected a wide range of social security programs, including early retirement, disability and unemployment insurance. On balance this has limited the possibilities for substitution.

Figure 16: Men's employment rate by year and age



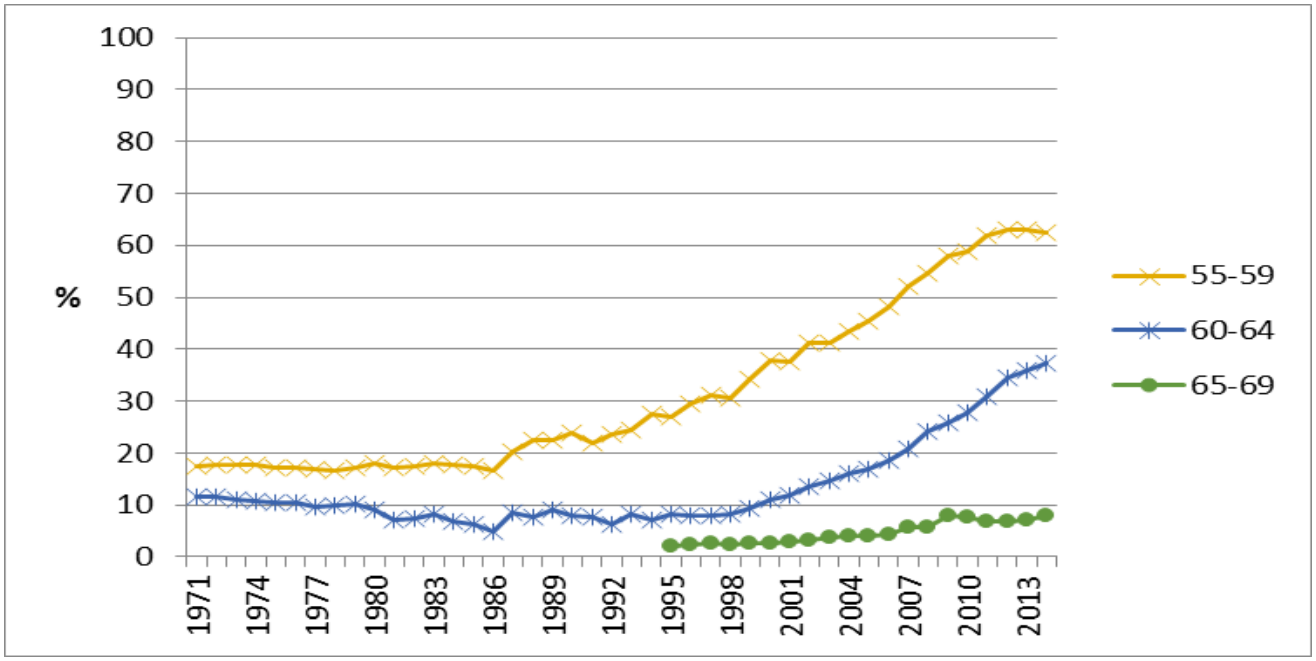
Source: OECD, http://stats.oecd.org/

Figure 17: Men's unemployment rate by year and age



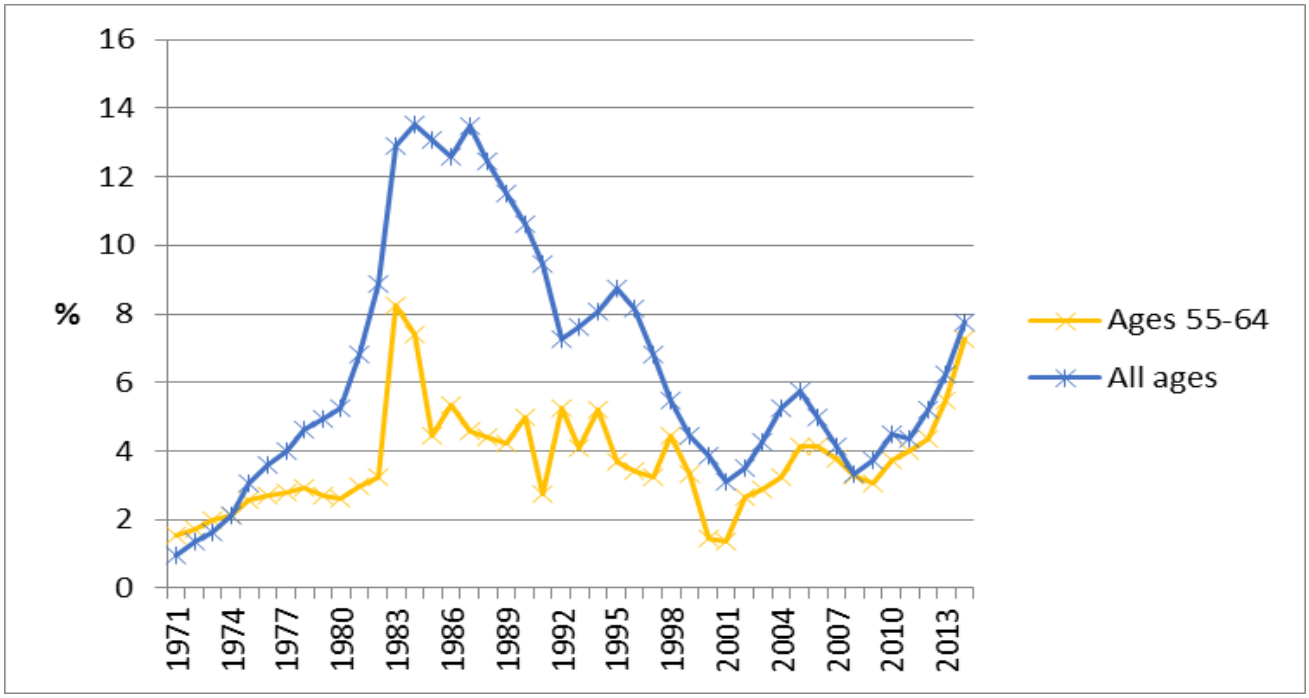
Source: OECD, http://stats.oecd.org/

Figure 18: Women's employment rate by year and age



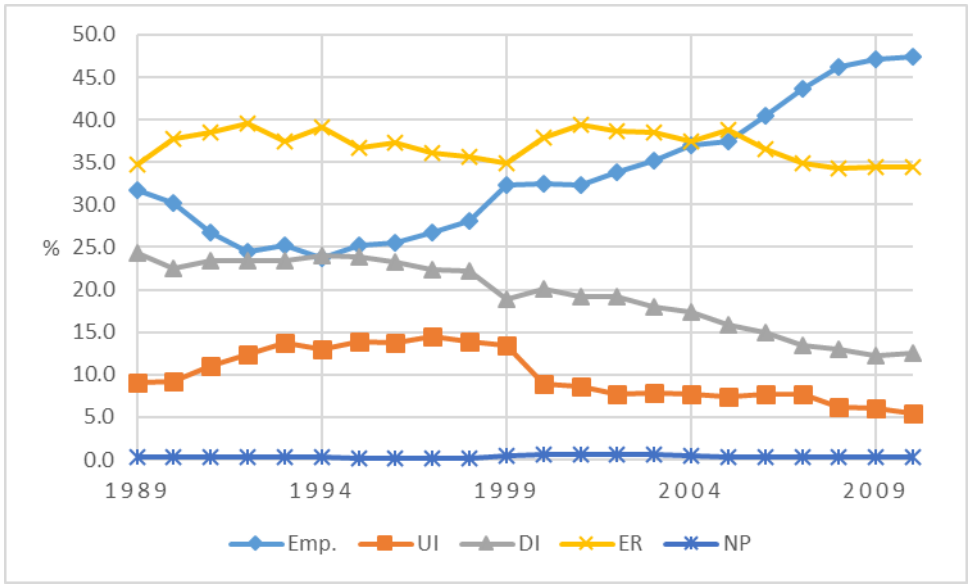
Source: OECD, http://stats.oecd.org/

Figure 19: Women's unemployment rate by year and age



Source: OECD, http://stats.oecd.org/

Figure 20: Employment, UI, DI, ER and Non-Participation rates of men aged 60-64 by year and age



Source: Statistics Netherlands, Income Panel Study (IPO). All rates are a percentage of people aged 60-64

5. Discussion

The economic literature as well as some of the findings above suggest that the introduction of early retirement schemes at the end of the nineteen-seventies, together with lenient eligibility rules for disability and unemployment insurances, resulted in a strong reduction in labor force participation among the older population in the two decades thereafter. Likewise, reforms of social security programs and pension schemes since the mid-nineteen-nineties with the purpose of creating stronger incentives for continued work at older ages, such as stricter eligibility rules for ER, UI and DI, have been quite effective in the Netherlands. Figure 20 shows that most of the increase in employment among men aged 60-64 has been accompanied by a decrease in UI and DI recipients while ER rates remained high until recently. These policies have largely been designed in response to changes in economic circumstances, some which we have highlighted in this chapter in Sections 2 and 3.

