Pension Systems and Income Inequality among the Elderly in Europe

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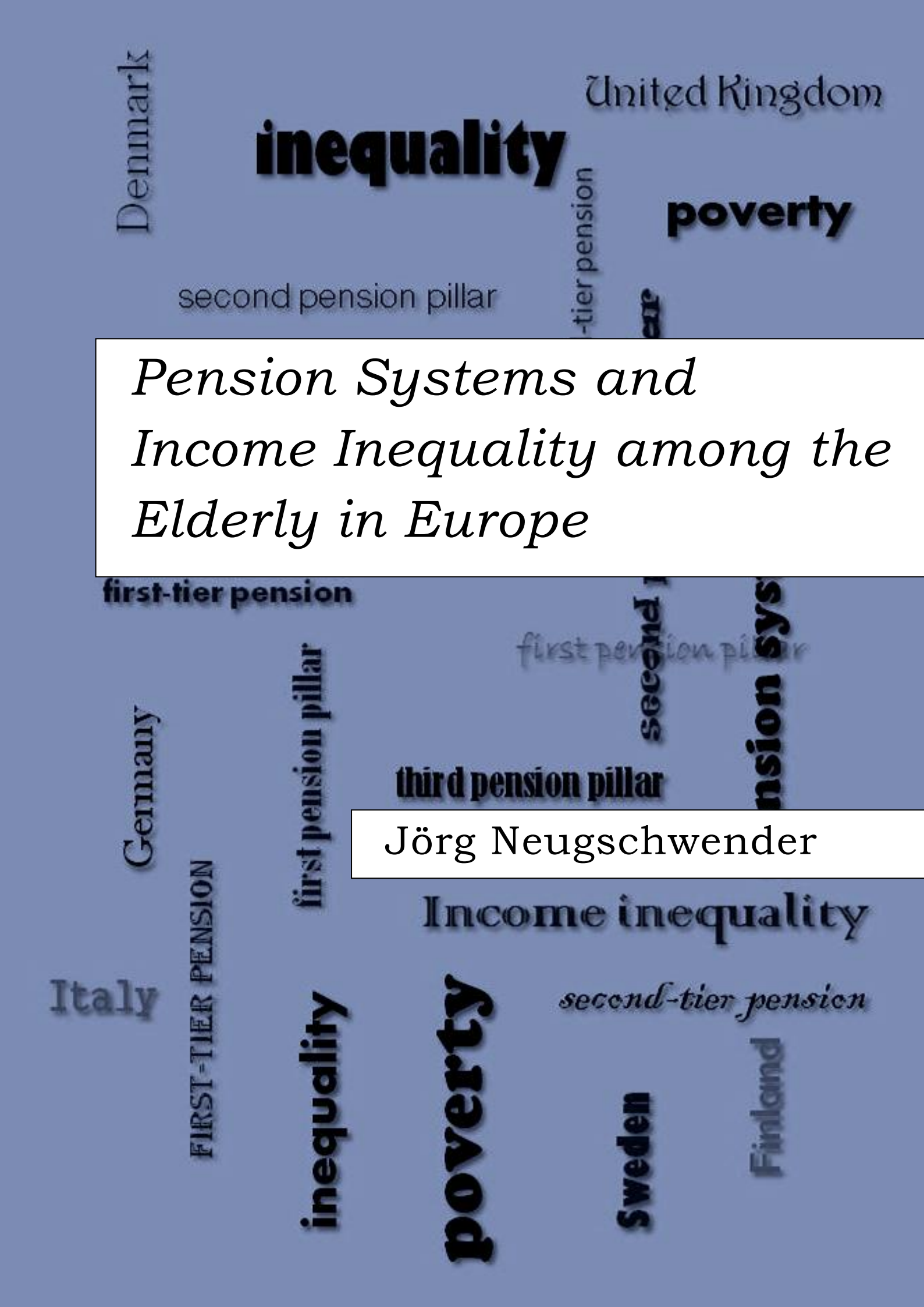

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I. Introduction

During the late 19th century, the state has taken on a much stronger role protecting those who have or had difficulties to provide for themselves during their life; various welfare state programmes for the sick, disabled, elderly and survivors, as well as for families have been introduced. Nowadays societies are characterised by a variety of public welfare state programmes and occupational welfare policies; these measures affect the well-being of individuals, families, and households in manifold ways. Sickness and family-related benefits mostly protect individuals during the working phase, disability benefits protect the temporarily or permanently disabled, survivor payments secure the family in case of loss of the main income earner, and old-age benefits maintain the standard of living for the elderly during the retirement phase.

