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Causes and consequences

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SOCIAL INEQUALITIES IN LATER WORKING LIFE AND RETIREMENT

CAUSES AND CONSEQUENCES

**BY
JEEVITHA YOGACHANDIRAN QVIST**

DISSERTATION SUBMITTED 2020



AALBORG UNIVERSITY
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Jeevitha Yogachandiran Qvist



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CV

Jeevitha Yogachandiran Qvist studied sociology (BA and MA) at Aalborg University, where she graduated in 2014. Before starting as a PhD Fellow at the Department of Politics and Society at Aalborg University in 2016, she has been employed at the Danish Ministry of Immigration and Integration and the National Social Appeals Board in Copenhagen.

At the Department of Politics and Society, she has been a member of the research group Centre for Comparative Welfare Studies (CCWS) that focuses on welfare research and comparative social policy and the Centre for Labor Market Research (CARMA), a research centre on labor market policies and evaluations. Her research interests include social stratification, retirement, ageing, immigration, and quantitative analysis with the use of administrative register data.

ENGLISH SUMMARY

In this thesis, I investigate why people from lower social classes retire earlier and experience more health problems in their post-retirement period than people from higher social classes. Utilizing longitudinal register and survey data from Denmark, this question is addressed in four self-contained research papers.

Research paper 1 (The working class and early retirement in Denmark: individual push factors) examines the extent to which so-called push factors, i.e. poor health, previous unemployment, partner's poor health, overly physical work demands and, low decision latitude, explain why people belonging to the working class retire earlier than professionals. The results suggest that, among men, these push factors can explain up to 86 per cent of the difference in retirement timing between members of the working class and professionals. Among women, the corresponding figure is up to 55 per cent. The most important push factor is having overly physical work demands, which alone explains between 23 and 31 per cent of the difference in retirement timing between members of the working class and professionals.

Research paper 2 (Labour market disadvantage or poor health upon arrival? An examination of the native-immigrant gap in early retirement on a disability pension) examines why non-Western immigrants have a higher risk of early retirement on a disability pension than natives. To this aim, the study investigates the extent to which the native-immigrant gap in disability pension uptake is explained by non-Western immigrants' disadvantaged position in the labour market, when health differences between non-Western immigrants and natives that predated the non-Western immigrants' entrance into the labour market are controlled for. The results suggest that between 19 and 25 per cent of the native-immigrant gap in disability pension uptake is explained by non-Western immigrants' health upon arrival, whereas the vast majority of the gap is explained by non-Western immigrants' disadvantaged position on the Danish labour market, measured as social class and unemployment history.

Research paper 3 (Educational inequalities in health after work exit: the role of work characteristics) examines the extent to which different work characteristics, i.e. physical demands, psychosocial demands, variation, and autonomy, explain why lower-educated individuals experience more health problems after work exit compared to higher-educated individuals. To maximize the generalizability of the findings, this study is conducted among older workers in four other Northern European countries besides Denmark. These countries include the Netherlands, Germany, Finland, and the United Kingdom. The results suggest that lower-educated individuals have a higher risk of physical demands, little variation in job tasks and low autonomy, and a lower risk of psychosocial demands, such as working at a high pace. These included work characteristics partially explain the association between education and health

after work exit in all five countries. However, the sizes of these indirect effects vary across the included countries and type of work characteristics.

Research paper 4 (Early retirement: a health-giving choice for all? Evidence from Denmark) examines the effect of early retirement on post-retirement health among men and women, and whether this effect varies by social class. When taking into account that individuals with poor health already select themselves into early retirement and possible other unobservable characteristics that can affect the association between early retirement and health, the results suggest that the effect of early retirement on post-retirement health, measured by visits to general practitioners (GP), hospitalization, and mortality, is small, if anything. Only among men, the findings suggest that there is a positive short-term effect of early retirement on post-retirement health, as early retirement reduces the number of visits to GP. This effect is particularly driven by skilled manual workers.

This summary report synthesizes the research questions of the four self-contained research papers and provides a more thorough presentation of the theoretical and methodological approaches that guide my work in the research papers. Based on the empirical evidence from this thesis, I conclude that social inequalities in terms of social class/education, gender, and ethnicity play a pivotal role in understanding retirement patterns. Empirically, I show that these stratification bases affect individuals' life chances during working life through a number of push factors, which lead to both early retirement and poor health after retirement.

DANSK RESUME

I denne afhandling undersøger jeg, hvorfor personer der tilhører lavere sociale klasser trækker sig tidligere tilbage fra arbejdsmarkedet og har et dårligere helbred i livet efter tilbagetrækning, sammenlignet med personer der tilhører højere sociale klasser. Dette spørgsmål adresseres ved hjælp af danske register- og survey data i fire selvstændige forskningsartikler.

Forskningsartikel 1 (Arbejderklassen og tidlig tilbagetrækning fra arbejdsmarkedet: push faktorer på individniveau) undersøger, i hvor høj grad at såkaldte push faktorer, dvs. dårligt helbred, arbejdsløshedshistorik, partners dårlige helbred, alt for fysisk krævende arbejde og lav grad af medbestemmelse på jobbet, kan forklare hvorfor personer i arbejderklassen trækker sig tidligere tilbage fra arbejdsmarkedet, sammenlignet med personer der tilhører serviceklassen. Blandt mændene viser resultaterne, at push faktorerne kan forklare op til 86 procent af forskellene i tilbagetrækningstidspunktet mellem personer der tilhører henholdsvis arbejderklassen og serviceklassen. Blandt kvinderne er den samme procentdel på 55 procent. Den vigtigste push faktor af betydning er det at have et alt for fysisk krævende arbejde, som alene forklarer mellem 23 og 31 procent af forskellen i tilbagetrækningstidspunktet mellem personer der tilhører henholdsvis arbejderklassen og serviceklassen.

Forskningsartikel 2 (Ringe arbejdsmarkedstilknytning eller dårligt helbred ved ankomst? En undersøgelse af forskelle i tildeling af førtidspension blandt ikke-vestlige indvandrere og personer med dansk oprindelse) undersøger, hvorfor ikke-vestlige indvandrere har højere risiko for at komme på førtidspension end personer med dansk oprindelse. Til dette formål undersøger artiklen, i hvor høj grad at ringe arbejdsmarkedstilknytning kan forklare dette gab, når man samtidig tager højde for ikke-vestlige indvandreres helbredsstatus umiddelbart efter deres ankomst, og dermed inden at de træder ind på det danske arbejdsmarked. Resultaterne viser, at mellem 19 og 25 procent af gabet af forskellene i tildeling af førtidspension blandt ikke-vestlige indvandrere og personer med dansk oprindelse kan tilskrives ikke-vestlige indvandreres helbred umiddelbart efter ankomst. Resten af gabet kan stort set forklares med ikke-vestlige indvandreres ringe arbejdsmarkedstilknytning målt som social klasse position og arbejdsløshedshistorik.

Forskningsartikel 3 (Uddannelsesforskelle i helbred efter stop af arbejde: betydningen af arbejdsforhold) undersøger, i hvor høj grad at forskelle i arbejdsforhold, dvs. fysisk krævende arbejde, psykosociale arbejdsforhold, variation i arbejdsopgaver og medbestemmelse i jobbet, kan forklare hvorfor seniorer med kortere eller ingen uddannelse har et dårligere helbred efter stop af arbejde sammenlignet med seniorer med højere uddannelse. Foruden data fra Danmark inkluderer dette studie data fra fire øvrige nordeuropæiske lande, Holland, Tyskland, Finland og England med det formål at

maksimere generaliserbarheden af resultaterne. Analysen viser, at seniorer med kortere eller ingen uddannelse har større risiko for at have haft fysisk krævende arbejde, lidt variation og lav grad af medbestemmelse på deres arbejde samt mindre risiko for at have haft en række psykosociale arbejdsforhold såsom høj arbejdsintensitet. I alle de inkluderede lande, kan disse arbejdsforhold delvist forklare, hvorfor seniorer med kortere eller ingen uddannelse har et dårligere helbred efter stop af arbejde sammenlignet med seniorer med højere uddannelse. Betydning af de enkelte arbejdsforhold for sammenhængen mellem uddannelse og helbred efter stop af arbejde varierer dog på tværs af landene.

Forskningsartikel 4 (Efterløn: et helbreds forbedrende valg for alle?) undersøger, hvilken effekt efterløn har på mænd og kvinders efterfølgende helbred, og om denne effekt varierer på tværs af social klasse. Når man tager højde for, dels at dem der i forvejen har et dårligt helbred oftest vælger at gøre brug af efterlønnen, dels andre uobserverbare karakteristika der kan påvirke sammenhængen mellem efterløn og helbred, viser resultaterne, at efterløn kun har en lille – hvis nogen – effekt på ens efterfølgende helbred målt som antal lægebesøg, indlæggelser samt dødelighed. Kun blandt mænd, viser resultaterne, at der kan være en kortvarig positiv effekt af at forlade arbejdsmarkedet ved alderen 60 år, da efterløn for denne gruppe reducerer antallet af lægebesøg. Denne reduktion af antal lægebesøg gør sig særligt gældende for mænd, der tilhører den manuelle faglærte arbejderklasse.

Denne sammenfattende rapport syntetiserer de enkelte forskningsspørgsmål og præsenterer en mere detaljeret gennemgang af de teoretiske og metodiske rammer, der er anvendt i de enkelte forskningsartikler. Baseret på de empiriske fund fra denne afhandling konkluderer jeg, at social ulighed i forhold til social klasse/uddannelse, køn og etnicitet spiller en afgørende rolle for senere livsforhold. Igennem det empiriske arbejde viser jeg, at sociale forskelle medfører, at nogle grupper bliver mere eksponeret for en række negative forhold igennem deres arbejdsliv end andre grupper, hvilket leder til både tidligere tilbagetrækning fra arbejdsmarkedet og et dårligere helbred efter tilbagetrækning fra arbejdsmarkedet.

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RESEARCH PAPERS AND THEIR PUBLICATION STATUS

This thesis comprises four self-contained research papers together with this summary report. The four research papers are listed below.

- Research paper 1 Qvist, J. Y. (2020a). The working class and early retirement in Denmark: individual push factors. *Ageing & Society*. <https://doi.org/10.1017/S0144686X20000203>
- Research paper 2 Qvist, J. Y. and Qvist, H.-P. (n.d.). Labour market disadvantage or poor health upon arrival? An examination of the native-immigrant gap in early retirement on a disability pension. Revised and resubmitted to *Acta Sociologica*.
- Research paper 3 de Breij, S., Qvist, J. Y., Holman, D., Mäcken, J., Seitsamo, J., Huisman, M. and Deeg, D. J. H. (2019). Educational inequalities in health after work exit: the role of work characteristics. *BMC Public Health*, **19**, 1515.
- Research paper 4 Qvist, J. Y. (n.d.). Early retirement: a health-giving choice for all? Evidence from Denmark. Unpublished manuscript.

Other relevant publications:

de Breij, S., Mäcken, J., Qvist, J. Y., Holman, D., Hess, M., Huisman, M. and Deeg, D. J. H. (2020). Educational differences in the influence of health on early work exit among older workers. *Occupational and Environmental Medicine*, **77**, 568-575.

Qvist, J. Y. (2020b). Social klasse og tidlig tilbagetrækning fra arbejdsmarkedet: Et livsforløbsperspektiv [Social class and early retirement: a life course perspective] *Tidsskrift for Arbejdsliv*, **22**, 31-45 (In Danish).

Qvist, J.Y. and Jensen, P. H. (2020). Beskæftigelses- og arbejdsløhedsmønstre blandt seniorer [Patterns of employment and unemployment among seniors] In Jensen, P. H. (Ed.), *SeniorArbejdsliv*. Copenhagen: Frydenlund, pp. 39-59 (In Danish).

TABLE OF CONTENTS

Chapter 1. Introduction	15
1.1. Research question	16
1.2. Institutional context: Denmark.....	19
Chapter 2. Theoretical background	23
2.1. (Early) retirement as a social scientific concept.....	23
2.2. Approaches to retirement: between agency and structure.....	24
2.3. The life course perspective: agency within structure	26
2.4. Social inequalities in health: theoretical explanations	29
2.5. Conceptions of social class	30
2.6. The role of gender and ethnicity	35
2.7. Analytical framework: hypotheses.....	37
Chapter 3. Methodology	39
3.1. Register and survey data	40
3.1.1. Measuring retirement and health.....	42
3.2. Statistical methods	43
3.2.1. Event history analysis	43
3.2.2. Mediation analysis	45
3.2.3. Quasi-experimental analysis	46
Chapter 4. Research papers	49
4.1. Key findings.....	49
Chapter 5. Conclusion and discussion	55
5.1. Theoretical and methodological implications of main findings.....	55
5.2. Policy implications of main findings	58
5.3. Questions and recommendations for future research	60
Litterature list	63
Appendix	77

CHAPTER 1. INTRODUCTION

Retirement from work is often romanticized. It is a story about pursuing new leisure activities, socializing with family and friends, and travelling the globe. However, only for some is the decision to retire a joyful one that marks the beginning of a third age characterized by having more time for family, friends, and leisure pursuits. For others, it is forced upon them early because they are laid off in the final years of their working lives and fail to find new work, or because they have been worn out by harsh working conditions and continue to face health problems in their post-retirement period.

A large literature suggests that the risk of early retirement and poor health in the third age is unequally socially distributed. Two empirical regularities have persistently been documented across time and national contexts. Firstly, people from lower social classes are more likely to retire early than people from higher social classes (Uhlig, 1952; Hayward *et al.*, 1989; Brown *et al.*, 1996; Blekesaune and Solem, 2005; Blossfeld, Buchholz and Hofäcker, 2006; Siegrist *et al.*, 2007; Blossfeld, Buchholz and Kurz, 2011; Radl, 2013; Visser *et al.*, 2016; Leinonen *et al.*, 2020). Secondly, people from lower social classes suffer from a faster deterioration in health in their later life and post-retirement period than people from higher social classes (Chandola *et al.*, 2007; Hyde and Rees Jones, 2007; Majer *et al.*, 2010; Hoebel *et al.*, 2017; Nazroo, 2017).