Figures 2 and 3 suggest however that probably not all labor force participation and employment changes are due to institutional changes. These figures show that participation rates above the normal retirement age of 65 have, from the mid-nineteen nineties onward, increased by 15 percentage points for men (almost tripling in levels) and 6 percentage points for women (almost quadrupling in levels) despite the fact that these groups have been less affected by the reforms of social security programs and pension schemes since the mid-nineteen-nineties that were mainly targeted at people younger than 65.

This may suggest that factors other than institutions, such as the health and skills of older workers (sections 2 and 3), may have played an important role in people working longer and the strong increases in labor force participation at all ages since the mid-nineteen-nineties. Or, at a minimum, these other factors provided the necessary conditions for DI and ER reforms to be successful. For instance, the improved health of older people may have facilitated the reforms over the last two

decades as it ensured the necessary extra work capacity.[6] In this interpretation, the reforms provided people the incentives to keep on working and their improved health and better skills made it possible for them to do so.

A final factor that has gained recent attention in the literature is the impact of the strong rise in women's employment at older ages, as shown in Figure 18, on men's employment behavior. Men and women take joint retirement decisions and an individual is more likely to continue working if his or her spouse works longer (Schirle 2008; Bloemen, Hochguertel, and Zweerink 2015). Hence, more men are likely to continue working if their wives are working and the strong rise in women's labor force participation is likely to have had its own positive impact on men's labor force participation.

Looking toward the future, less generous pensions and a continuing increase in the normal retirement age are likely to contribute to further increases in labor force participation. Two concerns are often raised in the policy debate. First, keeping older people work longer may adversely affect employment of the young, and especially in times of high youth unemployment this argument is put forward. As we discussed above, the empirical evidence of Kalwij, Kapteyn and de Vos (2010) and of references therein suggests this is not a reasonable concern. Empirical findings of previous studies do not support the hypothesis that employment of the young and old are substitutes. In other words, encouraging later retirement is unlikely to have adverse effects on youth employment. A second concern is that there may be adverse effects of working longer on health. For instance, the relatively

[6] Based on a combination of population mortality and survey data, additional work capacity in 2013 is estimated to be about 31 percentage points at ages 60-64, increases to 53 percentage points at ages 65-69 and is reduced to about 44 percentage points at ages 70-74. At ages 55-59 additional work capacity is close to zero. These findings suggest that at ages 55-59 participation rates nowadays are as high as one can expect based on the health of this population but that health per se is not a restrictive factor for higher participation rates at older ages (Kalwij, Kapteyn and De Vos 2017).

smaller decline in women's than men's mortality at age 60 (Figure 6) is often attributed to the rise in smoking among women (Pampel 2002) and, possibly in part related to this, the increased labor force participation of women and corresponding work related stress which, in turn, has been shown to increase the risk of cardiovascular disease (Kivimäki, Leino-Arjas, Luukkonen, Riihimäki, Vahtera & Kirjonen 2002; Kouvonen, Kivimaki, Virtanen, Pentti & Vahtera 2005). Overall, the empirical evidence on the causal impact of work on health at older ages is mixed. Kalwij, Knoef & Alessie (2013) and Neuman (2008) find that retirement has no adverse health effects, Charles (2004), Hemingway, Marmot, Martikainen, Mein & Stansfeld. (2003) and Coe & Zamarro (2011) find a positive effect on health, and Kuhn, Wuellrich & Zweimueller (2010), Behncke (2012) and Dave, Rashad & Spasojevic (2008) conclude that retirement may have a negative impact on health.

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Appendix A. Social Security System Reforms 1995-2016

In Table 1 we provide a comparison between the benefits for older workers and retirees available in 1995 and 2016. In Table 2 we provide a timeline of the most important reforms to the system between both years. In the remainder of this appendix, we will discuss the main characteristics of the benefit system and the implemented reforms. A large part of this discussion is based on De Vos, Kapteyn and Kalwij (2012).

State pension

The Dutch benefit system is characterized by a clear distinction between benefits for persons younger than the state pension (SP) age and benefits for older persons. The latter receive the flat rate SP. Until 2013, the SP age was 65 but in the aftermath of the credit crisis government used the opportunity to introduce a gradual increase of the SP age in order to ensure the future sustainability of the pay-as-you-go SP. The SP age will reach 66 in 2018 and 67 in 2021 and is to be linked to the life expectancy thereafter. The flat rate SP is supplemented when the spouse is younger than the SP age and has a low income. This supplement is gradually abolished, starting in 2015.