In advanced economies, such as Western Europe and the Anglo-Saxon countries, the elderly population is primarily secured by regular payments from institutionalised pension systems. A pension system can be defined as the complete set of individual public and private schemes within a country that provide institutionalised saving opportunities, regular annuities, or cash-sums for old age. Along these lines, it is common in scientific debates to describe the income situation of the elderly by the *public-private mix* of income (Rein and Rainwater 1986), referring to the idea that not only public welfare state benefits generate stable income; individuals can contribute also to various private plans, provided by employers and financial institutes.

Public pension schemes offer two main mechanisms securing the financial well-being of the elderly: contributory and non-contributory pension schemes. Contributory pensions are frequently strongly tied to earnings during the working phase; contributions are typically calculated as a percentage deducted from the wage, and accumulated in individual entitlements to later old-age benefits. Non-contributory pensions do not require individuals to make contributions to a scheme, but instead are paid based on age or residency in a country or obtained by those in need with no stable income.

In addition, various states grant also access to former benefits of a deceased spouse. All pension transfers can be paid as lump-sums or annuities; however, particularly the benefits for old age are usually foreseen as annuity payments, as the main function of public programmes is income security during the entire retirement phase.

Besides public welfare state activity, trade unions' and employers' involvement in occupational welfare policy, their strength, and their perception of occupational pensions are some of the central determinants for pension policy outcomes. Trade unions' and employers' engagement in social security and pension policy shows strong cross-national differences (cf. Ebbinghaus 2010). Alternatively, individuals can take up personal pension plans with financial institutes. Thus national solutions of private (occupational + personal) pension regulations differ strongly. A key distinction in private schemes can be made in mandatory vs. voluntary occupational/personal savings plans (cf. World Bank 1994).

There exist two main types of private pension plans: *defined-benefit* (DB) and *defined-contribution* (DC) plans. DB plans are typically linked to the years of contributions and (final) salary; DC plans foresee individual accounts and investments in manifold financial products and funds managed either by financial institutes, or by occupational pension funds offered by employers or a group of employers (Queisser et al. 2007).

During the last decades public pension systems were frequently reformed in order to respond to concerns of competiveness and financial sustainability due to demographic ageing: whereas reform measures in the early 1990s focused primarily on cost containment strategies, more recent reforms aimed at increased coverage with both mandatory and voluntary schemes, better incentives to prolong the working career, a more diversified pension savings profile, and a strengthened focus on *adequacy* of pensions (see Chapter 1 in OECD 2013a; Arza and Kohli 2008b). Recent reforms have in common a trend towards individualisation of pension provision, and a strengthened role of private actors in providing pension plans (Arza 2008).

As a result, a variety of multi-pillar systems emerged; these cross-national differences in pension provision were documented in various edited volumes focusing on the politics of pension reform (Arza and Kohli 2008a; Bonoli and Shinkawa 2005; Disney and Johnson 2001; Ebbinghaus 2011a; Immergut et al. 2007; Meyer et al. 2007; OECD 2013a). Nowadays, OECD countries show a broad variation in terms of coverage with private pension schemes, public and private spending, and pension fund accumulation (Queisser et al. 2007).

The design of public and private pension schemes and the linkages between each element, altogether characterise the financial well-being of the elderly. The regulations for individual pension schemes, such as contributions, coverage, eligibility and benefit calculation, are essential sources of institutional differences that explain cross-national differences in the income-mix of the elderly. Particularly, social partners are not only a major actor in occupational pension provision, but also strongly affect the distribution of primary market income and thus shape also the redistributive outcomes of pension systems (Ebbinghaus 2010).

These cross-national differences in public and private pension regulation may create quite unequal income level across countries. In general, outcomes of pension policies can be measured in terms of achievement of the two main goals on which pension systems were built up in the first place: *poverty prevention* and *income maintenance* (World Bank 1994; OECD 2007). In order to reach these goals, labour market attachment and pension systems interact strongly. Strong labour market attachment that is leading to reasonably high accumulated contributions might be considered a pre-condition to enable adequate poverty prevention and income security in old age (Hinrichs and Jessoula 2012).