While the existence of these empirical regularities is well documented in the literature, less is known about the social mechanisms that bring these social class differences about and how they vary across other subpopulations, such as gender and ethnicity. The need for research that contributes to this agenda has not least been accentuated by demographic trends and the political responses to these trends. For decades, European populations have been ageing because of declining fertility rates and increasing life expectancies. This process has accelerated and the populations in Europe are now some of the oldest in the world (Muenz, 2007; Walker and Maltby, 2012). The fact that men and women live longer, on average, than ever before is, of course, one of the greatest accomplishments of humankind. However, because smaller proportions of the populations in Europe are of working age, and because a larger proportion is retired, this development also brings about economic and social challenges for welfare states (Hofäcker and Unt, 2013).

Historically, public pension systems are at the heart of the welfare state. Public pension systems were among the first institutions in the development of the welfare states, at a time when the elderly were extensively perceived as the ‘deserving poor’ (Walker and Maltby, 2012). Additionally, today’s public pension system remains by far the most cost-intensive social expenditure in Europe (Eurostat, 2020). However, in response to the demographic challenges and as a result of growing concern among policymakers in Europe about welfare states’ economic sustainability, new ageing policies have been put into law under the label ‘active ageing’. These policies, among

other things, aim to cut back early retirement options, strengthen lifelong learning programmes and extend the statutory retirement age.

In recent years, there has been widespread consensus across the political spectrum in Denmark about the reforms that have tied the statutory pension age to the average rise in life expectancies of men and women. However, these political initiatives for the time being follow the mantra of ‘one size fits all’, and they have failed to take into account that a rise in the average life expectancy does not necessarily imply that all workers are able to extend their working life (Mosquera *et al.*, 2018), and particularly that the average life expectancy not only varies between men and women but also between people of different social classes (Brønnum-Hansen and Baadsgaard, 2012; Brønnum-Hansen, 2017; Mosquera *et al.*, 2018). Thus, politicians are now faced with the problem that the abovementioned reforms can be expected to cause an increase in social inequality, because workers from the lower social class, who typically are more worn out by harsh working conditions, will have difficulty responding to the economic incentives to extend their working life. Moreover, the increased economic incentives to extend working lives could, at least indirectly, cause an increase in health inequality in old age, because people from the lower social classes might attempt to extend their working lives a couple of years even though they are already worn out.

1.1. RESEARCH QUESTION

The dilemma between economic necessity and social considerations is real and not easily resolved. Nevertheless, to possibly alleviate the negative social consequences of extending working lives, it is imperative that we know more about why people from the lower social classes retire earlier and are more exposed to post-retirement health problems than people from the higher social classes. This is where my thesis steps in. Throughout the thesis, I aim to address the following overarching research question:

What explains why people from lower social classes retire earlier and experience more health problems in their post-retirement period than people from higher social classes?

The overarching research question incorporates two distinct but consecutive dimensions of social inequalities in later life. The first dimension is inequality in the transition into early retirement; the second dimension is inequality in health after retirement, i.e. post-retirement health. In examining these two dimensions, I have a particular focus on the constraints through which these social inequalities are likely to be produced. Following the retirement literature, these constraints may originate from the so-called push factors. Push factors are factors that have a negative impact on individuals’ ability to work, such as poor health and adverse working conditions, and which might have long-term consequences in the third age (Wang and Shultz, 2010). These

push factors can be expected to be unequally distributed across subpopulations and disproportionately affect individuals in lower social classes, in which also women and immigrants are overrepresented. Additionally, push factors are vital barriers to extend working lives and to enjoy a post-retirement period free of constraints. Thus, this thesis sheds light on push factors as possible explanations for the persistent inequalities in early retirement and post-retirement health. The overarching research question is examined in four self-contained research papers that each have their own sub-research question.

The first research paper examines the relative impact of the push factors on explaining differences in retirement timing between members of the working class and the service class. These push factors are identified in the literature as poor health, unemployment history, partner's poor health, and adverse working conditions. The research question of this paper is:

- 1) *To what extent do differences in poor health, unemployment history, partner's poor health, and adverse working conditions explain why men and women belonging to the working class retire earlier than members of higher social classes?*

Next, I turn my focus to the native-immigrant gap in early retirement. Non-Western immigrants in Denmark have a higher risk of early retirement on a disability pension than natives. Previous research has linked the native-immigrant gap in early retirement to non-Western immigrants' disadvantaged position in the labour market. However, a shortcoming in previous literature is that the impact of health upon arrival, i.e. health conditions that are likely to be related to events that took place prior to or during the migration process and therefore likely to be present before non-Western immigrants enter the labour market, have not been controlled for. Thus, the aim of the second research paper is to disentangle the role of push factors that constitute potential health differences upon arrival and later disadvantaged labour market positions in the host country in explaining the native-immigrant gap in early retirement on a disability pension:

- 2) *To what extent do health differences upon arrival and disadvantaged labour market positions, respectively, explain why non-Western immigrant men and women retire earlier on a disability pension than the native population?*

After addressing these two research questions concerning the mechanisms leading to social inequality in early retirement, I move on to examine the health inequalities in life after the transition into retirement. Previous literature has distinguished between different theoretical mechanisms that explain social inequalities in health. Among these theoretical mechanisms are neo-material and psychosocial explanations that stress the importance of harsh physical and psychosocial working conditions that have a negative impact on health. The third research paper focuses on the role of these

adverse working conditions and investigates this push factor in depth by disentangling the role of different working conditions on health inequalities after retirement. To gain more knowledge of this issue, my third research question addresses:

- 3) *To what extent do the working conditions from the previous job explain health inequalities after retirement?*

Finally, the last research paper studies the impact of early retirement on health inequalities in old age. Given that health inequalities after retirement are partially explained by adverse working conditions, early retirement may slow down the rate at which the health of members of the working class deteriorates more compared to the higher service class, because retirement implies that members of the working class are no longer exposed to adverse working conditions. The fourth research question addresses:

- 4) *What is the impact of early retirement on post-retirement health among men and women and does the impact of early retirement on post-retirement health vary by social class?*

By answering these four sub-research questions, I make two key contributions to the existing literature on social inequality in retirement. Firstly, I identify causes and consequences of retirement among different subpopulations. Generally, the majority of studies conducted so far have used variables like social class or other similar stratification measurements as covariates/control variables, but results have not been systematically compared across different groups, including gender and ethnicity. Secondly, previous research has interpreted differences in retirement patterns between subpopulations with reference to different mechanisms, but the explanatory power of these mechanisms has to a lesser extent been grounded in empirical work. Consequently, there is a lack of systematic scientific evidence linking how and to what extent different mechanisms impact social inequalities in early retirement and post-retirement health. As Breen and Rottman (1995a, p. 461) have underlined: *“Even where class differences in outcomes are very stark – as in health – it is not obvious why they arise. And one consequence of our inability to tease out these linking mechanisms is that policy to address class inequalities is likely to be a very blunt instrument”*. Hence, such a decomposition of the mechanisms explaining social inequalities in early retirement and post-retirement health is warranted, as it serves to determine the importance of individual explanatory components regarding early retirement and post-retirement health.

Thus far, section 1.1 has outlined the overarching research question and how the sub-research questions of the four research papers are interrelated. However, as the four research papers are self-contained with their own research question and focus, the key terms such as (early) retirement and the stratification measurement(s) are likely to have different definitions and measurements depending on the research aim and the

availability of the data at hand. These definitions and measurements are outlined thoroughly in each of the research papers. Table 1 gives an overall view of how the key terms are defined and measured in each research paper.

Table 1. Overview of key definitions in the research papers

Paper number and topic	(Early) retirement	Social inequality measurements	Outcome
1. Causes of social class inequality in early retirement	All early retirement pathways: disability pension, social welfare benefits, early retirement scheme	Occupational class (EGP) based on ISCO-88 and gender	Early retirement (see definition of early retirement)
2. Causes of ethnic inequality in early retirement	Disability pension	Immigrant status, occupational class (EGP) based on ISCO-88, and gender	Disability pension
3. Causes of health inequalities after retirement	Work exit: regular retirement, early retirement scheme, disability pension, social security	Educational levels based on ISCED 2011	Self-rated health after work exit
4. Consequences of early retirement on health	The early retirement scheme	Occupational class (EGP) based on ISCO-88 and gender	Visits to general practitioner, hospitalization and mortality

Note: ISCO-88: International Standard Classification of Occupations (1988); ISCED 2011: International Standard Classification of Education (2011).

1.2. INSTITUTIONEL CONTEXT: DENMARK

Except for one study that uses a coordinated analysis approach between Denmark and four other Northern European countries (research paper 3), the present thesis takes its point of departure solely in a Danish context. Although the thesis does not focus explicitly on meso- or macro-level factors in retirement, the institutional arrangements within a national context have a fundamental impact in shaping individuals retirement behaviour and later life (Schils, 2008; Hofäcker and Unt, 2013). Thus, the pension system and social security policies are likely to facilitate how individuals are able to respond to opportunities and risks in the labour market (Schils, 2008).

In welfare regime theory, Denmark is traditionally conceptualized as a social-democratic welfare regime, characterized by universalist, egalitarian and institutional social policies, where de commodification is relatively high and access to healthcare is equal for all residents. Welfare regime theory emphasizes that a country's pension system mirrors its legacy regarding social protection policies (Esping-Andersen, 1990). This has traditionally also applied to Denmark, which has been characterized by generous pensions and early retirement benefits (Jensen, 2004).

The Danish pension system is a multi-pillar system comprising three different pillars. First, a flat-rate state pension (old-age pension) is provided to all individuals who have had 40 years of residence in Denmark, independent of other pension entitlements and previous income. Thus, this pillar serves as the backbone of the system, ensuring a decent standard of living for older people that have reached the statutory pension age. The yearly basic amount in 2020 corresponds to 77,028 DKK (10,350 euros). Together with this amount, pension supplements and other means-tested benefits such as housing and heating supplements are available to assure the most disadvantaged pensioners of a reasonable standard of living. The second pillar consists of primarily occupational pensions, constructed as a defined contribution scheme. Wage-earners contribute with one-third and employers with two-thirds of the total contributions, amounting to 12 per cent of wages for manual workers, 15 per cent for medium educated (e.g. schoolteachers), and 18 per cent for highly educated segments of the population. The occupational pension scheme has been built up gradually since the 1960s and as of the early 1990s, covers almost all workers in the Danish labour market. Still, as manual workers were not included in the scheme until the early 1990s, the occupational pension system has not yet fully matured. When the system is fully matured, it will ease the pension pressure on the welfare state, given that income from the occupational pension scheme is deducted from the means-tested pension benefits in the first pillar (Andersen, 2006). Finally, the last pillar consists of private pension savings and other savings, such as pension savings from banks and insurance companies, which give the individual a voluntary opportunity to ensure a higher pension than those provided from the first and second pillars (Andersen, 2015).

In Denmark, the statutory pension age is rising from 65 years to 67 years for both men and women in the period between 2019 and 2022. If individuals in Denmark want to withdraw from the labour market before the statutory pension age, there are currently different pathways:

- *The early retirement scheme:* This scheme allows older individuals to retire at the age of 60 if they have been born before 1954. The age limit for the uptake of the early retirement scheme has increased and in 2020, the age limit is 63 years, where the statutory pension age is 66. Eligibility is conditional on membership of an unemployment insurance fund and that the person in question has paid contributions to the scheme for at least 30 years. Take-up rates have fallen rather dramatically since 2002, and so has the participation

rate in the scheme, i.e. the share of individuals who pay contribution to the scheme. Between 2000 and 2016, the membership rate of the early retirement scheme fell from 60 to 20 per cent among all 30-to-59-years-olds in the population and from 80 to 25 per cent among all 30-to-59-years-old that are members of an unemployment insurance fund (Ministry of Social Affairs and the Interior, 2019).

- *Disability pension*: Besides the early retirement scheme, it is possible to retire early via a disability pension, which is granted by the municipality of residence based on a health assessment. From 2013, the disability pension is only available from the age of 40 and up to the statutory pension age (Andersen and Jensen, 2016).
- *Private or occupational pension savings*: Individuals can also retire early, from three years before the statutory pension age, through private or occupational pension savings.
- *Senior pension*: As of January 2020, a new retirement scheme, the so-called senior pension, has been established; it gives older workers the possibility to retire a maximum of six years before the statutory pension age. To be eligible, the individual in question must have worked at least 27 hours a week for 20-25 years. The scheme is granted by the municipality of residence based on a health assessment. The working capacity of the individual must be reduced to the extent that the individual is not capable of working more than 15 hours per week (The Danish Agency for Labour Market and Recruitment, 2020).
- *Social security benefits (e.g. unemployment benefits, sickness benefits)*: Although social security benefits such as unemployment benefits are not a formal pathway to retirement, these benefits can also serve as a pathway out of the labour market.

The Danish pension system has been praised as one of the most economically sustainable and robust systems in the world because of its unique combination of state pensions and occupational pensions. Additionally, from an inequality perspective, minimum protection is relatively high (Andersen, 2006).

