Pensions, retirement, and the financial position of the elderly

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1 Introduction

This thesis collects five studies that are related to *pensions, retirement and the financial position of the elderly*. The five studies each aim to contribute to the understanding of pensions, retirement and the financial position of the elderly. The chapters in the thesis can be read independently. This introductory chapter provides the motivation for this thesis' topics (section 1.1) followed by the research questions underlying each of the chapters (section 1.2) and a summary of the main findings of each chapter (section 1.3).

1.1 Motivation

Long-term trends, such as the aging of the population and the increased life-expectancy, and the consequences of the recent financial crisis, have raised concerns about the sustainability of pension systems. The aging of the population increases the old-age dependency ratio thereby increasing the pressure on the working population. This effect on the dependency ratio is enforced by the low and decreasing fertility rates. Whereas this dependency ratio was 29 in 2010, it is expected to increase to 55 in 2040, meaning that there are 55 persons over the age of 65 for every 100 persons of age 15-64. The increased life-expectancy implies that people, on average, receive pension benefits for a longer period. The recent financial crisis has had a large impact on the capital reserves of pension funds which resulted in pension benefits cuts accordingly. Current pension systems are not well-prepared to face the long-term trends and the short-term volatility.

Consequently, many OECD countries have proposed and implemented reforms to alleviate the pension system from the pressure of demographic aging and to create sustainable pension systems for the future (OECD 2011b). Many of the reforms implemented to alleviate the pension systems from the consequences of aging populations are related to increasing both the statutory and effective retirement age, making pension benefits less generous and increasing contributions. Increasing the retirement age aims to increase the labor supply at older ages such that older people postpone receiving pension benefits and contribute to the pension system for a longer period. One of the most prominent measures taken to induce labor supply at older ages is making the options to retire earlier than the statutory retirement age less available and less generous. Decreasing the benefits and increasing the contributions of pensions means that the accumulation of pensions per contributory year decreases.

These reforms imply that public- and private pensions have become less generous. As a consequence, the proposed and implemented reforms have raised a lot of discussion about the financial position of current and future retirees. What are the effects of the reforms on current retirees? Do we expect future retirees to have an adequate pension for consumption needs? Do people need to retire later while working more hours during their career? What are the consequences of making early retirement less available and less generous? What jobs are needed to retire later? This thesis aims to understand the effects of aging on people's retirement behavior and the adequacy of their (future) pensions.

1.2 Research questions

Reforms are complicated by institutional path dependency and long-term contracts. Therefore, reforms implemented to combat the negative consequences of aging to society, such as increases in the statutory retirement age, are often politically controversial and difficult to implement. Hence, the approach that many countries have initially taken is to privatize pensions which entails a shift from the relative importance of public- to private pensions and from defined benefit (DB) to defined contribution (DC) sys-

tems (Barr and Diamond 2009, OECD 2009b, Orenstein 2011). This shift reduces the pressure of demographic aging on the public finances, as mandatory public pensions are usually financed by a PAYG system, but it may increase inequality of income of the elderly.

Chapter 2 addresses the research question *Do shifts from public- to private pension provision lead to higher levels of income inequality or poverty among older people?* The chapter explains that private pension plans are generally less redistributive than public pension plans. Therefore, it is expected that the observed shifts from public- to private pension plans has led to higher levels of income inequality among the elderly. Chapter 2 empirically analyzes the distributional effects of shifts from public- to private pension provision by relating the relative importance of the public- and private pensions to indicators of income inequality and poverty among elderly in 15 European countries for the period 1995-2007. This approach allows us to draw conclusions about the consequences of reforming the pension system for the financial well-being of the elderly.

To assess the financial well-being of the elderly, *Chapter 3* focuses on the questions *Do Dutch households save adequately for retirement? Which pension components are important, and what are the vulnerable groups?* The chapter argues that it is important to assess the adequacy of pensions based on analyzing microdata which allows us to investigate the heterogeneity and taking into account the pension that people accumulate in the current system. Prior assessments of the adequacy of pension systems calculated replacement rates for a fictitious person who earns a median income during his career and who is assumed to accumulate a pension during a full career (Mercer 2013, OECD 2013c). According to these studies, the Netherlands are ranked high among pension systems that give an adequate income during retirement. However, the question arises whether adequacy is still that high when the adequacy of retirement income is based on microdata and taking into account the pension that people actually accumulate in the current system.