A major concern today, however, is that the elderly are not adequately secured through the mix of the manifold pension system regulations; through week labour market attachment and public pension reforms that cut benefits due to demographic ageing, current workers face an increased risk of under-protection and poverty (Hauser 2008; Hinrichs 2008). Results

of recent reforms might limit the redistributive focus of social security towards the income poor; the individualisation of risks may create a broader share of elderly at the bottom end of the income distribution (Zaidi et al. 2006). Similar concerns have also been reflected by the OECD: 'People who do not have full contribution careers will struggle to achieve adequate retirement incomes in public schemes, and even more so in private pension schemes which commonly do not redistribute income to poorer retirees' (OECD 2013a: 14).

In terms of recipient patterns of non-contributory pensions, a gender divide is likely to occur. As women's labour market attachment is weaker, contributions to pension systems are lower, thus dependency on non-contributory pensions is expected to be higher among women (Arza 2015; Behrendt and Woodall 2015; Zaidi 2007).

Pension systems and social protection – a comprehensive perspective

Pension policy and its outcomes for different groups of people is a multifaceted field of study in the disciplines of economics, political science, and sociology. Researchers in the field of economics are mostly concerned with financial sustainability, individual risk profiles, and cost minimising strategies. Political scientists and macro-sociologists seek to explain reform paths in pension policy and try to identify societal exclusion and reform opportunities. Researchers in micro-sociology seek to discover societal consequences for specific groups shaped by specific mixes of public and private regulation.

In the following, it is argued that in order to understand inequality of pension income among the elderly comprehensively, it is necessary to relate pension income back to (1) *pension system characteristics*, (2) *individual labour market attachment*, and (3) *living arrangements* at the same time. Pension systems interrelate with labour markets and living arrangements in manifold ways. For instance, periods of inactivity due to unemployment, parental leave or disability typically lower an individual's pension at retirement age. Also the income mix of couples might be quite different than the one of never-married, divorced, or widowed single elderly persons.

The dimension *pension system characteristics* relates to the fact that historically, nation-specific pension systems have developed along various paths, redistributing income differently across the aged (see Chapter II.2). Whereas some elements of pension schemes, like earnings-related social insurance may have favoured the reproduction of market inequality, other mechanisms such as minimum pension regulation, means-testing, care credits and survivor benefits (see for example overview by Monticone et al. 2008) are additional redistributive elements of public pension schemes. Manifold private schemes by trade unions, employers, or groups of employers can substitute or complement individual's saving. The entire package of public and private pension schemes influence the savings profiles and generate differences in the income mix in old age.

Individual labour market attachment also strongly affects individual's public private pension provision mix. Nowadays, to stay in well paid and stable jobs can be considered as the *new social risks* (Armingeon and Bonoli 2006; Bonoli 2006; Bonoli 2007; Taylor-Gooby 2004a; Taylor-Gooby 2004b). *New social risks* proponents argue that further adjustments are needed

to protect various risk groups better as compared to the current pension system design. Therefore, Hinrichs and Jessoula (2012) propose a new analytical approach that brings together research on instability of employment, social protection, and pension systems and its consequences for social protection in old age.

Closely linked to the dimension *individual labour market attachment* is the dimension of *living arrangements.* The sphere *living arrangements* can be further subdivided in two elements: *living arrangements* during the working career and *living arrangements* during retirement. Couple households may choose a shorter period of full-time labour market participation for one partner, particularly when raising children; thus contributions to specific pension schemes also differ by household type. The situation during retirement simply describes the potential resource sharing with a partner and/or other household members.

In addition to these three dimensions, individuals' income mix has in recent decades also been strongly influenced by changing early-retirement policies in public and private schemes. While in the 1980s and early 1990s such measures were attractive means for employers and employees to retire early (OECD 2001), such options were taken back more and more in the second half of the 1990s. Incentives to work longer than statutory retirement age were also introduced (OECD 2001; Ebbinghaus 2006a). Particularly in systems where minimum benefits are paid only when reaching the statutory retirement age, occupational and personal pensions might work as a bridge for senior workers who were excluded from the labour market before reaching statutory retirement age (OECD 2001: 12; 35-37). On the other hand, if workers choose to postpone retirement, they might accumulate further pension credits/points.