Nevertheless, Denmark is likely to have the most far-reaching retirement policies in Europe in the future. As a result of two major reforms of the Danish welfare and pension system, the Welfare Agreement from 2006 and the Retirement Reform from 2011, that tie the statutory pension age and the age limit for opting for the early retirement scheme to the average life expectancy of a 60-year-old, Denmark will, if the policies are fully phased in, be the country in the EU with the highest statutory pension age. Moreover, forecasts suggest that women in Denmark will have the shortest post-retirement life expectancy, 16.3 years, in any EU country (The Danish Ministry of Finance, 2019). Additionally, although wages and contributions are similar in different occupations, replacement rates differ because the Danish labour market is highly gendered. As women live longer than men and have a lower income, on average, the

replacement rate will be lower in female-dominated occupations compared to male-dominated occupations (Jensen, 2020). Thus, despite its sustainability, there is a gender trap in the Danish pension system, as the contribution requirements lead to systematic gender inequality. Put together, the Danish context provides an interesting setting to study social inequalities in early retirement and post-retirement health, because these future far-reaching retirement policies may substantially change the social safety net within the social-democratic welfare regime of Denmark and indirectly increase health inequalities among men and women. Additionally, the choice of Denmark can be characterized as a critical case (Flyvbjerg, 2006) to study social inequalities in later working life and retirement. The Danish welfare state has been characterized by generous retirement options and equal access to healthcare compared to other welfare regimes. Thus, the social inequalities in early retirement and post-retirement health and the extent to which push factors (constraints) explain these inequalities in the Danish case are theoretically likely to apply in other national contexts with lower de commodification and higher inequalities in access to healthcare. Hence, although the results provided are related to a Danish context, the examined research questions do not apply specifically to the Danish case and the mechanisms investigated are applicable to other countries. As such, the empirical studies can be replicated in other national settings and across different welfare regimes. In fact, research paper 3 does this. By incorporating a coordinated analysis framework, my co-authors and I replicate one analysis in five different Northern European countries with the aim of maximizing the generalizability between different settings (Hofer and Piccinin, 2009).

CHAPTER 2. THEORETICAL BACKGROUND

The following chapter sets out the theoretical background of this thesis. The chapter will begin with a clarification of the term ‘retirement’, followed by a description of the different theoretical approaches to understand retirement. From an economics-oriented perspective, retirement is commonly theorized as being the product of a rational decision-making process, whereas gerontologists and sociologists conceptualize retirement as less a matter of individual choice but more a result of constraints that are externally structured. These theoretical approaches propose different models for what determines retirement and the possible consequences of retirement. However, later academic work has advocated a theoretical framework that takes the life course into account since the analytical distinction between retirement as a rational decision-making process or as structurally constrained by itself is insufficient to explain social inequalities in the causes and consequences of retirement (Phillipson, 2004; Wang, Henkens and van Solinge, 2011; Radl, 2014). In line with this strand of research, I argue that social inequalities in retirement and post-retirement health are most fruitfully understood from a life course perspective, which I will elaborate on in the next section. After this, I will explore the different mechanisms that explain health inequalities and which are likely to affect health inequalities in later age. Subsequently, I will outline the concept of social class, together with the role of gender and ethnicity. Finally, based on the theoretical outline, I will render the analytical framework and hypotheses presented in the four research papers.

2.1. (EARLY) RETIREMENT AS A SOCIAL SCIENTIFIC CONCEPT

How one defines retirement depends on the context within which it is used, as the term is ambiguous with multiple denotations. Most often, retirement has been referred to as a complete withdrawal from the labour market with the uptake of an old-age pension (a one-time event). However, in reality, retirement transitions are far more sequential and can stretch over several years, as withdrawal from the labour market does not necessarily correspond with the uptake of an old-age pension. To avoid conceptual confusion between these two events, the term ‘work exit’ is used in the literature to indicate the event of withdrawing from work (Kohli and Rein, 1991). Beehr (1986) distinguishes between three dimensions of retirement that are related to the timing (i.e. age of work exit or retirement), completeness (i.e. complete vs. partial retirement), and voluntariness (i.e. the degree of choice). As such, retirement is a multifaceted event, for which reason social inequality in retirement cannot only be captured by the age of retirement (Radl, 2014). Rather there are several ways in which a

work exit can take place, which is likely to vary depending on social class. Kohli and Rein (1991) developed the term ‘pathways’ of exit to describe the diverse ways in which one can bridge the period from work exit to the statutory pension age, which is typically linked to the uptake of the old-age pension. A pathway is an institutional arrangement such as an early retirement scheme, occupational pension, unemployment benefits, or disability pension. Pathways can consist of one type of institutional arrangement or a sequence of different institutional arrangements. Access to specific pathways is related to the individual’s entitlement as well as freedom of choice and therefore the differentiation between pathways is related to social stratification (Kohli and Rein, 1991). Whereas entitlement consists of objective criteria for being granted different benefit schemes, freedom of choice refers to the capacity of the worker to make an independent choice about retirement. This capacity depends upon the constraints such as job loss or poor health that inhibits individuals’ retirement choice (Schils, 2008; Riekhoff, 2018). An alternative way to conceptualize this heterogeneity of retirement is to distinguish between voluntary and involuntary retirement, although the question of voluntariness should rather be seen as a continuum than as a sharp division (Beehr, 1986). Despite the various ways to conceptualize the heterogeneity of a work exit or retirement, there is no reason to assume that different pathways are equivalent in their causes and consequences.

Thus, in this thesis, I choose to distinguish between or select specific pathways to retirement and formulate most of my hypotheses in relation to pathways. In my research papers I mainly use the term ‘early retirement’, because the pathways I include in the studies, as a rule, is permanent. One exception is research paper 3 that combines different transitions such as unemployment, early retirement and regular retirement into one single event. In this particular study, these transitions are not necessarily permanent or entered before the statutory pension age, and therefore I use the term work exit in this study. However, as these events take place in later age in the study, I mainly interpret the work exit as retirement.

2.2. APPROACHES TO RETIREMENT: BETWEEN AGENCY AND STRUCTURE

The theoretical approach that has gained most prominence in the retirement literature and in public debate about retirement and pensions is consistent with rational decision-making theories. This approach emphasizes retirement as a motivated choice behaviour in which retirement is a cost-benefit decision, where financial incentives and the attractiveness of retirement are compared to continuing work. The retirement decision is based on the individual’s available information about the work sphere and the leisure sphere. These spheres are evaluated against each other, and only when the financial or non-financial resources available after retirement outmatch the potential consequences of a work exit will the individual chooses to retire (Wang and Shultz,

2010). From this point of view, early retirement can be explained by the so-called pull factors, which refer to the attractiveness and economic incentives as well as the signal value of pension and early retirement schemes (Jensen, 2005, 2011). This is the case, for example, if the individual chooses to retire earlier than first planned based on the economic incentives that are built into an early retirement scheme. Additionally, the signal value of an early retirement scheme, such as the age of eligibility, contributes to create societal values and norms of when the 'normal' retirement age is (Jensen, 2005). Empirically, there is strong evidence of the effect of pension and early retirement systems on individuals' retirement behaviour, as generous early retirement benefits also result in earlier retirement among individuals (Gruber and Wise, 1999; Schils, 2008). Another theoretical mechanism that links rational decision-making to retirement behaviour is role theory. Role theory also incorporates factors such as family status and work experience in the retirement decision. These factors act as guiding principles on how individuals identify themselves and their roles in society. If the decision on retirement matches their future self-image as a retired individual, the individual will choose to retire (George, 1993; Feldman, 1994; Wang and Shultz, 2010). From this point of view, early retirement can be explained by the so-called jump factors that refer to the desire to realize other individual potentials than paid work (Jensen, 2005). Retirement is guided by inner motivations of enriched life quality, and therefore financial considerations in the retirement decision will be a secondary matter. Jump explanations present two types of rewards for retirement: the first type concerns new life experiences that attempt to shape the desired life project of the individual, such as travel or education; the second type concerns social rewards through engaging more with family, friends, etc. (Jensen, 2005, 2011).

The conceptualization of retirement as a rational choice has been challenged by scholars, who point to structural factors that limit the room for agency in the decision-making process. In particular, scholars who criticize the rational choice approach argue that it overemphasizes the room for choice since retirement is often forced upon individuals involuntarily (Phillipson, 2002; Vickerstaff and Cox, 2005; van Solinge and Henkens, 2007; Jensen, 2011; Erik Solem *et al.*, 2016). This may be the case, for example, if the individual is physically or mentally worn down and has no other choice but to leave the labour market. In that event, an informed decision-making approach seems of little use (Wang & Shultz, 2010). Instead, scholars who take a more structural approach emphasize the role of push factors or constraints that prevent the individual from meeting the demands at work, such as poor health and poor job quality, that induce early retirement. A basic premise in this school of thought is that people generally want to work if they are able. This implies that early retirement must be induced by push factors that force the individual to retire involuntarily (Jensen, 2005).

There is little doubt that the most important push factor for early retirement is poor health (Edge, Cooper and Coffey, 2017). The influence of poor health on retirement can be explained by continuity theory (Atchley, 1971). A basic premise in continuity theory is that individuals seek to maintain continuity in their life course. Adverse

health conditions represent a discontinuity because the individual is robbed of the opportunity to continue working, and therefore poor health may also critically affect adjustment to retirement. Additionally, role theorists emphasize that the transition into retirement can lead to a negative retirement adjustment if the role transition is involuntary and thereby does not match or fulfill the worker's own preferences. Other push factors also include a partner's poor health status, which increases the risk of early retirement. Furthermore, poor job quality, or, more precisely, the match between a worker and the working characteristics can also be push factors (Fisher, Chaffee and Sonnega, 2016). A substantial amount of research has shown how work enhances self-efficacy when the work is complex and challenging, whereas a low degree of autonomy and little variation in the tasks increases workers' dissatisfaction with work (Gecas, 2003). Other push factors include unemployment or age discrimination, where layoffs or firing are targeted older workers (Jensen, 2005, 2011).

It is evident that theoretical perspectives on early retirement tap into debates in the social sciences about the role of structure and agency that are as old as social science itself. In this light, it is not surprising that the literature on retirement has not converged towards a single dominant perspective. In fact, most of the retirement literature recognizes that both structure and agency play a significant role in shaping retirement (Radl, 2014). Yet the opportunity for agency within social structures arguably differs between social groups. Whereas people in the higher social classes have a real choice to make about whether to trade income for leisure, which may be influenced by what are referred to as pull factors, these factors appear less likely to influence the retirement decision in the lower social classes, who often have little choice but to retire when their bodies have been worn out or they have been laid off. This argument should not, of course, be stretched too far. I do not argue that people from the lower social classes have no room for agency at all. What I argue is that from a pragmatic empirical standpoint, push factors are arguably of so much greater relevance in explaining retirement among the lower social classes than either pull or jump factors. This standpoint explains why I pay attention to the role of push factors rather than pull or jump factors throughout the thesis. Further, I argue, that these push factors have their roots in the working life and that the transition into retirement and health status in post-retirement life is rooted in earlier trajectories throughout the life course. In bringing this about, I will use the life course perspective, which stresses the importance of incorporating contextual factors and pre-retirement characteristics to explain variation in retirement timing and post-retirement health.

2.3. THE LIFE COURSE PERSPECTIVE: AGENCY WITHIN STRUCTURE

The fundamental characteristic of the life course perspective is that processes and outcomes are shaped by earlier social trajectories that people follow over the life course

(Elder, 1994). The principal approach to agency within a life course perspective is that “*individuals construct their own life course through the choices and actions they take within the opportunities and constraints of history and social circumstance*” (Elder, Johnson and Crosnoe, 2003, p. 11). Thus, individuals are not passively acted upon by structural constraints, but they make choices based on their historical and social circumstances. These choices, in turn, have vital consequences for future events.

Life course theorists within a European context have further emphasized how institutional arrangements create age-based life courses (Kohli, 2007; Mayer, 2009). This is termed an ‘institutionalized’ life course, that generates “*the rules by which individuals unfold and conduct their lives*” (Kohli, 2007, p. 256), thereby creating a social order of the individual life course. In this view, the life course is structured around the organization of work and employment, where three distinct and age-based life phases can be separated into periods of 1) preparation for work/education, 2) work and 3) retirement. Although these phases generally occur in different age periods and institutional contexts, they are highly interwoven, as the preparation phase determines the amount and type of work, which in turn structures the retirement pattern (Henretta, 2003). However, critics of this tripartition of the life course have argued that this view neglects central dimensions of the life course other than work, such as family, which also defines how individuals’ lives unfold across the life course through linked lives (Heinz, 2007). Additionally, even before the phase of preparation for work, individuals are already born into a stratified society along dimensions that include, but are not limited to, gender, ethnicity, and social class, which in turn determine the other pathways (Lynch and Brown, 2011). As such, the life course perspective represents a rather complex and multifaceted individual ageing process that operates at both an individual and an institutional level.

To conceptualize how unequal ageing processes develop between individuals, the concept of the cumulative advantage/disadvantage (CAD) theory has emerged. CAD theory refers to the process in which differences in individuals’ structural positions result in widening systematic divergence over the life course (O’Rand and Henretta, 1999; Dannefer, 2003; DiPrete and Eirich, 2006). This theoretical approach has clear similarities to the statement “*From unequal beginnings emerge even more unequal endings*” (Lynch and Brown, 2011, p. 109), known as the Matthew effect. The core assumption is that socioeconomically advantaged groups will accumulate resources throughout the life course, which results in growing social opportunities by mid- and late life. As the socioeconomically advantaged groups benefit more and more from their resources, their lower counterparts become more disadvantaged, leading to a greater gap between socioeconomic groups in later parts of the life course (O’Rand and Henretta, 1999; Dannefer, 2003). The CAD theory is also applicable in relation to how social class differences in retirement patterns evolve over the life course. Even though social class differences may already exist in the early stages of a working life, the working life may not have mentally or physically begun to tell on individuals. However, as time passes, the working life leads to differences in exposure to material,

cultural and psychosocial risk factors for poor health and other push factors that lead to early retirement (Qvist, 2020b). Previous literature has shown that workers undertaking manual work are often confronted with physical and mental disabilities caused by harsh working conditions and irregular and inflexible working hours (Hansen and Ingebrigtsen, 2008). Moreover, unskilled manual workers are more likely to have experienced longer and cyclical spells of unemployment throughout their working life. There is strong evidence that such working lives have scarring effects, as they are related to negative labour market constraints in later life (Gangl, 2006; Pettinicchi and Börsch-Supan, 2019). As this gap between low and high social classes becomes greater throughout the life course, this is likely to entail an increase (for members of higher social classes) and decrease (for members of lower social classes) in resources aimed at postponing early and involuntary retirement. Correspondingly, these constraints are likely to continue after retirement, leading to increasing social class differences in health (Leinonen *et al.*, 2020).