Occupational pensions

In many cases the SP is supplemented by a (fully funded) occupational pension (PP), which ideally supplements the SP to 70% of previous earnings. Until the early 2000s, most occupational pension rights were calculated on the basis of final earnings but currently, most pension rights are calculated on the basis of the average earnings during employment. Furthermore, until recently, most occupational pensions were indexed on the basis of the wage index. However, following the credit crisis and the dramatic reduction of the market interest rates most pension funds have had to

suspend indexation or indeed lower the pensions in order to meet the legal solvability criteria (cf. Kalwij, Alessie, Gardner and Ali 2018).

Early retirement

For persons younger than the SP age until recently various pathways to retirement were available. Early retirement (ER) was introduced in most sectors during the 1970s, mainly in reaction to rising unemployment (cf. Kapteyn, de Vos and Kalwij 2010), and at least until the end of the 1990s in most cases consisted of an offer too good to refuse, usually at age 60 or thereabout. In particular, workers retiring later than the earliest possible ER date were not compensated by higher benefits or lower taxes, so that in fact they faced an implicit tax rate of more than 100% (cf. Kapteyn and De Vos, 1999). Notably, ER was not the result of government policy but the outcome of negotiations between trade unions and employers. However, government facilitated ER by making ER contributions tax deductible.

The prospect of exploding costs once the large baby boom cohorts start to reach the ER age turned out to be sufficiently threatening for effective reforms to be put in place by the end of the 1990s. In most cases a cost reduction as a result of reducing the effective ER entitlement was combined with the introduction of a more or less actuarially fair system. As a result, an employee could still opt for retiring early, but with a reduced pension, or later, but with a higher pension. By 2006, the government dealt a final blow to the old ER systems by effectively terminating the tax exemption for ER contributions that would enable a retirement age lower than 65. Only systems offering a replacement rate of at most 70% at the pension age of 65 and actuarially fair reductions when an earlier pension age is chosen can still collect tax exempt contributions.

Unemployment Insurance

For workers approaching 60 who were not entitled to ER, e.g. because of an insufficiently long employment history or because they worked in a firm which did not offer ER, and who could not plausibly be retired via Disability Insurance (DI, see below), Unemployment Insurance (UI) offered a third pathway to retirement before the SP age of 65. In most cases, it offered a replacement rate of 70%, and furthermore, until recently, no obligation to search for employment after the age of 57.5.

As of 2004, persons aged 57.5 or older receiving UI are no longer exempt from the requirement to seek work. In other words, they are no longer 'automatically' receiving UI until age 65 but have to try to find work and, in theory, accept a job offer. Moreover, as of October 1, 2006, the maximum duration of UI is 38 months. After that period all that is left is a means tested entitlement to Social Assistance (SA) with a benefit equal to the net minimum wage. Starting in 2016, the maximum duration of UI will be further reduced. It will be limited to 24 months in 2019.

Disability Insurance

Introduced in 1967, the Dutch Disability Insurance (WAO, *Wet op de Arbeidsongeschiktheids-verzekering*) aimed to insure employees against loss of earnings as a result of long-term inability to work as a result of illness or incapacity. If after having been ill for a period of one year, the employee could not resume work, he/she would be entitled to an earnings related DI benefit which could last until the employee reached the statutory retirement age of 65.

Starting in the 1970s, the numbers of individuals on DI in the Netherlands showed a continuous increase until the 1990s. These numbers were much higher than expected when the new DI legislation was introduced and much higher than might be expected given the average health status of the population. In fact, in the mid-1970s when unemployment was rising dramatically, the route to DI was generally used by employers as a path of least resistance to shed superfluous employees. For

the employee DI was both socially more acceptable and more attractive than UI, in particular because the benefit could be received until age 65 when the old age pension would kick in.

With the increase in the number of benefit recipients, expenditures on DI started to rise dramatically, and since the start of the 1980s government policy has sought to reverse the trend of the ever increasing DI expenditures by various reforms to limit access to DI, increase the number of persons exiting DI and lower the average DI benefit.

When lowering the replacement rate of DI from 80 to 70% and limiting access to the full DI for partially disabled unemployed new entrants did not result in reversing the trend of ever increasing numbers of DI recipients, the government introduced a series of measures in the early 1990s: the duration of the full DI benefit was limited for new entrants younger than 50, stricter disability criteria were introduced for entry into DI and younger DI recipients were to be retested. Mainly because most employees took out a private insurance to compensate for the shorter duration of the full DI benefit for younger persons, DI remained an attractive option. Next to limiting the access and the generosity of the benefit, policies were also introduced to shift the costs to firms with high numbers of employees exiting to DI. First, the costs of sickness benefits were charged directly to the employer for two to six weeks (1994), and later on for a full year preceding the exit to DI. Second, in 1998 experience rating was introduced: for large firms in particular, the DI contributions were partly based on the DI record of the firm in question. A high exit rate into DI resulted in higher contributions.