Chapter 3 develops a much needed integral method to assess the adequacy of retirement savings of Dutch households based on actual

accumulation in the current system by taking into account private wealth[1] next to wealth accumulated in public (1st pension pillar) and private pensions (2nd and 3rd pension pillar). Taking into account private wealth is important since different forms of assets may act as substitutes for one another. Solely focussing on public and private pensions may therefore underestimate the income available at retirement as (housing) wealth may be annuitized for consumption purposes during retirement. Analysis of the adequacy of retirement savings is decomposed for different generations and potentially vulnerable groups such as the self-employed.

The analysis identifies the mandatory (occupational) private pensions (2nd pension pillar) as one of the main components of retirement income. These mandatory private pensions are accumulated over the life-cycle according to an earnings related pension formula in the Netherlands. Life-cycles wage profiles are therefore crucial in determining income available at retirement. This line of reasoning also holds for other countries where earnings related pension formulas also (partly) determine the accumulation of wealth in public pensions (1st pension pillar).[2] Wage profiles are a central component in life-cycle models of consumption and savings since income uncertainty is derived from the deterministic component in wages over the life-cycle (Gourinchas and Parker 2002, Scholz et al. 2006) and so for the analysis of the adequacy of income during retirement. Based on a life-cycle model, Scholz et al. (2006) conclude that the extent and magnitude of undersaving is generally small in the US, although younger cohorts tend to be less likely to have saved sufficiently for retirement.

The conclusions of life-cycle models depend on the correct specification of the life-cycle wage-profile. However, life-cycle models do not consider selection effects into work. Wages are likely to be observed non-randomly over the life-cycle, e.g. wages are observed for people who are working. These individuals may earn a different potential wage than the individuals who are not working. Neglecting this non-random selection into work may bias estimated wage-profiles (Casanova 2010, 2013). For the analysis of the adequacy of retirement savings in the Netherlands, this is important

[1] Housing wealth and other private savings such as net savings account, securities, stocks substantial shareholders and business assets.

[2] For example, Norway, France, the UK and the US.

because accumulation in mandatory private pensions is based on these life-cycle earnings. Since only people in paid-employment earn a wage and accumulate mandatory private pensions,[3] a biased estimation of the wage-profile leads to incorrect assumptions regarding the future accumulation in mandatory private pensions.

Chapter 4 proposes a new panel data sample selection estimator correcting for simultaneous decisions in participation and working hours decisions. Whereas prior panel data sample selection estimators only include a selection correction for work versus non-work (Dustmann and Rochina-Barrachina 2007, Kyriazidou 1997, Rochina-Barrachina 1999, Semykina and Wooldridge 2010, 2011, Wooldridge 1995), we add additional information about part-time and full-time work. Adding information regarding part-time versus full-time work decisions provides extra information regarding the individuals' unobserved characteristics that may influence their wages (e.g. tastes, preferences, ability, effort). This is especially relevant when analyzing life-cycle wages as part-time employment is often chosen among women raising children (Booth and Van Ours 2008, Gregory and Connolly 2008). Men, on the other hand, often use part-time employment as partial retirement mechanism (Cahill et al. 2006, Ruhm 2006) with substantial decreases in wages as a consequence (Aaronson and French 2004, Casanova 2013). The proposed new estimator is used to estimate wage-profiles over the complete life-cycle for both men and women and to show the existence of selection effects in life-cycle wage profiles.

Existence of selection over the life-cycle would suggest that earlier estimates of wage profiles, without selection correction[4] or with binary selection correction can be improved. The new estimator can be applied to estimate selection corrected life-cycle wage profiles to assess the savings adequacy for retirement in both life-cycle models (Scholz et al. 2006) and microsimulation models (Borella 2004). The new panel data sample

[3] Although it depends on the pension fund to what extent unemployed and disabled persons can also accumulate private pensions.