In terms of the institutionalized life course perspective, however, the degree of accumulation of social inequalities across the life course is likely to depend on institutional arrangements. For example, in a comparative study, Gangl (2006) shows that a combination of flexible labour market regulations and generous unemployment benefits, which is one of the features of Scandinavian labour market policies, helps to cushion the long-term consequences of a job loss. As such, the institutional arrangements within a country are likely to impact both the short- and long-term accumulation of social inequalities. As regards early retirement policies, these can likewise be expected to cushion a harsh working life, thereby weakening or levelling off the accumulation. The theory of levelling off the accumulation is referred to as the age-as-leveller theory and has emerged as a contrast to the CAD theory that posits an increase in inequality throughout later life. The age-as-leveller theory presumes that social class differences will decrease in later life relative to middle adulthood due to the biological process of ageing and social or institutional programmes aiming to redistribute income and offset market forces (Lynch and Brown, 2011). Thus, the age-as-leveller theory raises the question of whether early retirement may narrow the gap in health differences between members of lower and high social classes, as this event entails that earlier constraints related to being employed or within the labour market are no longer present.

In this thesis, the life course perspective is utilised as the underlying conceptual framework for all four research papers. I theorise that social class differences in early retirement and post-retirement are situated within earlier experiences in the life course, as a result of cumulative advantage/disadvantage. Furthermore, I theorise, as implied by the age-as-leveler theory, that health inequalities may likely diminish as a result of retirement. Section 2.7 in this chapter further describes these hypotheses.

2.4. SOCIAL INEQUALITIES IN HEALTH: THEORETICAL EXPLANATIONS

Whereas the first part of this thesis focuses on the transition into retirement, the second part of the thesis focuses on social inequalities in post-retirement health. For centuries, epidemiological research has repeatedly observed social class and educational gradients in health (Glymour, Avendano and Kawachi, 2014). As stated by Link and Phelan (1995), social class is likely to be a fundamental cause of health, because social conditions, regardless of time, history and setting, puts people in disadvantaged positions at risk of adverse health conditions, since they do not have access to the power, money and social status that is required to prevent these adverse health conditions.

A considerable part of the epidemiological research has pointed out the mechanisms that link social class to health. Starting with the work from the Black Report (Department of Health and Social Security, 1980) the literature has distinguished among different types of mechanism that explain the social class gradient in health, which in later academic work has been challenged and modified (Bartley, 2004). The literature generally distinguishes between neo-material explanations, behavioural-cultural explanations, and psychosocial explanations. This thesis does not go into depth and empirically test each type of explanation. Nevertheless, this section briefly describes the different theoretical explanations of health inequalities to underline that a variety of mechanisms are likely to impact health inequalities, thereby emphasizing that other explanations than the ones I explicitly include in the thesis are relevant for understanding health inequalities more comprehensively.

Neo-material explanations of health inequalities emphasize the role of material conditions that are outside the control of individuals and refer to how individuals in lower social classes are at a higher risk of poor health because of low material resources and poor working conditions (Blane *et al.*, 1997). Low material resources not only include income but also infrastructure facilities such as education, occupation, health services, housing quality, and transportation (Lynch *et al.*, 2000). Poor working conditions refer to hazardous and arduous occupations. Workers with manual occupations are more exposed to physically demanding work and dangerous working environments including conditions such as noise or chemicals, which have adverse consequences for their physical health (Bartley, 2004; da Costa and Vieira, 2010)

Next, the link between social class and health can be attributed to the behavioural-cultural explanation, which refers to differences in norms, values, and beliefs among people with different socioeconomic statuses. This explanation states that people in lower social classes share a culture that stimulates unhealthy behaviours, such as smoking, unhealthy eating habits, and low levels of physical activity. The underlying assumption behind this explanation has usually not been clearly spelt out in the literature, particularly because the relative impact of 'behaviour' and 'culture' within this explanation is not crystal clear from the existing research (Bartley, 2004). Generally,

this explanation stresses that behaviours are assigned to specific cultural norms which vary depending on social class (Sisson, 2007). This is often explained with the use of Bourdieu's concept of habitus, which states that individuals during childhood acquire a system of long-lasting and transportable dispositions that influence their behaviour during the life course (Bourdieu, 1990).

Thirdly, the social class gradient in health is explained with reference to psychosocial risk factors. The psychosocial explanation is related to the psychological effects of living in stressful conditions and with low social status (Bartley, 2004). This explanation pays particular attention to the negative consequences of lack of sense of control, absence of social support from family and friends, unsatisfactory family-work life balance, and psychosocial work hazards. Psychosocial work hazards include conditions such as job strain, which arises with the combination of high job demands and low job control (Karasek, 1979). Other types of psychosocial work hazards include an imbalance between effort and reward, where the effort put into the job must be repaid in the form of rewards such as increased wages, promotion, or recognition from employers (Siegrist, 1996). These psychosocial risk factors must be avoided to achieve a healthy work environment for the individual (Bartley, 2004).

The different theoretical explanations are not mutually exclusive, as they can operate simultaneously and at different stages in the life course. From the outline presented here, it is clear that social inequalities in health can be attributable to a wide range of risk factors. In this thesis, I focus on the role of adverse working conditions to explain health inequalities after retirement, because these conditions, as opposed to other risk factors not related to the working life, may harm the health of workers more, if they are to spend an extended part of their lives at work.

2.5. CONCEPTIONS OF SOCIAL CLASS

In this thesis, I use the term 'social class' to conceptualize the social stratification that occurs in society. At the most general level, the concept of social class conveys the social fact that resources, constraints, and opportunities are unequally distributed within a structure of social power. A structure of social power mirrors individuals' possession of resources that enable them to pursue certain sorts of action. Members of the same social class share common positions in terms of resources, constraints, and opportunities to exert social power. Additionally, individuals may or may not be aware of their own class position, but fundamentally they share similar living conditions (Breen and Rottman, 1995b).

The concept of social class has been used as long as sociology has been considered a discipline, but consensus has never been reached on the criteria for mapping a class structure and its measurement. The two most prominent types of class theory - and the

initial conceptualization in which the majority of class theories have their roots - are those of the classical social theorists Karl Marx and Max Weber. At their core, both Marx and Weber emphasize the unequal distribution of economic conditions and allocate individuals into social classes based on employment conditions and relationships. However, following the Weberian tradition, classes are defined on the basis of common market positions and work situations, which in turn produce inequality in life chances, whereas in Marx's class theory, the essential logic of class relations is manifested in social relations of production and exploitation within the production system. Additionally, Weber holds a multidimensional view of social stratification, where status groups and parties also form social stratification in society (Breen and Rottman, 1995b; Scott, 2002; Bartley, 2004).

Contemporary class theorists have accommodated and expanded Marx's and Weber's understanding of social classes in response to changes in the global and capitalist economy. Most notable is the neo-Marxist class classification developed by Erik Olin Wright (1997, 2005) and the neo-Weberian class classification, the Erikson-Goldthorpe-Portocarero (EGP schema), developed by John H. Goldthorpe and colleagues (1992). According to Wright, classes are formed by relations to exploitation-generating assets, which are assets that allow certain occupations to control the work by others. Wright extends Marx's concept of exploitation by not only focusing on exploitation within ownership by production but also focusing on exploitation within the ownership of organizational assets and skills, which are defined by conditions such as educational level, being involved in policy decisions in the organization and having authority to distribute jobs tasks and sanctions. Another class formation is found in the EGP scheme, where the key distinction is not exploitation but between ownership and different types of employment relationships within the labor market. In this thesis, I draw on the class formation that conceptualizes the EGP scheme. The distinction between different types of employment relationships appears more useful and rewarding to apply for the purpose of this thesis, which I will elaborate on later in this section. Additionally, the differences between Wright's schema and the EGP schema are not only conceptually, but they also result in a different allocation of individuals into social classes. Particularly, the working class, or the proletariat, constitute one large part of Wright's schema - up to 50 per cent of the population. In the EGP schema, further distinctions are made within the working class. Additionally, the EGP schema has been found to be a more powerful predictor of different outcome measures than Wright's schema (Breen and Rottman, 1995b), and the validity of the EGP schema has been tested and approved in several studies (Evans, 1992; Evans and Mills, 1998; Mills and Evans, 2000).

In the EGP class scheme, the first guiding principle is the class division between the employers, the employed, and the self-employed. The second guiding principle is within the employed, where classes are differentiated between occupational positions

that are regulated by a labour contract relationship or by a service contract relationship. Labour contract relationships are characterized by short-term relationships between employer and employee and specific exchanges of wages for effort, and the worker is closely supervised and monitored by the employer. In contrast, the nature of a service contract relationship is characterized by a longer and more developmental contract and additional exchanges being of more diffuse character, such as salary increments and career opportunities (Erikson and Goldthorpe, 1992). Because occupations in service contracts, unlike occupations in the manufacturing sector, are characterized by diffuse duties that require discretion for efficient performance, employment relations in the service sector involve a great deal of trust from the employers, whereas occupations with labour contracts are much more closely monitored (Goldthorpe and McKnight, 2006). Employees with service contract relationships constitute the service class, where the upper service class has a higher level of authority and autonomy compared to the lower service class. Employees with an employment relationship that resembles the labour contract constitute the working class. Based on the skill level, the working class is differentiated between skilled manual workers and unskilled manual workers. Situated between the service class and the working class, routine, non-manual workers have job positions that do not typically require specialized skills but are more difficult to monitor. Many elements from the service contract relationship are present in their employment relationship; however, career opportunities are less present. Moreover, the self-employed, small employers, and farmers are distinguished as a separate class because they do not have an employment relationship with an employer (Scott, 2002).

Table 2, taken partly from Bartley (2004) and Halpin (1999), gives an overview of the EGP schema in a full (eleven) and five-class version and provides examples of occupations within the classes. According to Erikson and Goldthorpe (1992), the exact number of classes are not the most important question in class analysis, as long as the stratification is based on the same criteria. Thus, the number of classes should rather depend on the analytical purpose. In this thesis, I primarily use the five-class version, as the main aim is to compare members of the working class (skilled and unskilled manual workers) to members of the service class. Additionally, I create a further category of the unemployed.

Table 2. The EGP class scheme

Eleven-class version	Five-class version proposed by Halpin (1999)	Examples of occupations
1) Higher level professionals, administrators and officials; proprietors and managers in large firms.	1) The service class: professional and managerial employees	Architects, engineering, corporate managers
2) Lower level professionals, administrators and officials; higher level technicians, managers of small firms; non-manual supervisors		Secondary and primary teaching professionals, office managers, priests, journalists
3a) Higher level routine non-manual workers 3b) Lower level routine non-manual and service workers	2) Routine non-manual workers	Office clerks, custom office clerks
4a) Small proprietors and self-employed with employees 4b) Small employers and self-employed with employees 4c) Farmers and self-employed with workers in primary production	3) Self-employed and small employers, and farmers	-
5) Lower level technicians and manual supervisors 6) Skilled manual workers	4) Supervisory and skilled manual employees	Chemical processing operators, machinery mechanics
7a) Semi-skilled and unskilled manual workers 7b) Agricultural and primary production workers	5) Semi-skilled and unskilled manual employees, industrial and agricultural	Waiters, garbage collectors, porters, textile machine operators

In this thesis, the EGP scheme is particularly well suited to capture the challenges that post-industrial labour markets bring about for the weakest and least qualified

individuals that may result in early retirement. Given the analytical focus on the constraints that may hinder people from members of the working class from prolonging their working life, it is assumed that the quality of employment relationships, which is the organizing principle among employees in the EGP scheme, is crucial to understand these labour market constraints. Employees with labour contract relationships sell their labour to employers during periods of need as long as they are able, and can readily be laid off during bad times or replaced by other workers, such as younger workers with assumed higher levels of productivity. Moreover, because the job tasks of members of the working class are manual and thereby involve physical strain and other health-damaging work environments such as exposure to chemicals or monotonous work, it may be difficult for these workers if they have health problems to stay in work.

Several frequent criticisms have been raised against the EGP class schema and ‘big classes’, referring to overarching class divisions. One type of criticism is inspired by post-modern theory, claiming that social class is an outmoded or even ‘dead’ concept that does not capture and explain social division in a post-modern society (Clark and Lipset, 1991; Kingston, 2000). According to this view, social class and economy do not capture the social divisions in post-modern society, because other social differentiations related to differences in lifestyle consumption and other stratification bases such as gender and ethnicity have more impact. Accordingly, the hierarchical class stratification based on economy is weakened and individuals no longer use the term ‘class’ to identify their social position. Another type of criticism is that the degree of within-class heterogeneity is too large. Most prominent is the critique from Grusky and colleagues (2004, 2005) that underlines how the ‘big class’ approach ignores the different institutionalized occupational boundaries that exist within each class. To support their critique, they demonstrate how variability in life chances can be captured by utilizing more comprehensive occupational divisions, so-called micro-classes. Micro-classes are job categories that share the same forces of educational experience, self-selection into occupations, and occupation-specific culture and practice. Thus, as opposed to the big-class approach which they term ‘nominal’ classes, the micro-class approach facilitates the examination of differences between ‘real’ occupations.