This comprehensive perspective on pension systems, labour market attachment, and living arrangements signifies the relevance of cross-national comparisons that study financial outcomes of individual pension schemes and the entire pension system in order to give evidence-based policy advice. Different risk profiles require different pension system regulation to be adequately protected in old age; it is argued that this protection can be organised in various ways depending on the national circumstances to take action securing social needs and to set up protective pension schemes.

Therefore this monograph will address four major research questions: Why is there cross-national variation of income received by the elderly? What implications do different institutional pathways of pension systems have for the income situation? What role do non-public pension systems play in the income-mix and for the development of inequalities? Which developments can be observed in the public-private income mix and generosity of the pension system?

This cross-national study of past and current pension system legislation and the current public-private mix will reveal how pension systems compare and whether or not these systems succeeded guaranteeing a minimum living standard respectively were regulated well maintaining the previous income level. This monograph will particularly look at the financial well-being of the elderly and attempt to explain sources of cross-national differences.

The key dimension of this comparative study will be the detailed study of variation in second-tier pension schemes and their effect on the outcomes. The second dimension of analysis will be the development of pension outcomes over time. An extended overview on the research questions and agenda (see Chapters III.2 and III.3) will be presented after a laying the theoretical foundation for the study of pension systems and studying general cross-national differences among the elderly around the world.

One aim of this comparative study is to contribute to the political debates and challenges faced by pension policy. Pension policy actors find it difficult to predict the future outcomes of newly designed or modified pension schemes/systems. Frequently the future outcomes of pension policies remain a *black box* at the time of their implementation; it requires a period of 40 to 50 years of unchanged regulation and stable employment patterns under the new regulation to capture the complete and pure outcomes of the reform. However, at the same time other occupational and/or personal pension schemes might develop, and change the initial perspective on expected consequences for financial outcomes at the time of reform. It becomes evident that pension institutions need to be adjusted on a regular basis in order to effectively protect the society's changing risk groups.

But also reforms of specific pension schemes affect particular groups at different points in their employment career. Each person may be affected quite differently by modified pension policies. Depending on a specific birth cohort, years of employment, year of retirement, or age at retirement, pension benefits are expected to differ. A good example is the extension of occupational pension schemes that occurred in many European countries some decades later than the extension of public schemes. Younger birth cohorts could successively receive higher income from strengthened occupational schemes than older birth cohorts. Thus, as soon as policies change combined pension entitlements from the various pension schemes also change, and birth cohorts are differently affected; this situation makes it difficult for policy evaluators to measure the various effects of reform packages independently.

Overview of chapters

Chapter II sets the framework for this study – this section documents how outcomes of pension systems are typically studied in a cross-national perspective. The first section is mainly concerned with conceptual approaches studying pension systems. These concepts are extended by a discussion of institutional set ups which further explain which types of pension systems have developed in which context. The separate section on pension reform processes will show which combinations of pension systems have developed, and which factors have been shaping them; an overview of various pension systems around the world will be presented. The third section on inequality measures will link the institutional framework of pension systems to measurement tools and data-specific findings; it also evaluates studies that are analysing distributional outcomes of pension systems. The concluding subsection will establish an overarching research framework for the study of pension systems; it aims at building up an agenda how to best study pension systems, and their implications for old age.

Chapter III will first assess living arrangements, labour market participation, and the income packaging of the elderly around the world; for these empirical studies, data from the Luxembourg Income Study (LIS) Database will be evaluated. A second section then further elaborates research questions and the pursued research agenda for the empirical studies in Chapters IV to VI.

Chapter IV includes a comparison of three countries that were primarily focusing on poverty prevention policies (*Beveridge* tradition) with their public pension system: Denmark, Finland, and the United Kingdom. The study aims at contrasting variation in private pension scheme regulation that broadly developed due to the limited role of public minimum protection. First, a historical overview of pension system development is presented. In a second step, inequalities are analysed. The analyses include an evaluation of recipient rates and income shares of private pensions in the income mix along various socio-demographic characteristics (sex, age, and household size) and along the income distribution by income deciles. The study clarifies also in how far individuals benefit from intra-household redistribution; therefore recipient rates and income shares are evaluated on an individual and household level. For each decile of the elderly population the income-mix is first compared relatively to society's median disposable income, and second to income received by each decile in the total population in order to interpret *income replacement* and *pension adequacy* of the elderly.