[4] A huge strand of literature uses prime-aged men to estimate wage profiles and assume that non-random selection in work is negligible among this group. However, the assumption is arguable and the consequence of this approach is that the results of the wage-profile can not be generalized to women and old-age men.

selection model forms the basis for the Dutch contribution to the *OECD Retirement Savings Adequacy* project (OECD 2014).

Whereas Chapter 4 analyzes selection effects into part-time employment and full-time employment and the consequences for life-cycle wages, *Chapter 5* focuses on the extent to which non-standard employment, such as part-time employment, may postpone early retirement. The research question that is dealt with in Chapter 5 is *Did the rise in non-standard employment, such as self-employment and part-time employment, contribute to the increased labor force participation observed among older workers across Europe?* Early labor market withdrawal has contributed substantially to the decreasing working lives observed in Europe (Brugiavini and Peracchi 2005). Pestieau (2003) argues that the financial sustainability of pension systems is substantially affected by these low participation rates of older workers. Barr (2006) argues that *'The problem [of the financial sustainability of pension systems] is not that people are living longer, but that they retire too early.'* Longer working lives would alleviate some of the pressure of population aging on the sustainability of pension systems (Maestas and Zissimopoulos 2010). Inducing longer working lives can be attained by either increasing the statutory retirement or decreasing early labor market withdrawal (or both). Longer working lives have two effects on the sustainability of pensions: 1) increases the number of years to accumulate pensions[5] and 2) reduces the number of years to pay benefits. In relation to the adequacy of retirement savings as analyzed in Chapter 3, the results of Angelini et al. (2009) suggest that increasing participation rates among older workers may also increase the adequacy of pensions to finance consumption in retirement.

Gruber and Wise (1998) argue that the low participation rates of older workers have been a consequence of large disincentives to work at older ages. Formal early retirement programs as well as social insurance programs, that were often used to smooth transitions from work to retirement in practice, are prominent explanations of the relatively low participation rates among older persons. Since the 1990s, many governments have

[5]Increasing the statutory retirement age by a year does, however, not imply an increase in the effective retirement age of one year because of early retirement possibilities.

started to reform formal and informal early retirement possibilities (Casey et al. 2003). Hence, the participation rates of older workers have been rising for both men and women in many European countries, although the participation rates are still low compared to those of prime age workers.

Simultaneously, rapid increases in non-standard forms of employment, such as part-time employment and self-employment, have been observed since then and especially among people aged 50-64 (Chen et al. 2013). Both forms of non-standard employment provide flexibility in working hours and may therefore be used as gradual retirement mechanisms to bridge the period between full-time employment and full retirement (Bruce et al. 2000, Cahill et al. 2006, Ruhm 2006). Morris and Mallier (2003) show that the high and increasing importance of such non-standard employment opportunities among this age-group in European countries can be related to the countries' patterns in labor force participation at older ages. Chapter 5 captures this idea into a formal retirement model and estimates a reduced form empirical model at the country-level so to analyze the effect of part-time employment rates and self-employment rates on early retirement measured at both the extensive (e.g. participation decision) and intensive margin (e.g. hours decision).

Insight in this relationship between non-standard employment and postponement of retirement is relevant for policy-makers because of two main reasons. Firstly, policy makers can increase the possibilities of non-standard work for older workers to increase the sustainability of the pension system. Secondly, non-standard work may be used to supplement pension income at older ages. Regarding this second reason, the financial well-being of elderly may not only be evaluated by pension wealth (as in Chapter 2 and 3) and private wealth (as in Chapter 3), but also by the ability to postpone retirement and to supplement the income streams from pension wealth and private wealth. Next to private (housing) wealth and informal care by children and grandchildren, the ability to postpone full retirement may contribute to the financial well-being of elderly besides the income streams from public and private pensions.

Thus far, it is argued that the increase in non-standard employment is related to voluntary decisions to decrease working hours prior to retirement. However, the increase in non-standard employment is also likely to

be in anticipation to declining opportunities in both (full-time) employment (Dorn and Sousa-Poza 2010) and early retirement possibilities such as disability- and unemployment insurance (Casey et al. 2003). Reforms in early retirement schemes may have shifted persons towards non-standard employment as early retirement schemes may no longer be available or as generous as prior to the reforms. Chapter 5's analysis takes into account such spill-over effects between early retirement and non-standard employment, but does not try to explain the nature of the increases in non-standard employment.