Although a micro-class framework could contribute to a comprehensive view of opportunities and risks in early retirement and post-retirement health, this framework also entails that the purpose of class analysis itself would be lost. The validity of social class should not depend on whether there are ‘real’ classes or whether social class is a part of individuals’ self-identity. Instead, the validity of class analysis should depend on its ability to distinguish between different positions of social power that are linked to specific individual outcomes. Consequently, as is the case with the EGP schema, classes should be defined by their relationship to one another and not as a definitive number of classes. Additionally, in relation to this thesis, the micro-class approach calls for a rather static view on occupations throughout the life course. Many working class members are more likely to hold different occupations throughout their life

course, as their job career is more volatile. Hence, their class position is likely to be better captured with an aggregated working class. Additionally, unskilled manual workers do not have shared educational experiences within their occupations, which according to the micro-class perspective is one of the institutional features that characterize the micro-classes. Moreover, decomposing micro-class differences rather than social class differences in early retirement and post-retirement health would expand the complexity of the class analysis, thereby losing the bigger picture. Consequently, micro-classes can arguably be viewed as a detailed supplementary stratification tool and not as a classification scheme to be replaced with the categorization of big classes.

In research paper 3, in which the dependent variable early retirement is replaced with self-rated health, my co-authors and I use the highest educational level to divide the analysis population into individuals with low, intermediate, and high education. The choice of using educational groups and not occupational classes as the EGP class schema, as used in the other research papers, is primarily a pragmatic choice. For the particular study in research paper 3, education is a stratification measure that is available across the five included datasets, thereby allowing the opportunity to conduct the study within a coordinated analysis framework. Within epidemiology, education is likely to be the most used and judicious social stratification measure (Winkleby *et al.*, 1992). An advantage of using educational groups, particularly when investigating health in old age, is that the risk of reverse causality is reduced, as educational attainment for most people is an early life outcome. Although, evidence also exists on a reverse causality for the relationship between education and health (Glymour, Avendano and Kawachi, 2014). Another advantage is that educational attainment, compared to occupational class, is available for all individuals. Hence, unemployed individuals that typically are a challenge for class analysis are not excluded from the analysis or separated from other classes.

2.6. THE ROLE OF GENDER AND ETHNICITY

Besides social class, I include gender and ethnicity as social stratification categories in this thesis. Below I will outline how I understand and analyse these stratification categories in relation to social class. A key issue in the stratification literature is how social class is disentangled from other stratification variables such as gender and ethnicity. According to the ‘primacy of class’ explanation, gender and ethnic stratification can merely be explained by social class differences. However, this view has been criticized by scholars who point to the limitations of social class as a sole measure of inequality (Savage *et al.*, 2013). Additionally, scholars have argued for a framework that combines life course theory with intersecting axes of inequalities to understand social inequalities in later life more comprehensively (Holman and Walker, 2020).

Regarding gender, feminist critics argue that social class formation is engaged with a parallel process of gender differentiation. This is because class schemas are themselves gendered, as women and men are segregated into specific occupations. Additionally, feminist critics argue that social class categories typically exclude unpaid domestic labour, thereby excluding a large fraction of women's production from analyses of social class (Crompton, 2003). In Denmark, the share of men and women in employment is relatively high and has been increasing since 2000. In 2018, the employment rate for men was 76.5 per cent and 72.6 per cent for women (StatBank, 2020). Nevertheless, women in Denmark, as is the case for other European countries, retire earlier than men (Radl, 2013). Descriptive statistics from the Danish Longitudinal Survey of Ageing 2017 show that 44 per cent of women have retired before the age of 62; for men, the figure is 26 per cent. Additionally, at the age of 67, 28 per cent of men were still employed, and 10 per cent of women (Larsen and Amilon, 2019). These gender differences are not novel in the retirement literature, but the extent to which these differences are likely to be entrenched in occupational classes remains unresolved. So far, previous literature has found diverging impacts on retirement of women's and men's social class positions. Radl (2013) found that class differences in retirement timing were largely the same for women and men, and thus supported the primacy of class thesis. Other scholars have found that social class effects on early retirement are more pronounced for women than for men (Dahl, Nilsen and Vaage, 2003; Riekhoff and Järnefelt, 2017).

In this thesis, I run the class analyses separately for men and women, where possible, thereby stressing that gender cannot be separated from social class. This approach is followed because the Danish labour market is both vertically and horizontally gender-segregated, which is likely to affect the causes for and consequences of retirement differently for men and women within the same class. Vertical segregation refers to women being situated lower on the occupational ladder than men. This vertical segregation has declined in the past 20 years, partly because more women have entered the educational system. Horizontal segregation refers to the fact that women and men remain differentiated in terms of sector and industry. Men are more likely employed in the private sector, whereas women are employed in the public sector. Additionally, a greater share of women is concentrated in industries such as public administration, education, and health, whereas men are more positioned across different industries. However, men still dominate some industries, such as the trade and transport industry. Horizontal gender segregation, in contrast to vertical gender segregation, has not been significantly reduced in the last 20 years (Larsen, Holt and Larsen, 2016). These gender specificities in the labour market are likely also to have different impacts on retirement patterns among women and men of different social classes.

With regard to ethnic minorities and retirement, state-of-the-art research is limited. Ethnicity is here defined based on country of origin. More and more immigrants in Europe are approaching retirement age and more immigrants have already retired. The fact that older immigrants most often have not earned their right to institutional early

retirement schemes, this group of older people may be a particularly vulnerable group that face more poverty and adverse health consequences in their third age. Up to now, a great body of labour market research on immigrants has shown that the majority of immigrants suffer from labour market disadvantages (Schultz-Nielsen, 2017; Statistics Denmark, 2018). Additionally, research shows that, compared to native-born populations, immigrants can face additional challenges due to the long-term implications of moving to another country, such as poor health and discrimination (Dinesen *et al.*, 2011; Spallek, Zeeb and Razum, 2011). This suggests that ethnicity should be differentiated parallel to other axes of inequality such as social class.

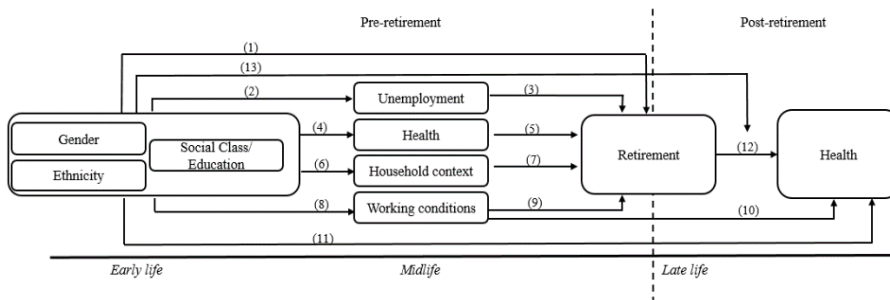
In this thesis, the ethnicity perspective on retirement is investigated in relation to non-Western immigrants' higher risk of disability pension uptake. The impact of possible migrant-specific labour market constraints on older immigrants' retirement patterns has not been addressed in previous research. Instead, previous research has linked the native-immigrant gap in early retirement to non-Western immigrants' disadvantaged position in the labour market, thereby indirectly referring to the primacy of class hypothesis as the main explanation for this gap. However, as argued in research paper 2, it is likely that migrant-specific factors such as health upon arrival can explain some of the native-immigrant gap in disability pensions. Therefore, the approach of this study is to disentangle non-Western immigrants' disadvantaged labour market position from their health upon arrival to explain the native-immigrant gap in disability pension uptake.

2.7. ANALYTICAL FRAMEWORK: HYPOTHESES

Based on the theoretical framework, I outline a number of hypotheses that guide my empirical work in the research papers. Figure 1 illustrates the analytical framework of these hypotheses and depicts how the sub-research questions of the four self-contained research papers are related.

As shown in Figure 1, the underlying assumption throughout the thesis is that the transition into retirement and post-retirement health is an outcome of cumulative advantages and disadvantages that originate from earlier circumstances and experiences in peoples' working lives. Social class, gender, and ethnicity constitute the bases through which individuals are located within a social position. These social positions are expected to impact individuals' life chances in the employment system, where workers in higher social classes and with more education gain higher rewards, while workers with fewer resources experience diminished status in their later life. The mechanisms through which these inequalities are generated in early retirement and post-retirement health are expected to be mediated by indirect effects via the push factors that individuals are exposed to throughout their working life.

Figure 1. Analytical framework of the thesis



In research paper 1, social class differences in early retirement among men and women are expected to be mediated by indirect effects through unemployment history (arrow 2–3), health (arrow 4–5), household context (partner’s health) (arrow 6–7), and working conditions (arrow 8–9). The remaining direct effect of social class on early retirement after these push factors is taken into account (arrow 1) is attributable to other factors. In research paper 2, the native-immigrant gap in early retirement on a disability pension is expected to be mediated by health upon arrival (arrow 4–5) and disadvantaged position in the labour market (arrow 2–3). The remaining difference in disability pension uptake between natives and immigrants after including the mediator variables (arrow 1) is attributable to other factors. Research papers 3 and 4 focus on post-retirement health. In research paper 3, educational differences in post-retirement health are expected to be mediated by working conditions (arrows 8 and 10). The remaining difference in post-retirement health between the educational groups after working conditions are controlled for (arrow 11) is attributable to other factors. Finally, research paper 4 focuses on the impact of the early retirement scheme on post-retirement health (arrow 12). As posited by the age-as-leveller theory, social inequalities in health diminish over time because of institutional programmes such as retirement. The reason for this is that the event of retirement entails that exposure to adverse working conditions is no longer a risk factor. However, I hypothesize in the research paper that positive health effects of early retirement on post-retirement health depend on social class (arrow 13), such that members of the working class have greater health benefits than members of higher social classes

CHAPTER 3. METHODOLOGY

This thesis puts theoretical emphasis on the life course perspective in which individuals' opportunities for shaping their later working life and retirement vary depending on their social class position. Empirically, the aim is to decompose possible mechanisms at the individual level that explain social inequalities in early retirement and post-retirement health. By adopting this theoretical and empirical framework, this thesis follows the notion of methodological individualism and analytical sociology (Elster, 1982; Hedström and Swedberg, 1996; Hedström and Bearman, 2009). The guiding principle of methodological individualism is that social phenomena of any kind can only be explained with reference to individuals and their actions. In that sense, it is useful to distinguish between a strong and a weak version of methodological individualism, the weak version being advocated in this thesis. The strong version of methodological individualism only accepts 'rock bottom' explanations, where aggregate social phenomena such as norms or social institutions are excluded from explanations of individual actions. In the weak version, such social phenomena are accepted as part of the explanations of individual actions (Hedström and Swedberg, 1996). Analytical sociology retains this understanding of weak methodological individualism and incorporates the social structures in which individuals are embedded; in some parts of the literature, this is referred to as structural individualism (Hedström and Bearman, 2009; Demeulenaere, 2011). From this methodological individualistic perspective, social class is viewed as an aggregate of individuals that share a common level of resources, constraints, and opportunities. Therefore, social class is not in itself an agent but exists because the actions of individuals within these occupational positions cause similar outcomes. This is in contrast with for example traditional Marxist approach that views social class as an entity that has the potential for collective action if it becomes self-conscious or a class "for itself". Methodological individualism and analytical sociology stand in opposition to social theories that explain structural outcomes with direct reference to other structural causes, thereby paying very limited attention to the explicit role of human agency. To establish this theoretical micro-foundation, analytical sociology advocates a mechanism approach to social theory, where the identification of social mechanisms is vital in terms of "*making intelligible the regularities being observed by specifying in detail how they were brought about*" (Hedström and Bearman, 2009, p. 5). Thus, researchers should follow an analytical strategy that aims to show how established statistical associations are generated.

In conducting this type of analytical and theory-driven social science, it is important to set up a methodological framework that matches the hypotheses with the statistical techniques and the availability of data at hand. In this chapter, I will discuss the data and methodological approaches used in the research papers. I start by presenting the register and survey data, and I describe how the data are combined in the research papers and how my key variables, retirement and health, are measured. Next, I will

give a brief introduction to the statistical methods that I use throughout the thesis and outline how these techniques match the hypotheses that I test in the research papers.

3.1. REGISTER AND SURVEY DATA

Retirement is a process that takes place over time, and therefore it is of the utmost importance to study this process longitudinally. As early as 1986 it was noted that to study retirement “*longitudinal designs must be employed so that events of some duration can be assessed. Only then can the retirement decision and events or states caused by retirement be understood fully*” (Beehr, 1986, p. 31). However, as noted in a literature review 30 years after, most studies so far have been cross-sectional, although there has been an increase in the number of longitudinal studies (Fisher, Chaffee and Sonnega, 2016). While cross-sectional studies have provided the field with valuable knowledge, they fail to capture the dynamic processes of the causes leading to and the consequences of retirement. The studies included in this thesis strive to go beyond this, as they all utilize rich and large-scale longitudinal data based on either register data or register data merged with survey data, which are well suited to analysing the causes and consequences of life course transitions such as retirement.

Research paper 1 and research paper 3 merge survey data with register data, while research paper 2 and research paper 4 solely utilize register data. Danish administrative register data provide a valuable and comprehensive source for conducting research in social science. Every individual residing in Denmark is required to hold a personal identification number, which is a unique ten-digit number that is used to register and identify every individual for administrative purposes. The administrative registers contain information about births, deaths, households, immigrations, emigrations, and social conditions, covering (but not limited to) education, income, labour market status, and health (Thygesen *et al.*, 2011). With the personal identification number, it is possible to link different administrative registers together at the individual level in order to obtain an extensive and multidimensional dataset that contains information over time (Schmidt, Pedersen and Sørensen, 2014). Additionally, it is possible to link individuals to other members of the household, such as spouse/cohabiting partner, siblings, children, and to survey data.