Chapter V aims at contrasting the outcomes of mixed systems from the Beveridge type minimum pension tradition against the outcomes from public contribution-based Bismarckian systems. This study analyses Denmark, Germany, Sweden, and the United Kingdom. Similarly as in Chapter IV, a first section documents the main pathways of pension system regulation. The empirical section evaluates recipient rates and income shares of private pensions in the income mix along various socio-demographic characteristics (sex, age, and household size) and along the income distribution. A special focus is placed on the development of various indicators between two points in time. Evaluated indicators are poverty rates, poverty gaps, the Gini coefficient, and relative income level of the low, middle, and high-income group of the elderly in comparison to society's median disposable income split by various income sources.

Chapter VI includes a comparison of six Western European countries that show broad institutional variation in terms of pension system design: Denmark, Finland, Germany, Italy, Sweden, and the United Kingdom. This study aims at analysing the current shifts in the income mix and the income distribution by birth cohorts. First, recipient rates and income shares of private pensions in the income mix are presented. Then absolute income levels from public and private pensions are compared by deciles and cohorts. An evaluation of two specific birth cohorts of the elderly that are ten years apart, clarifies the development of the income mix over time. In a last step, a specific birth cohort is studied in order to assess the generosity of pension income along the income distribution by deciles; similar as in the earlier chapters pension income is shown in relative terms in comparison to each society's median income; the analyses focus on comparing the ranking of countries by income deciles before and after taxes.

Chapter VII is the concluding chapter that will summarise the main findings from the individual studies. This section explicitly sums up the cross-national variation in pension system regulation and its implications for the design of pension systems and the public-private pension income mix and inequality across the elderly. Final remarks will also point to limitations of this monograph and present future research needs and alternatives.

II. Theoretical framework: varieties of pension systems

II.1. Pension systems – the public-private mix

Pension system regulation has grown to a complex field of study, many actors have been included setting up institutional arrangements, which serve two main purposes*: poverty prevention* and *income maintenance* in old age (OECD 2005; European Commission 2003; World Bank 1994). This institutional diversity can be distinguished along various lines (cf. Ebbinghaus 2011b). Who provides pensions? Which functions serve specific pension schemes? What benefits are paid? Who pays? Who governs pension plans? But most importantly from an inequality perspective: who is covered by which (public or private) pension plans?

The following literature review will set up the core framework for the analysis of pension systems. This chapter will clarify how different pension schemes within an entire pension system can be classified and which actors are typically involved in pension provision. This section contains three major sections. First, a general section introduces common concepts in order to study pension systems. The following section emphasises the role of occupational welfare policies that may build a crucial counterpart to public welfare state activity. A last section gives a brief overview of personal savings opportunities that each individual may possibly take up in addition to public and occupational schemes.

General conceptual approaches to study pension systems

In scientific contributions and policy debates it is common to distinguish between pillars and/or tiers of old-age protection systems. In the following I will also apply this terminology, keeping in mind its different meaning. The concept of pillars is mainly concerned with the provider of each pillar (Goodin and Rein 2001); the concept of tiers (World Bank 1994; OECD 2007; Whitehouse 2006) describes its function. The first-pillar is organised by the state through the social security system, the second pillar is provided by occupational groups, social partners, and/or individual firms through specific agreements, and the third pillar is made available by private financial institutions through personal saving plans. The first tier aims at providing a minimum income protection to prevent poverty (*poverty prevention* function). The second tier is linked to previous labour market earnings and insurance by replacing a certain level of the previous earnings (*income maintenance* function) and thus ensuring *pension adequacy* (European Commission 2003). Third-tier pensions describe an individual *topping up* of second-tier benefits.

In order to further classify the combinations of pension schemes, various typologies were introduced in pension research. The following paragraph will provide a short overview on the main typologies; its current prototypes will be discussed in detail in the subsection of pension reform processes (Chapter II.2). This section sets the conceptual basis on how these typologies can be linked to the pillars and tiers approaches. In present societies two major types of public pension systems are still predominant: *Bismarckian* and *Beveridge* type systems (Ebbinghaus 2011b; Hinrichs 2009; Schludi 2005).