Chapter 6, on the other hand, does try to shed some light on the reasons of choosing non-standard employment, more specifically self-employment, at older ages by answering the question *Is there evidence for necessity-driven self-employment at the end of working life?* Self-employment is found to be relatively important among the 50+ population, compared to younger age groups (Hurd 1996, Karoly and Zissimopoulos 2004, Zissimopoulos and Karoly 2007). One of the main explanations for the relatively high importance of self-employment among older persons is that older persons, who tend to have stronger preferences for leisure (Kantarci and Van Soest 2008), primarily choose a period of self-employment before full retirement as a gradual retirement route in which they are able to decumulate the number of hours worked.[6] However, the 50+ population also faces difficulties finding a new job once unemployed (Chan and Stevens 2001, Maestas and Li 2006). Chapter 6 sheds a new light on the often assumed gradual retirement function of self-employment by constructing three testable hypotheses related to the labor market dynamics of older workers in order to analyze the importance of necessity-driven self-employment at older ages. The three testable hypotheses all relate to ending or avoiding unemployment at older ages which is often associated with the necessity of self-employment.[7]

[6]This is suggested by Bruce et al. (2000), Fuchs (1982), Giandrea et al. (2008), Gu (2009), Hurd (1996), Morris and Mallier (2003), Zissimopoulos and Karoly (2007).

[7]Such as suggested by Earle and Sakova (2000), Glocker and Steiner (2007), Kellard et al. (2002), Kuhn and Schuetze (2001), Reize (2000), Rissman (2003), Taylor (1999).

Main findings 1.3

This section provides the answers to the questions raised in section 1.2.

Chapter 2 hypothesizes that the relative shifts from public to private pensions in order to relieve the pressure on the public finances from the aging population has led to higher levels of income inequality among the elderly. *A priori* shifts from public to private pensions are expected to have such an effect as private social security plans are generally less redistributive than public social security. Using macroeconomic information on 15 European countries over the period 1995-2007 does not confirm this hypothesis. No evidence is found that shifts from public to private pension provision are associated with higher levels of income inequality and poverty among elderly people. Intriguingly, this is not in line with findings in the literature on pension reform and income inequality (Arza 2008, Fukawa 2006, Hughes and Stewart 2004, Milligan 2008, Oshio and Shimizutani 2005, Weller 2004) and with literature on the redistributive effects of public and private social security in general (Caminada and Goudswaard 2005, Goudswaard and Caminada 2010).

Nevertheless, this chapter is the first to analyze the relationship between public- and private pensions and income inequality using pooled cross-section and time-series data which should provide more information on the true relationship between the public/private pension mix and income inequality than analyses solely based on cross-sectional (Brown and Prus 2004, Fukawa 2006, Weller 2004) or time-series data (Milligan 2008, Myles 2000, Oshio and Shimizutani 2005, Schirle 2009).[8] Chapter 2 discusses a number of tentative explanations that are conceivable for not finding a positive effect of shifts from public to private pension provisions on income inequality among elderly using our analysis.

Chapter 3 is concerned with the adequacy of retirement savings of Dutch households. To investigate the adequacy of retirement savings, this chapter analyzes not only public and occupational private pension rights, but also

[8] In a cross-sectional approach, the effects of pension reform cannot be analyzed over time. Studies taking a time-series approach in one country have difficulties examining whether the findings also hold for other comparable pension reforms in other countries.

annuity insurances, housing wealth and private savings. The adequacy of the total of available pension income at retirement is determined by replacement rates and absolute levels of pension annuities. Taking into account the total of pension annuities and summing over all age- and socioeconomic groups gives a median gross replacement rate of 83% and a median net replacement rate of 101%. Average and median total resources available at retirement are 33,000 and 27,000 euros per year respectively. By only taking into account public- and private pensions, the median gross replacement rates would be 71%.