There are several strengths of using register data in this thesis. Firstly, it gives the opportunity to study the timing of the transition into retirement rather than the planned retirement age or snapshots of retired individuals. Additionally, the mechanisms studied are included as time-varying factors in research paper 1 and 2, which implies that changes in health, employment status, etc. are taken into account in the statistical models, and thus the transition into early retirement is estimated more precisely. Secondly, the data are recorded regularly with a complete long-term follow-up, and attrition is only possible in terms of emigration or death. Thus, it is possible to follow individuals from the time before retirement until very old age and, for some, mortality,

which is of particular importance when studying health consequences in life after retirement, as people's health status naturally changes over time, and more rapidly in the third age. As opposed to retrospective data register data are not subject to recall bias, as they are recorded simultaneously with time. Recall bias refers to the potential impreciseness of responses to questions related to prior events in life, in particular unfavourable events such as previous unemployment spells (Jacobs, 2002). Thirdly, an advantage of using register data is the possibility of covering the whole population of interest, which is a particular advantage when the aim is to study minority groups, as is the case in research paper 2. In this research paper, my co-author and I have a particular focus on retirement patterns among immigrants compared to natives. Immigrants and their descendants constitute around 14 per cent of the population in Denmark, which implies that in a random sample this group will constitute approximately the same share of the sample (Hedegaard, 2017). Thus, it requires a big sample or oversampling to have sufficient data to examine retirement patterns among immigrants. Additionally, immigrant groups may be harder to reach in a survey because of their lower socioeconomic position (Font and Méndez, 2013). Large sample sizes also enable the use of more advanced analytical approaches such as the quasi-experimental design conducted in research paper 4, which takes advantage of the exogenous variation created in policy legislation within large samples (Connelly *et al.*, 2016). Finally, register data provide more precision than self-reported measures, which are typically more vulnerable to non-response and measurement errors (Møberg, 2017). For example, research has shown that the validity of self-reported disability pension is lower compared to using register data on disability pension grants (Svedberg *et al.*, 2010). Together these advantages offer more solid ground for taking selection bias and endogeneity problems into account and ultimately studying causal effects.

However, the use of register data is not unproblematic. The most salient issue concerning the use of register data is that the data are not collected for research purposes, which can entail problems in terms of data operationalization. The administrative nature of the data thus requires that the individual has been in contact with the public system - for example, that the individual has been in contact with health professionals in order to appear on the health register. In addition, register data do not contain attitudinal measures, such as opinions or values (Connelly *et al.*, 2016; Møberg, 2017).

To overcome some of these issues, two of the research papers merge register and survey data. The thesis uses survey data from the Danish Longitudinal Survey of Ageing (DLSA). The DLSA is a prospective cohort study of 52+ year-olds conducted at five-year intervals since 1997. New cohorts of 52-year-olds and refreshment samples from the participating cohort were added in the subsequent waves in 2002, 2007, 2012, and 2017. In this thesis, the four waves from 1997 to 2012 are included, which cover the cohort born between 1920 and 1960. In 1997, the data were collected solely through home visits; in the following waves, data were collected via telephone interviews, or home visits if telephone interviews were not possible. The response rate in the DLSA is relatively high, ranging between 70 and 84 per cent in the four waves. Also, the

wave to wave retention rate—i.e. the percentage of respondents in the previous wave continuing to participate in the following wave—is generally high, ranging between 81 and 86 per cent. A study conducting on the representativeness and non-response in DLSA found that although the data suffer from selection bias, this selection is mostly due to mortality, as respondents with the poorest health and lowest socioeconomic status are more likely to die out of the panel, and less likely to withdraw from the study due to reasons other than mortality (Kjær *et al.*, 2019). In this thesis, the DLSA particularly contributes with information on working characteristics such as physical work demands and psychosocial work demands that are not available in the registers, and with information about self-rated health which differs from objective health measures in the registers.

3.1.1. MEASURING RETIREMENT AND HEALTH

The transition to retirement and health constitute the two key variables in the thesis. In research papers 1 and 2, retirement is the dependent variable and health status constitutes one of the key independent variables. In research papers 3 and 4, health is the dependent variable and retirement is a key variable for constituting the sample (research paper 3) and the most significant independent variable (research paper 4).

The transition to retirement is measured from the registers in all four studies. The data sources are the Register-based Labour Force Statistics (RAS), which provides annual information on individuals' attachment to the labour market at the end of each year (Petersson, Baadsgaard and Thygesen, 2011) and the Danish Register-based Evaluation of Marginalization (DREAM register), which is a national database containing weekly information on social benefits and transfer income (Hjollund, Larsen and Andersen, 2007).

Measuring individuals' health status is more challenging, as health status is a multi-dimensional and not directly observable concept (Strauss and Thomas, 2008). Additionally, there is a substantial difference between health measures that are self-reported (collected through surveys) or objective (most often collected through registers), and the relationship between the two measures is complex (Wu *et al.*, 2013). In research paper 1 and research paper 3, I use self-rated health from the DLSA, where individuals score their current health status on a five-point scale ranging from excellent to very poor. Self-rated health is an appropriate and frequently used global measure of health as it has been shown to be a valid predictor for mortality (Deeg and Bath, 2003; Wu *et al.*, 2013). Compared to objective health measures, self-rated health may additionally capture preclinical symptoms of diseases and it can show more recent changes in health (Deeg and Bath, 2003). However, a shortcoming of this measure is that the severity of the health status is unknown, and it cannot be ruled out that some respondents rate their health in light of other events such as retirement, known as justification bias (Dwyer and Mitchell, 1999). In research papers 2 and 4, I use objective health measures based on diagnoses, healthcare utilization, and mortality. The use

of these measures, on the one hand, removes potential justification bias, since objective health measures cannot be affected by for example the event of retirement. However, on the other hand, mainly severe diseases and health problems are captured with objective health data. Additionally, it can be questioned whether these objective health measures reflect utilization behaviour rather than actual health. Hence, a combination of both types of measurement in the same study may provide further evidence of the role in health on later life outcomes.

3.2. STATISTICAL METHODS

I use a number of statistical techniques separately and in combination in this thesis. The kinds of applied methods range from event history analysis to mediation analysis and quasi-experimental analysis, which I will elaborate on in the following sections.

3.2.1. EVENT HISTORY ANALYSIS

Event history models are a class of statistical methods that are well suited for studying life course transitions. The focus of research papers 1 and 2 is the transition into early retirement, and both studies utilize event history models. Historically, these models have their roots in medical research, where they have been used to study deaths and the onset of diseases, for which reason they are also known as survival models. However, these models have been adapted into a wide area of social and natural science where the timing of events is of crucial importance (Allison, 2010).

Event history analysis has two features that are different from regular regression models. The first feature covers the handling of censored data (Allison, 2010). Censored data occurs either when individuals in the study never experience the outcome event or when individuals drop out of a study and therefore are lost to follow-up. The nature of censoring lies within the fact that it is not possible to distinguish between these two reasons for censoring (Singer and Willett, 2003). By creating a solid design, such as following the individuals over a sufficient amount of time, censoring can be minimized but not eliminated (Singer and Willett, 2003). The validity of event history analysis rests on the assumption that censoring is noninformative rather than informative. Noninformative censored cases are unrelated to the probability of experiencing the event—i.e. censored individuals are not a selective group of those who are more likely to experience an event. Thus, we assume that censored individuals are representative of those who remain in the study. However, this assumption is not always realistic in longitudinal studies, where drop-outs are possible. This is the case in research paper 1, for example, when individuals drop out of the survey between the included waves, which can be expected to be those individuals who also happen to retire early. In this case, censoring is informative, as the censored individuals may be

more likely to have experienced retirement. Another distinction in censoring is between right-censoring and left-censoring. While right-censoring refers to censored observations after the period of investigation has started, left-censoring refers to observations that are censored because their start time is not observed. Left-censoring is a possible drawback in all of the research papers included in this thesis, as they relate to a potential healthy worker selection effect (Li and Sung, 1999), where those who are very early retirees and possibly those workers who are most disadvantaged are not included in the studies due to the availability of data or the chosen time period of investigation. Left-censoring, similar to informative censoring, is a challenge in event history analysis that is not easily addressed. The most common solution in the literature is to exclude left-censored observations from the analysis and be aware of how the exclusion of observations might affect the provided estimates.

The second feature covers time-dependent covariates. Time-dependent covariates are covariates that change status during the period of investigation, where the aim is “*to indicate that a (qualitative or metric) causal factor has changed its state at a specific time and that the unit under study is exposed to another causal condition*” (Blossfeld, Golsch and Rohwer, 2007, p. 25). Thus, time-dependent covariates give the opportunity to study the implied longitudinal causal relationship, which is important, as many covariates leading up to a specific event are likely to change its status. In the case of retirement, this may, for example, cover health deterioration or a partner’s retirement status.

In event history analysis, it is of crucial importance to specify the time metric in terms of model estimation. Time recorded in smaller and more precise intervals is labelled continuous time, while time recorded in larger intervals are referred to as discrete time. In research paper 1 and research paper 2, retirement timing is measured with a one-year interval due to the register data used. Therefore, I use the discrete-time logit model, which according to Allison (2010, p. 236) can be defined as:

$$\log \left[\frac{P_{it}}{1 - P_{it}} \right] = \alpha_1 + \beta_1 x_{it1} + \dots + \beta_k x_{itk}$$

The equation predicts the conditional probability of being retired within a time interval t , given that the individual has not already retired (Allison, 2010). The discrete-time logit model can easily include time-varying covariates since each variable has two subscripts, i for individuals and t for time intervals. The model handles right-censored data by including individuals’ time until a censored event occurs. Given that the censored data are noninformative, this approach allows examination of the event occurrence among those individuals who are left in each time interval while still being able to generalize the results to the total population of interest (Singer and Willett, 2003).

3.2.2. MEDIATION ANALYSIS

The aim of mediation analysis is to examine not only whether an independent variable is associated with a dependent variable, but also why. The variables that are believed to transmit the effect of an independent variable on a dependent variable are referred to as mediator variables (Hayes, 2018). The motivation for conducting mediation analysis in this thesis is that it is a tool that enables examination of why social inequalities affect early retirement and post-retirement health.

When conducting mediation analysis, and to identify a proper mediator, it is important to remember that mediation analysis involves causal mechanisms. Thus, in its most basic form, a simple mediation analysis must assume that the mediator variable M is causally located between the independent and dependent variable. Therefore, x is assumed to influence the mediator variable (the a -path) and the mediator variable is assumed to influence the dependent variable y (the b -path). The part of the association between x and y that remains when the mediator variable is controlled for is referred to as the direct effect of x on y , while the part of the association between x and y that is explained by the mediator variable is referred to as the indirect effect (c' -path). Finally, the sum of the direct and indirect effect is referred to as the total effect of x on y (the c -path) (Hayes, 2018).

The indirect effect can be estimated by using either the product-of-coefficient method or the difference-of-coefficient method. While the indirect effect is calculated as the product of the a -path and the b -path in the product-of-coefficients method, it is calculated as the difference between the c -path and c' -path in the difference-of-coefficient method (Hayes, 2018). When the mediator variable and outcome variable are estimated using linear regression models, the two approaches will give the same results. However, these decomposition principles do not apply in non-linear models such as logit or probit regression because of rescaling bias (Breen, Karlson and Holm, 2013). In non-linear models, the scale of the coefficients is dependent on the explained and unexplained variance, which together constitute the total variance. In a linear regression model, the unexplained variance decreases by the same amount as the explained variance increases, when a third variable is included in the model. However, in non-linear models, such as logit models that assume a standard logistic distribution, the unexplained variance is fixed (Mood, 2010; Rijnhart *et al.*, 2019). Consequently, the total variance increases regardless of whether a particular mediator variable explains part of the association between a dependent and independent variable, which undermines the logic of mediation analysis. As a consequence of the increase in total variance, the scale of the coefficients will also increase, which makes the comparison of coefficients in logistic regressions invalid.

Different solutions have been proposed in the literature as to how these problems may be addressed. In research paper 3, my co-authors and I perform mediation analysis

using the product-of-coefficient method based on coefficients from both logistic regression and generalized estimating equations, as the mediators are dichotomized and the dependent variable, self-rated health, is linear. By calculating the indirect effect with the product-of-coefficient method, we follow the approach suggested by Rijnhart and colleagues (2019). In their study, they compare the product-of-coefficient method and difference-of-coefficient approach with different standardization methods of coefficients based on logistic regression. They find that in cases where the mediator variable is dichotomized, the crude product-of-coefficient performs best compared to other standardization methods.

For research papers 1 and 2, which both utilize a discrete-time logit model, the mediation analysis is conducted with the difference-in-coefficient approach based on KHB-corrected coefficients. The KHB method decomposes the coefficients into a part that is attributable to confounding and another part attributable to rescaling, and thus extends the decomposition method of linear models to non-linear models (Karlson, Holm and Breen, 2012).

3.2.3. QUASI-EXPERIMENTAL ANALYSIS

In research paper 4, the aim is to study the causal effect of early retirement on post-retirement health. This is a challenging question to address, because individuals with poor health are also more likely to retire early and therefore the association between early retirement and post-retirement health may solely be driven by self-selection into early retirement. In addition, there may be unobservable factors that are correlated with both early retirement and post-retirement health which can confound the relationship between the two variables. Therefore, this study uses a quasi-experimental design to estimate the causal nature of the relationship between early retirement and post-retirement health.