Bismarckian social insurance systems primarily aim at maintaining acquired living standards. Bismarckian social insurance systems focus on two main components: accumulated individual pension entitlements that closely relate to an individual's previous earnings and the derived benefits for survivors or partners taking care of children or the elderly. In many Western societies major extensions were introduced in the 1950s, e. g. Germany, Italy, Belgium. Replacement rates of 60-70 per cent of previous labour market earnings were envisaged for the broad majority of contributors.

The Bismarckian contribution-based pension promises fostered a *crowding out* of complementary systems as income maintenance was already broadly provided by the public system (Ebbinghaus and Gronwald 2011; Pedersen 2004). However, the existence of contribution or benefit ceilings created an income gap for high-income earners that made it necessary for this group to save outside the public system if they aimed at similar replacement rates like the low to middle-income earners. Depending on the influence of coordinated policies, selective schemes were introduced in favour of high-income groups, e. g. VBL in Germany and TfR in Italy.

In contrast to the Bismarckian approach, several countries took up the Beveridgean idea of pension provision. This type of pension guaranteed only an absolute minimum level of public benefits to prevent poverty, e. g. Canada, Denmark, Finland, the Netherlands, United Kingdom, and Sweden (before 1990s). Broadly defined, minimum pensions represent the idea to pay at least a certain minimum amount as a universal social right (Marshall 1950). Full entitlement can either be based on accumulated years of employment (United Kingdom) or residency (for example Canada, Denmark, Sweden, and the Netherlands.

The World Bank and the OECD distinguish Beveridgean minimum pension systems further in *basic*, *targeted*, and *minimum* pension schemes (Whitehouse 2007: 5-7; OECD 2009b: 19-21; World Bank 1994): *Basic* pensions are universally paid to all retirees, albeit they might be lowered due to insufficient years of employment or residency. *Targeted* or *resource tested* schemes include incomes and/or asset tests for eligibility. Income tests measure the amount of other pension income or various other incomes, means tests take into account incomes and assets. *Minimum* pension schemes are similar to targeted schemes. Payment is granted in the case of insufficient accumulated earnings-related entitlements that otherwise would fall below a certain minimum income threshold. All these systems have in common a strong redistributive focus to the income poor.

A Beveridge-type system in its pure form provides first-tier benefits only. However, most of the initial Beveridge type systems have at a later stage been supplemented by second-tier earnings-related components from public or occupational schemes (Hinrichs 2009). In contrast to earnings-related social insurance systems, the limited function of first-tier minimum pension schemes *crowded in* the development of further public and/or occupational schemes, for example in Switzerland, the Netherlands, Sweden, Denmark, Finland, and the United Kingdom (Ebbinghaus and Gronwald 2011). The modest public efforts to maintain the living standard for the middle to high-income earners strengthened the activity of unions and employers to bargain for occupational welfare policies.

Nowadays, the income maintenance function (second-tier provision) in Beveridgean systems is mostly reached by additional mandatory personal accumulated earnings-related entitlements. Korpi and Palme (1998) refer to *encompassing* pension systems, when old-age income security is provided by accumulated contributions and citizenship; this mixed approach between Bismarck and Beveridge type pension systems provides both a universal basic protection and compulsory coverage with contributory pensions for the active population. These systems have been developed particularly in the Nordic countries since the 1960/1970s (Korpi and Palme 1998).

Public vs. occupational welfare policies and theoretical framework

Besides the welfare state, employers also offer social security. Historically, entrepreneurial strategies aimed at binding workers to their firm by setting up beneficial occupational retirement plans; hence, occupational plans tended to favour particularly high qualified employees. Potential beneficiaries were rewarded and thus received incentives to stay with the same employer. Later occupational pension system legislation led to further inclusion of various occupational groups of employees, preventing discrimination and exclusion of employees from such beneficial agreements. Inclusion was strongly achieved by social partner's aims of universal protection for their workers (Esping-Andersen 1996).

Often firms remained the decisive actor of occupational pension scheme design and accumulation rules. However, collective agreements might decide upon comprehensive coverage for workers in a specific branch or industry, and fix minimum contributions or minimum rates of return (Ebbinghaus and Wiß 2011).