Regarding the relative importance of each pension component, public and occupational pensions each account for more than 35% of total pension annuities. Private non-housing assets account for 14% and imputed rental income from net housing wealth accounts for about 10%. Assuming that households deplete their housing wealth during retirement would increase the median gross replacement rate by another 5%-points. The relative importance of the pension components differs between generations: younger generations tend to have higher accumulated occupational pensions while the older generations tend to have a relatively larger share of their wealth in private savings and housing.

In the literature, it is often assumed that a 70% gross replacement rate of previous earnings is the norm for an adequate pension (Haveman et al. 2007). Using a replacement rate of 70% of current gross income, 31% of all households face an inadequate income during retirement when taking into account the total of pension annuities. Based on relatively low replacement rates and low absolute levels of pension income available at retirement, the chapter identified several potentially vulnerable groups in terms of retirement savings adequacy such as the self-employed, first-generation immigrants, single women and recipients of social assistance-, unemployment- and disability benefits.

Aforementioned results regarding the adequacy of retirement savings of Dutch households are sensitive to the assumptions made for the future. Deviating from an intermediate scenario, young generations would benefit most from an optimistic future scenario but also suffer more from a pessimistic scenario compared to older generations.

A different approach to assess the adequacy of retirement income is taken by Scholz et al. (2006) who base their analysis on the estimation of a life-cycle model of consumption and savings. Like in all life-cycle models, conclusions regarding consumption and saving depend on the correct specification of the wage-profile as the earnings process is the most important determinant of income over the life-cycle. However, most life-cycle models do not correct for non-randomness in observed wages. As a consequence, corrections for non-random selection into work might are necessary to get unbiased estimates of the life-cycle wage profile (Casanova 2013). Unbiased estimates of life-cycle wages are not only important in life-cycle models (Gourinchas and Parker 2002, Scholz et al. 2006) but also in other models that depend on life-cycle earnings processes such as earnings inequality models (Cappellari 2004) and microsimulation models of future pension accumulation (Borella 2004).

Chapter 4 argues that the proposed new estimator improves estimates of life-cycle wage-profiles compared to models without selection or with binary selection as it allows to take into account more unobserved heterogeneity from working hours decisions. Applying the proposed method to Dutch administrative data showed that conclusions regarding selection into work over the life-cycle are different from applying the method suggested by Rochina-Barrachina (1999). Whereas the binary selection model of Rochina-Barrachina (1999) suggests negative selection into work for both men and women, the proposed ordered selection model finds positive selection among men and less pronounced negative selection among women. Positive selection suggests that persons with more affluent observed and unobserved characteristics work. The difference indicates that it is important to take into account both participation and hours decisions to account for non-randomness in observed wages.

Analyzing selection effects into part-time and full-time employment and decomposing the analysis for educational levels shows that the importance of the selection may differ between part-time and full-time employment and across educational levels, but the direction of the selection effects is generally positive. Persons with beneficial characteristics select themselves in part-time and full-time employment. This applies to both low-

and high-educated persons. The existence of such selection effects should be corrected for in models that depend on estimating wage processes.

Furthermore, the application of the model indicates that career breaks have a substantial negative effect on life-cycle wages with an average effect of 11% (men) and 7% (women) of the first year which increases up to 21% (men) and 17% (women) from the third year. Also, the model finds substantial part-time wage penalties in life-cycle wages of about 30% for women. For men, we do not find such a part-time wage penalty.

Causal effects between the rise in non-standard work and the decline in early retirement across Europe are analyzed in *Chapter 5*. The analysis finds that part-time employment decreases the labor market withdrawal of older men. More specifically, an increase in the part-time employment rate of 1%-point leads to a reduction in early retirement of 1.7% according to our definition of early retirement in the baseline specification. The results suggest that this is mainly because of the possibility to reduce working hours as we find that specifically voluntary part-time employment induces labor force participation at older ages. However, we do not define whether this reduction in working hours is due to phased retirement (e.g. a reduction in working hours in the same job) or bridge-jobs (e.g. a change in a less demaning job often associated with fewer working hours and a lower wage). Part-time employment as retirement mechnism is also found by Cahill et al. (2006), Gustman and Steinmeier (1984), Kim and DeVaney (2005), Quinn and Kozy (1996), Ruhm (1990, 2006).