What causality implies in this question is best described within the potential outcome framework (Morgan and Winship, 2015). For individuals who have not retired early, the causal effect can be conceived as the what-if difference in their health outcomes had they retired early. Similarly, for individuals who have retired early, the causal effect can be conceived as the what-if difference in their health outcomes had they not retired early. It follows that causal inference involves counterfactual outcomes because we can never observe the same individual in two different states: either people retire early or they do not. However, if we can invoke defensible assumptions about the treatment assignment mechanism and the relationship between the observed and counterfactual outcomes, causal inference might be feasible at the aggregate level. For example, if people were randomly assigned into the treatment and control groups, it would be feasible to assume that the observed and counterfactual outcomes were independent of the treatment assignment. Consequently, the average causal effect could simply be estimated as the difference between the average outcomes in the treatment and the control groups. The idea of instrumental variable regression that is used in

research paper 4 is to exploit exogenous variation from an instrumental variable to introduce random variation into the treatment variable of interest, in this case early retirement. It is possible to introduce this random variation into the treatment variable—i.e. early retirement—if the instrumental variable meets two criteria: the relevance criterion, where the instrument must affect the probability of treatment, and the exclusion restriction criterion, where the instrument must not affect the outcome variable other than via its effect on the treatment variable (Becker, 2016).

Instrument variables that fulfil these criteria can be found in changes in retirement legislation. Previous studies that have addressed the causal nature of the relationship between retirement and post-retirement health have used differences in eligibility criteria and changes in the age limit for early retirement or statutory pension age across different birth cohorts to create exogenous variation in retirement (Avendano and Berkman, 2015). In research paper 4, I use such a reform change in Denmark to estimate the causal effect of early retirement on post-retirement health.

CHAPTER 4. RESEARCH PAPERS

I present below the four empirical studies that comprise this thesis and give a summary of each.

- Research paper 1 Qvist, J. Y. (2020a). The working class and early retirement in Denmark: individual push factors. *Ageing & Society*. <https://doi.org/10.1017/S0144686X20000203>
- Research paper 2 Qvist, J. Y. and Qvist, H.-P. (n.d.). Labour market disadvantage or poor health upon arrival? An examination of the native-immigrant gap in early retirement on a disability pension. Revised and resubmitted to *Acta Sociologica*.
- Research paper 3 de Breij, S., Qvist, J. Y., Holman, D., Mäcken, J., Seitsamo, J., Huisman, M. and Deeg, D. J. H. (2019). Educational inequalities in health after work exit: the role of work characteristics. *BMC Public Health*, **19**, 1515.
- Research paper 4 Qvist, J. Y. (n.d.). Early retirement: a health-giving choice for all? Evidence from Denmark. Unpublished manuscript.

4.1. KEY FINDINGS

The first research paper (The working class and early retirement in Denmark: individual push factors) aims to explain why members of the working class have a higher risk of retiring early compared to professionals. Based on previous research, the study investigates how class differences in retirement timing can be decomposed into push factors, which in the study comprise health, partner's health, previous spells of unemployment and job quality, consisting of having overly physical demands and low decision latitude. These factors are labelled push factors because they refer to individual labour market constraints wherein workers have difficulty meeting the demands for work and are therefore likely to be forced or pushed out of the labour market. These push factors are more pronounced among members of the working class compared to professionals, but the relative impact of the different push factors in explaining the class differences in early retirement and different pathways to retirement remains unknown from previous literature. The study uses four waves (1997, 2002, 2007, 2012) of the Danish Longitudinal Survey on Ageing combined with Danish register data to conduct mediation analysis based on KHB-corrected discrete-time event analysis. The analysis includes 17,519 observations, comprising the later working life of 2,111 older

workers who are followed from the age of 52 until retirement. The results suggest that men and women belonging to the working class have an increased risk of early retirement compared to professionals. Among men, the odds for early retirement uptake is around 1.6 times higher for unskilled and skilled manual workers compared to professionals. The corresponding odds among women are 1.8 times higher for skilled manual workers and 2.3 times higher for unskilled manual workers. However, a significantly large part of the total class difference in early retirement is explained by indirect effects via the included push factors of poor health, partner's poor health, previous spells of unemployment, overly physical demands, and low decision latitude. Among both men and women, overly physical demands are the most important mediator, explaining around one-third of the total class difference in early retirement. The second most important mediators are poor health and previous spells of unemployment, which each explain up to one-fifth of the total class difference in early retirement. Finally, having low decision latitude explains up to one-tenth, primarily among men, and having a partner in poor health explains up to one-tenth, primarily among women, of the total class difference in early retirement. The total percentage of class differences in early retirement explained by the push factors is 57–86 per cent among men and 43–55 per cent among women. Moreover, the size of the indirect effects of the push factors depends on the particular pathway into retirement. Poor health is the most important mediator for class differences in social security and disability pension, whereas overly physical demands are the most important mediator for class differences in uptake of the (voluntary) early retirement scheme.

In the second research paper (Labour market disadvantage or poor health upon arrival? An examination of the native-immigrant gap in early retirement on a disability pension) my co-author and I have a specific focus on non-Western immigrants, and a specific but widely used pathway to early retirement for this group, disability pension. Non-Western immigrants in Denmark have a higher risk of early retirement on a disability pension than natives. Previous research from Norway and Sweden has linked the native-immigrant gap in early retirement on a disability pension to non-Western immigrants' disadvantaged position in the labour market. To explain this, sociologists often draw on the expulsion model, which argues that structural features of the labour market cause expulsion of the frailest and least qualified individuals. However, non-Western immigrants are likely to have worse health than natives before entering the labour market because of conditions or events that took place prior to or during the migration process, which have often been referred to as a main reason for non-Western immigrants' higher disability pension uptake. However, an important shortcoming in the previous literature is that these pre-existing health differences have not been controlled for and disentangled from non-Western immigrants' disadvantaged labour market position. Thus, to disentangle the role of pre-existing health differences and labour market position in explaining the native-immigrant gap in disability pension uptake, we use Danish register data including all disability pensions granted between 2003 and 2012 to all non-Western immigrants who arrived in Denmark in 1998 and a comparable group of natives ($N = 2,515,958$). The health status of the individuals in

the sample is measured in the registers in the period between 1999 and 2002, and thus immediately upon the non-Western immigrants' arrival in Denmark. Subsequently, the sample is followed in the registers from year 2003 until disability pension uptake or the last year of investigation, which is 2012. The results show that non-Western immigrant men and women have a higher risk of disability pension uptake compared to natives. The native-immigrant gap is largest among men who were aged between 40 and 59 upon arrival. The odds for disability pension uptake is 8.3 times higher for male non-Western immigrants in this age group compared to natives in the same age group. In support of the expulsion model, our results suggest that around one-fifth of the native-immigrant gap in disability pensions is explained by pre-existing health differences between non-Western immigrants and natives, whereas the vast majority of the native-immigrant gap among men and women in disability pension uptake is explained by differences in labour market disadvantage between non-Western immigrants and natives.

In the third research paper (Educational inequalities in health after work exit: The role of work characteristics) my co-authors and I aim to investigate the role of work characteristics on post-retirement health among older individuals in five Northern European countries: the Netherlands, Denmark, Germany, Finland and the United Kingdom. Previous research has shown that adverse working characteristics partially mediate the association between education and health. However, these studies have been mainly conducted for the working population, and the potential mediating role of adverse working characteristics in the educational differences in post-retirement health has been investigated to a lesser extent. Thus, in this study, we examine whether and to what extent the work characteristics of the previous job mediate educational differences in post-retirement health. To this end, we utilized five prospective cohort studies from each country to follow individuals from the time they had a work exit to a maximum of 15 years. We conducted generalized estimating equations on the association between education and self-rated health and calculated the size of the indirect effect of this association through physical demands, psychosocial demands, variation, and autonomy in activities from the last held job. The five cohort studies comprise the Longitudinal Ageing Study Amsterdam, the Danish Longitudinal Study of Ageing, The English Longitudinal Study of Ageing, the German Ageing Study, and the Finnish Longitudinal Study of Municipal Employees. By replicating the results across five Northern European countries with differing welfare regimes, we aimed to maximize the generalizability of the findings across these different settings. The results suggest that educational inequalities in health are still present after work exits in old age. Additionally, individuals in the lower educated category have been more exposed to physical work demands, low variation and low autonomy in job tasks, and less exposed to psychosocial demands. These adverse working characteristics partially mediated the association between education and post-retirement health in all five countries, but the sizes of the indirect effects varied across the included countries. In Table A.1 in the appendix of this summary report, the mediated percentages are calculated based on the indirect effects presented in research paper 3. These percentages suggest

that the sizes of the indirect effects vary across countries and types of work characteristics. However, these differences have to be interpreted within the total effects, which also vary across countries. Health inequalities after work exit are largest in England and lowest in Germany (c-path). The most consistent work characteristic that mediates the relationship between education and post-retirement health across all countries is physical work demands. This factor mediates 12 per cent of the association between low education and post-retirement health in the Netherlands. The corresponding figures are 14 per cent in Denmark, 9 per cent in Finland, 5 per cent in United Kingdom and 40 per cent in Germany. As such, these results suggest that physical work demands are a rather important explanation of the health inequalities among older people in Germany, whereas the health inequalities among older people in the United Kingdom must be explained to a higher degree by factors other than work characteristics.

The fourth research paper (Early retirement: a health-giving choice for all? Evidence from Denmark) aims to estimate the effect of early retirement on different health outcomes in the post-retirement period among men and women. To date, empirical evidence on the effect of early retirement on post-retirement health is inconclusive about the causal nature of this relationship and little is known about whether this effect varies by social class. Because people themselves choose to retire early, the association between early retirement and post-retirement health may solely be driven by self-selection into early retirement. In addition, there may be unobservable factors that are correlated with both early retirement and post-retirement health, which can confound the relationship between early retirement and post-retirement health. Thus, to estimate the effect of early retirement on post-retirement health, this paper uses birth period variation in incentives to postpone early retirement, which was created by a reform of the Danish retirement legislation in 1999 (N = 100,761). The health outcomes are measured as visits to general practitioners (GP), hospitalization, and mortality. It is hypothesized that members of the working class are likely to have the largest health benefits from early retirement because their working conditions include health damaging conditions such as physical demands and psychosocial stressors related to low job control. On the contrary, members of the higher service class may have the smallest health benefits or even worse health from early retirement, because they have been more committed to their work. Drawing on Danish administrative register data and an instrumental variable (IV) design, the results suggest that people who retire early generally have more adverse health outcomes in terms of visits to GPs, hospitalization, and mortality than people who remain in the labour market. However, this difference is not caused by early retirement. The IV estimates largely show that there is no causal effect of early retirement on post-retirement health. Yet, among men, the findings suggest that there is a positive and short-term health effect of early retirement, as early retirement reduces the number of visits to the GP by 32 per cent compared to remaining in the labour market. When conducting the analysis broken down by social class, this causal effect is particularly driven by skilled manual workers. As such, these findings partially confirm that early retirement can improve the health of men that belong to the skilled manual working class. However, this effect is not found for unskilled

manual workers and women. Additionally, the IV estimates on more severe health outcomes, hospitalization, and mortality do not provide any evidence of an effect of early retirement.

CHAPTER 5. CONCLUSION AND DISCUSSION

In the overarching research question, it was asked which factors explain why people from lower social classes retire earlier and experience more health problems in their post-retirement period than people from higher social classes. Sub-questions related to this overarching research question were addressed in four self-contained research papers. From Figure 1 in section 2.7, it was hypothesized that exposure to different push factors from the working life could explain social inequalities in early retirement and post-retirement health. The results suggest that the included push factors significantly mediate the relationship between social class and early retirement, between immigration and early retirement, and between education and post-retirement health. The most important push factor was physical work demands, that explain nearly one-third of class differences in early retirement and more than one-tenth of the educational differences in post-retirement health for Danish retirees. Additionally, around one-fifth of the native-immigrant gap in early retirement was explained by immigrants' pre-health status, whereas the majority of the gap was explained by non-Western immigrants' disadvantaged position in the labour market. Furthermore, from Figure 1, it was hypothesized that early retirement per se has an impact on post-retirement health and that health benefits are largest among members of the working class. The thesis showed that early retirement overall has no impact on post-retirement health, but provided some evidence that early retirement has a short-term health-preserving effect among men, and particularly among men with skilled manual work.

In this concluding chapter, I discuss the implications of the main findings in terms of theory and social policy. I also discuss remaining questions and provide some recommendations for future research.

5.1. THEORETICAL AND METHODOLOGICAL IMPLICATIONS OF MAIN FINDINGS

Some scholars have stated that the concept of social class has lost its explanatory power in modern post-industrial labour markets (Clark and Lipset, 1991; Kingston, 2000) and in the third age. According to Gilleard and Higgs (2002, p. 274) it does not seem credible *“to treat the third age as a class-based phenomenon”*, although the authors do recognize *“the reality of income- and wealth-related differences in patterns of expenditure and social participation”*. In contrast to these views, the results of this thesis suggest that social class continues to play a pivotal role because class

positions are linked to early retirement and post-retirement health. Even though scholars have argued against the role of social class, it can hardly be advertised as a novel finding that social class continues to structure patterns of early retirement and post-retirement health. It is well documented in the existing research that people from lower social classes are at higher risk of early retirement (Blossfeld, Buchholz and Hofäcker, 2006; Radl, 2014; Leinonen *et al.*, 2016) and of having poor health in their later life and post-retirement period than people from higher social classes (Chandola *et al.*, 2007; Hyde and Rees Jones, 2007). However, a central argument of this thesis is that social inequality in early retirement and post-retirement health is most fruitfully conceptualized by placing social class at the heart of the analysis and by conceptualizing push factors as the mechanisms through which social class affects the risk of early retirement and post-retirement health. While this point may appear trivial, it is essential in empirical research. Existing literature on determinants of early retirement and post-retirement wellbeing has been dominated by studies that use regression to examine the association between early retirement and an often long list of variables, including social class indicators along with assumed push factors such as health, physical work conditions, and job autonomy. However, this approach is likely to underestimate the role of social class as it controls away the mechanisms through which social class operates. For example, a significant proportion of the association between social class and early retirement is likely to be due to the indirect effect of social class on health. If this indirect effect is controlled away, it leads to over control bias. A similar point could be made about many other well-known push factors in the literature, such as job loss.