All these reforms still did not succeed in substantially reducing the numbers of DI recipients, and by 2002 the feeling was that enough was enough and the time had come for a more radical approach. As from 2002, during the year of sickness preceding exit to DI, employer and employee are jointly responsible for taking sufficient action for reintegration into the workforce. Moreover, this sickness period can be extended if insufficient reintegration measures have been taken. As from 2004, exit to DI only happens after two years of sickness, during which time the employer pays sickness benefits.

As from 2006, the new DI law, (WIA, *Wet werk en inkomen naar arbeidsvermogen*) makes a strict distinction between fully and permanently disabled and partially or temporarily disabled. The former receive a generous 75% of their previous earnings until age 65 (IVA, *Inkomensvoorziening Volledig Arbeidsongeschikten*). The latter receive a less generous benefit (WGA, *regeling Werkhervatting Gedeeltelijk Arbeidsongeschikten*) which depends on the previous earnings, the number of weeks worked before, and the current earnings (if any) and the percentage of previous earnings which the employee is deemed to be capable of earning. Furthermore, once again a retest operation has been set up for existing DI beneficiaries younger than 50 (whose DI remains unchanged).

Table 1: A comparison of State Pension (SP), Occupational Pensions (PP), Early retirement (ER), Unemployment Insurance (UI) and Disability Insurance (DI) between 1995 and 2016

	1995	2016
SP	SP age 65, flat rate pension with supplement for younger spouse with low earnings	SP age 65.5, to be increased to 67 in 2021 and follow life expectancy thereafter. Flat rate pension, supplement for younger spouse is being abolished
PP	From SP age, usually supplements SP to at most 70% of final earnings, indexed with wage index	From SP age: usually supplements SP to at most 70% of average earnings; indexation suspended. Earlier retirement still possible, but with actuarially adjusted pension.
ER	From about 60 to SP age: up to 80% of final earnings, no actuarial adjustment	
UI	In case of job loss: 70% of final earnings (with cap) for at most 4.5 years, followed by 70% of minimum wage for at most 3.5 years up to SP age. No job search required when older than 57.5 years.	70% of final earnings (with cap) for at most 38 months up to SP age. Active job search required.
DI	First year: sickness benefit of at least 70% of last wage. Next, DI of at most 70% of last wage, percentage depending on loss of earnings capacity. Duration depends on age, from age 59: duration until SP age. Next, lower benefit (often supplemented by private insurance) until SP age. Relatively easy access to DI, but retesting started.	Available up to SP age. At least 70% of last wage from employer (up to a cap) for first 2 years; reintegration programs during this time to encourage return to work. When the loss of earnings capacity is more than 80% and probability of ever being able to work again is low, benefit is 75% (up to cap) until SP age. In other cases (35-80% loss of earnings capacity) benefit level falls after a period, depending on age and/or length of previous employment. Strict screening of reintegration attempts, disability and loss of earnings capacity.

Table 2: Timeline reforms to State Pension (SP), Early Retirement (ER), Occupational Pension (PP) and Unemployment Insurance (UI), Disability Insurance (DI)

	SP	ER/PP	UI	DI / (long-term) Sickness Insurance
1995			Eligibility revised, short term benefit introduced	1994-1996: Retesting of younger DI recipients (<45) using stricter criteria
1996				Sickness benefit privatised: employer pays 70% of earnings (1 yr)
1998				(i) Introduction of (limited) experience rating DI contributions employer. (ii) Public employees included in DI
2000-05		Trend towards actuarially fairer flexible ER/PP age		
2001			Public employees included	
2002				Strict reintegration in case of sickness
2003			Abolition of continuation benefit	Experience rating for small employers abolished
2004		Trend toward PP based on average earnings rather than final earnings		(i) Sickness benefit period: 2 years (ii) Strict reevaluation DI recipients younger than 50
2006		ER: Fiscal friendly treatment of ER contributions repealed	Benefit period shortened, higher benefit first two months	Introduction of new DI: strict distinction between partially and fully, permanently disabled
2008				Experience rating DI abolished
2008-		PP: indexation often limited, trend toward DC benefits		
2013-	Gradual increase of the SP age from 65 to 66 in 2018 and 67 in 2021, to be linked to life expectancy thereafter			
2015-	Supplement younger spouse abolished			
2016-			Further shortening benefit period	

Main sources: SP: **www.svb.nl**, DI, UI: Kroniek van de sociale verzekeringen 2008, www.uwv.nl