Among women, the role of part-time employment in early retirement is somewhat more ambiguous. Effects of part-time employment on early retirement are smaller if significant at all. This finding is in line with the gender differences in gradual retirement found by Peracchi and Welch (1994) and the fact that part-time employment serves a different role over the life-cycle among women (Booth and Van Ours 2008, Gregory and Connolly 2008).

The results at the intensive margin follow a similar pattern as the results at the extensive margin: part-time employment significantly increases the average hours worked of persons aged 55-64 but only for men. Hours effects of part-time employment are not found for women. According to

these results, labor force participation of older men can be increased by creating opportunities for gradual retirement. One such opportunity may be part-time pensions, although it does not increase the labor supply of the elderly per se (Wadensjo 2006). The analysis does not suggest that variation in self-employment has a statistically significant effect on early retirement despite the fact the self-employment is often regarded as a gradual retirement mechanism (Bruce et al. 2000, Fuchs 1982, Giandrea et al. 2008, Gu 2009, Hurd 1996, Morris and Mallier 2003, Zissimopoulos and Karoly 2007).

Chapter 6 rejects the often assumed hypothesis of self-employment being a gradual retirement mechanism by testing whether there is evidence for necessity-driven self-employment prior to retirement. For this purpose Chapter 6 analyzes three testable necessity-hypotheses: 1) whether transitions from unemployment to self-employment are relatively important and increase with age, 2) whether high unemployment rates push workers from paid-employment to self-employment, and 3) whether the introduction of job search requirements for unemployed older workers increases self-employment.

Regarding the first necessity-hypothesis, unemployed and inactive individuals have a higher probability to enter self-employment at the end of working life than those in paid-employment. The probability of moving from paid-employment to self-employment is relatively low and does not increase with age (as would be the case when self-employment would be chosen out of opportunity to reduce working hours at the end of working life). Testing the second necessity-hypothesis suggests that the unemployment rate has a positive effect on transitions from paid-employment to self-employment among men, which suggests that men in paid-employment become self-employed at older ages in order to avoid a period of unemployment. For women, on the other hand, we find a negative effect of the unemployment rate on transitions from paid-employment to self-employment. The third necessity-hypothesis suggests that the introduction of job search requirements at the end of working life have stimulated people to exit unemployment and discouraged people to enter unemployment. This reform, however, did not increase necessity or

opportunity driven self-employment. Individuals that are confronted with search requirements are partly able to find a job, but there are also large substitution effects between unemployment and inactivity (mostly early retirement) which suggests that these options are still more attractive than using self-employment as (voluntary) retirement mechanism.

Based on the three testable hypotheses, the findings in Chapter 6 suggest that at the end of working life individuals with a relatively weak labor market position are more likely to switch to self-employment. The results do not suggest that self-employment is used as a gradual retirement route in the Netherlands despite the many evidence found for the US (Bruce et al. 2000, Fuchs 1982, Giandrea et al. 2008, Gu 2009, Hurd 1996, Zissimopoulos and Karoly 2007). It is likely that these different findings can be explained by the fact that part-time employment is generally more likely in Europe than in the US (OECD 2014). As a consequence, bridge jobs are much less important in European countries (Brunello and Langella 2012) which may explain the higher incidence of transitioning to self-employment at older ages in the US.

Together with Chapter 6, Chapter 5 suggests that part-time (paid) employment possibilities may especially be used as gradual retirement route (for men) in the Netherlands. As long as such part-time work at older ages induces labor supply (as suggested by Chapter 5) part-time employment possibilities may complement the income streams available at old age, thereby increasing the adequacy of resources available in retirement (as analyzed in Chapter 3) as well as the resilience of financial well-being to reforms in the pension system (as mentioned in Chapter 2). However, Chapter 4 indicates that individuals with more affluent characteristics self-select themselves into part-time employment. This means that individuals with less affluent characteristics, who are likely to be more vulnerable to a low income during retirement, have fewer opportunities and/or do not choose to exploit the advantages of part-time employment.