Throughout this thesis, the theoretical and analytical attention has been on push factors. As presented in Figure 1, the research papers have examined whether social class and educational differences in early retirement and post-retirement health are due to constraints among lower social classes. Opponents of this approach may oppose that it overlooks the fact that members of the working class may be more likely to retire earlier and experience adverse health conditions in their post-retirement period for reasons other than the ones included in the thesis. Additionally, push and pull factors may affect early retirement simultaneously. As I have outlined in the theoretical section, it is evident that other mechanisms such as pull factors can explain early retirement. However, while this thesis does not reject that other factors can explain these inequalities, the results indicate that, at least for early retirement, the push factors together explain a considerable amount, up to 86 per cent among men and 55 per cent among women, of the social class differences in early retirement. Additionally, among women, the native-immigrant gap in early retirement was completely explained by health upon arrival and disadvantaged position in the labor market. As such, these findings imply that room for potential pull factors or factors that are not related to constraints as reasons for the observed subgroup differences in early retirement is more diminished for members of the working class, particularly among working class men and immigrant women. Therefore, the push factors appear to explain early retirement patterns more among members of the working class compared to members of

higher social classes. In terms of inequalities in post-retirement health, the thesis has shown that differences in working conditions partially mediate health inequalities among retirees in Denmark. However, these mediating effects are not considerably large (up to 14 per cent), which points towards mechanisms other than working conditions being more important in terms of why health inequalities exist after retirement. These explanations are likely to be found within behavioural-cultural explanations such as lifestyle practices and psycho-social explanations, as outlined in section 2.4.

A central argument of this thesis has been that the effect of social class on later life outcomes through different mechanisms operates over the life course and varies between different subpopulations. Thus, a life course and social stratification perspective help to understand the role that social class, gender, and ethnicity play in shaping early retirement and post-retirement health. The use of longitudinal survey and register data in this thesis has made it possible to study working life determinants on later life outcomes between different subpopulations. The included push factors – health, partner’s health, physical work demands, and low decision latitude from research paper 1 – were included from the age of 52, whereas unemployment was included from the age of 36. In research paper 2, immigrants’ health status was included immediately upon their arrival, and in research paper 3 work characteristics were measured while the individuals were still working. These mechanisms partially explained subgroup differences in early retirement and work characteristics partially explained educational differences in post-retirement health. As such, these results contradict the view of retirement as an isolated phenomenon, that is separated from earlier phases in the life course. Although this thesis did not include the abovementioned push factors from a very early stage of the working life, it can be expected, according to the CAD theory, that these push factors accumulate over the working life, such that mechanisms from midlife and later working life are a proxy of the same mechanisms from earlier in life. Research paper 2 further identified non-Western immigrants as a potentially vulnerable group with a higher risk of early retirement on a disability pension compared to natives. The findings from this research paper suggest that health challenges that were present upon arrival partially mediate the native-immigrant gap in disability pension uptake, thereby stressing the importance of adopting a life course approach to study the complex interplay between immigration and later life outcomes.

However, even though push factors such as harsh working conditions continue to be associated with poor health after retirement as shown in research paper 3, this thesis also provides some evidence that retirement can be a relief for some workers, and hence the accumulation of push factors may level off after retirement. Research paper 4 shows that early retirement is likely to have a short-term positive effect on health in terms of reducing the number of visits to general practitioners by men in skilled manual work. However, this effect does not exist in the long run, nor in terms of more severe health outcomes such as hospitalization or mortality. The fact that early retirement has heterogeneous health effects depending on workers’ social class and gender

stresses the importance of considering the working life among different subpopulations as crucial for post-retirement wellbeing. In addition, these findings suggest that the CAD theory and the age-as-leveller theory may not necessarily be mutually exclusive, but that social inequalities between individuals develop differently depending on the specific outcome and the institutional arrangements that shape the life course of the individuals.

5.2. POLICY IMPLICATIONS OF MAIN FINDINGS

In light of the rising average life expectancies and consequently growing population of older people, policymakers in Europe have found it necessary to raise the statutory pension age to ensure a balanced economy. However, in the wake of this development, a pivotal concern for policymakers is how to design clever policies that can cushion people from the working class who cannot extend their working lives from falling into economic and social despair as the statutory pension age is raised.

While extending the statutory pension age in general is likely to be an effective tool to comply with the ageing population, the findings from this thesis suggest that there must concurrently be a pathway for those workers who are most vulnerable in the labour market if they are to leave the labour market before they are worn out and to ensure their post-retirement wellbeing despite their, on average, lower life expectancy. As pointed out by the ‘triple notion’ proffered by Kolberg and Hagen (1991), one argument against early retirement is that early retirement leads to diswelfare resulting in marginalization and passivity for early retirees. However, as shown in research paper 4 this thesis does not find support for this assumption. If anything, early retirement may be a relief for some workers in the lower social classes and therefore this group may benefit from having the possibility to retire early. Yet, designing policies that take such workers into consideration is a complex task.

European policymakers have been and are currently preoccupied with if and how to incorporate a differentiated pension age for some of the most vulnerable workers. In Denmark and other European countries, different solutions to this issue have been discussed, and some countries have already implemented differentiated special pensions for the most worn down workers (Zaidi and Whitehouse, 2009; Johnson, 2018).

One option is to allow workers in particularly hazardous and arduous occupations to apply for early retirement. Even though granting the most needy occupations the opportunity to opt for early retirement might seem appealing, several arguments have been raised against this approach. The first issue is how to identify particular occupations and on which parameters such a classification should be built. The second issue concerns how to tackle the fact that workers in particularly hazardous and arduous occupations may be more likely to change their job to a less demanding job in their

later working life (Zaidi and Whitehouse, 2009; Johnson, 2018). A further concern with this option is that workers may also be motivated by self-interest in working in particularly hazardous and arduous occupations, as these types of occupation typically, despite a high degree of regulation in the labour market, at least in Denmark, also result in higher salaries compared to other unskilled and skilled manual work. A fourth issue, which this thesis points towards, is that inequalities in early retirement and post-retirement health are not attributable only to working conditions. Although physical work characteristics contributed most in explaining social inequalities in retirement and post-retirement health, we learned from research paper 1 that self-rated health still mediated up to one-fifth of the association between social class and early retirement when physical work demands and low decision latitude are taken into account (Qvist, 2020b). Moreover, we learned from research paper 3 that the association between education and self-rated health after retirement was still significant after including working conditions (de Breij *et al.*, 2019). Thus, offering people the opportunity to retire based on occupations with particularly hazardous and arduous working conditions may only eliminate some of the inequalities in early retirement and post-retirement health.

Another option, which is a solution that the government in Denmark has put into law as of January 2020, is a senior pension scheme that can be applied for by the most worn down workers, who are then assessed by a medical doctor. Although this solution may capture the most worn down workers, this type of solution also means that the workers need to have substantial health deterioration to be considered eligible for the scheme. As indicated by the analyses in this thesis, many working class members may be more likely to retire early before their health develops into serious disabilities, and therefore this type of solution is likely to exclude the possibility of early retirement among many workers.

A third option, which is a solution that the government in Denmark has recently proposed, is to give workers with the highest seniority the possibility of retiring early, such that retirement eligibility follows the number of years of working life. Based on the findings from this thesis, this could be a solution to reduce the social inequalities in early retirement, as the investigated push factors are likely to have been present and accumulated over the working life. However, an often mentioned criticism of this solution is that this type of eligibility is grounded in a typically (male) breadwinner model, which exclusively requires full-time work with no interruptions and family responsibilities that have been offloaded (Moen, 2013; Johnson, 2018; Léime and Loretto, 2019). Yet, in the current proposal from the Danish government, the number of years of work also takes into account certain types of unemployment benefits, part-time employment, and parental leave. As such, this proposal is likely to take stratified and gendered life course pathways into account, as workers on the lower occupational ladder typically have more volatile employment careers and women have more caring responsibilities. However, even though this is an option to secure workers that are the most worn down, the eligibility criteria more or less exclude immigrants, since they

start their working career later in the host country. As we learned from research paper 2, non-Western immigrants are overrepresented among unskilled manual workers, and therefore this group may particularly face problems with deteriorating health and maintaining their employability.

Moreover, the findings from this thesis suggest that mechanisms other than health may be better dealt with by alternative programmes than early retirement or by an improvement in the working conditions earlier in the working life. For example, research paper 1 and research paper 2 showed that unemployment history explained a substantial part of both social class differences and native-immigrant differences in early retirement. Thus, some of these inequalities may likely be eliminated by skill development programmes and inclusive labour market policies rather than early retirement.

5.3. QUESTIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Although this thesis has provided the field with important knowledge about social inequalities in early retirement and post-retirement health, some of the findings also raise new important research questions that call for further research.

Throughout the thesis, I have focused on workers at the lowest end of the occupational ladder, i.e. the lowest educated who typically work manual jobs and have a low socio-economic position. This choice was based on the fact that these workers have the highest risk of retiring early and the poorest post-retirement health among all workers; hence, active ageing policies such as rolling back early retirement options and extending the statutory pension age are likely to have the most negative consequences for this group of workers. However, it has been recognized that workers in lower service class jobs may also have a higher risk of early retirement because of psychosocial working conditions. From research paper 3, it appears that high psychosocial demands, such as working under high pressure, are more prevalent among workers with higher education compared to workers with lower education. Additionally, Radl (2013) found that many women in the lower service class have similar retirement patterns to routine non-manual workers. Women in the lower service class typically work in the education or health sectors, such as primary school teachers or nurses, where the exposure to psychological stress is higher compared to other types of occupation. These risk factors and types of occupation have received little attention in the retirement literature. A study on early retirement among Danish nurses found that a poor working environment is less likely to determine nurses' risk of early retirement than other factors such as income, self-rated health, and the family situation (Friis *et al.*, 2007), which raises further questions as to the impact of working conditions on early retirement among the lower service class. On these grounds, future research may also

examine retirement patterns and post-retirement health among workers at the higher end of the occupational ladder with a stronger focus on psychosocial working demands that are typically more representative in lower service class jobs.

Secondly, the question of the possible health consequences of early retirement among immigrants needs to be further investigated. Research paper 2 suggests that a substantial part of the native-immigrant gap in disability pensions is explained by immigrants' disadvantaged labour market position, which is likely to have led to a deterioration of their health, resulting in a disability pension. However, it remains an open question what the consequences of early retirement are for immigrants' post-retirement health. As stated by Henkens and colleagues (2018), the well-being of immigrants who are no longer socioeconomically integrated in society through labour market participation can be considered the ultimate test of the level of social integration among immigrants. From previous literature, it is evident that non-Western immigrants have lower mortality compared to natives (Knudsen and Rostgaard, 2015), although they have a disadvantaged labour market position and more adverse health conditions upon arrival compared to natives (Statistics Denmark, 2018). This immigrant health-paradox calls for more research on what the health effects are of early retirement for immigrants.

Thirdly, from the findings in research paper 3, it remains an open question how much health mechanisms other than working conditions affect post-retirement health in explaining the health inequalities. In the conducted study, the coordinated analysis of five different countries naturally entails a trade-off between the comparability and accuracy of measurements across the different datasets and the number of variables or mechanisms that it is possible to include in the analyses. Hence, this study included a limited number of working conditions as possible mechanisms for health inequalities. Nevertheless, to possibly alleviate the increasing gap in health differences in old age, it is imperative that we also can distinguish the relative impact of working conditions from other mechanisms such as differences in lifestyle that are expected to impact health inequalities or push factors such as previous unemployment. Yet, this is a challenging issue, as the association between education and health is complex and likely to change and feed back to each other throughout the life course. In that regard, further research may also examine possible mechanisms leading to heterogeneous health effects of early retirement. In research paper 4, the analysis showed that early retirement is likely to have a health preserving effect among male skilled workers, but further research is required to understand the mechanisms behind this pattern.

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APPENDIX

Table A.1. Single-mediator analyses of the effect of education and work characteristics on self-rated health after work exit. Percentage mediated.

	NE	DK	UK	GER	FIN
Low education (versus high education)					
Self-rated health (c-path)	-0.277	-0.266	-0.507	-0.174	-0.461
Percentage mediated via:					
Physical demands	12%	14%	5%	40%	9%
Psychosocial demands	21%	-3%	-3%	20%	9%
Variation in tasks	38%	7%	NA	NA	5%
Autonomy	3%	1%	6%	NA	3%
Intermediate education (versus high education)					
Self-rated health (c-path)	-0.324	-0.117	-0.241	-0.116	-0.22
Percentage mediated via:					
Physical demands	8%	25%	3%	9%	7%
Psychosocial demands	12%	-3%	-5%	-20%	10%
Variation in tasks	22%	8%	NA	NA	4%
Autonomy	1%	2%	7%	NA	12%

Note: Mediation percentages are calculated based on the coefficients from Table 2-7 in research paper 3 (de Breij *et al.*, 2019). The c-paths are derived from the reduced model and are equal to the total effects of education on self-rated health after work exit. The percentages are calculated as $1-(c'-path/c-path)$, where c'-paths are derived based on the full models, in which the proposed mediator is included.

SUMMARY

This thesis examines the causes and consequences of social inequalities in later working life and retirement. A large literature suggests that the risk of early retirement and poor health in the third age is unequally socially distributed, as people from lower social classes retire earlier and are more exposed to post-retirement health problems than people from higher social classes. While the existence of these empirical regularities is well documented in the literature, less is known about the social mechanisms that bring these social class differences about and how they vary across other subpopulations, such as gender and ethnicity. Based on longitudinal register and survey data from Denmark this thesis gives answers to questions such as: Why do men and women belonging to the working class retire earlier than men and women belonging to the service class? Why do non-Western immigrants have a higher risk of disability pension uptake than natives? How much can adverse working conditions from the working life explain health inequalities after retirement? What is the effect of early retirement on post-retirement health and does this effect vary by gender and social class?

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