This section focuses on the interplay of public and occupational pensions. In previous research there is much variation how the interplay of public welfare state provision and occupational welfare policies has been conceptualised. Overall, there is consensus that occupational welfare policies contribute to the overall welfare level and therefore need to be included in cross-national comparisons (Esping-Andersen 1990; Kangas and Palme 1991). Rein and Turner (2004) emphasise the role of negotiated solutions to be a partial substitute towards public pensions. Greve (2007) considers occupational pensions as both a substitute to public welfare state activity and complementary welfare. According to Shalev (1996) occupational pensions are the central programme of occupational welfare that complements the public pension scheme.

Public pension policies may *crowd out* or *crowd in* further institutionalised pension schemes by the state, employers, or trade unions in order for individuals to maintain their living standard after retirement. In a first section I will provide a literature overview of theories that analyse the role of employers and social partners to provide social protection. Then, I take a closer look at occupational pension policies and its pathways of implementation that can be primarily distinguished into firm-based solutions and collective agreements.

Various theoretical concepts provide helpful lines of argumentation to explain the development and current importance of occupational welfare policy in general and the

current structure of occupational pension schemes in particular. Among them are the *power resources* theory (Korpi 1983), the *varieties of (welfare) capitalism* approach (Ebbinghaus and Manow 2001; Hall and Soskice 2001b), *occupational welfare* theory (Rein and Rainwater 1986; Reynaud et al. 1996; Shalev 1996; Greve 2007; Titmuss 1958) and in some part also Esping-Andersen's (1990) *three worlds of welfare capitalism*, and the *crowding in/out* thesis (Ebbinghaus and Gronwald 2011; Pedersen 2004; Rein and Behrendt 2004).

Most specific is Titmuss' (1958) early approach to conceptualise *occupational welfare* theory and the role that occupational pensions take up. Occupational pension plans are related to the employment position and thus tied to employer and firm policies. In his early essays on occupational welfare Titmuss fears that occupational welfare is narrowly related to 'occupational success' (Titmuss 1958: 52). Therefore, employer-based policies might be more exclusive than a universal public welfare state solution, insofar as occupational benefits may reflect occupational achievement channelled by the interests of specific groups of employees, employers, or social classes, implementing vested rights (*fringe benefits*) for themselves (Titmuss 1958). Not surprisingly, this situation can be linked to social class privileges and a gender divide in terms of inclusion/exclusion to occupational pension plans (Papadakis and Taylor-Gooby 1987).

Additionally, the established structure of industrial relations, i.e. unions and employer associations, shape working conditions and social security coverage within a country (Crouch 1993; Ebbinghaus 2006b). Collective agreements can be viewed as a counterbalance to firm-based individual agreements. Such contractual agreements result from labour negotiation and can be reached by industry, by occupation, or at the firm level (Rein and Turner 2004). Social partner's influence is channelled through the following areas: legislative framework, bargaining over plan structures and benefits, management and administration of plans, and controlling of pension funds (Davies 1996). In this level playing field, unions take action *via* the channels consultation, self-regulation, or concertation (Ebbinghaus 2006b). The state has the option of legal extension to all workers (*erga omnes* declaration) covered under a specific basic agreement within a branch or industry (Ebbinghaus 2005). Related to the area of pensions, collective agreements are strongest in France, the Netherlands and the Nordic countries (Rein and Turner 2004).

Ebbinghaus (2010) classified three major bargaining systems across advanced welfare states: *Liberal* countries deregulated their labour markets and the influence of unions is mainly based on voluntarism. In *Nordic* countries unions have always been playing a strong role for the extension of welfare state benefits. Tripartite solutions are also an important way of regulation. In between, *Continental European* countries are located. Their political power is also important, but it is mainly oriented to defending acquired social rights.

The development of structured occupational pension schemes can be further conceptualised through divergent traditions in state governance. Whereas *Liberal market economies* aim at a low influence of state actors, *Coordinated market economies* seek to balance market inequalities more strongly by regulatory efforts, particularly through union influence (Korpi 1983; Hall and Soskice 2001a). In line with this distinction, welfare state policies are in general more

developed *in Coordinated market economies*. By placing the firm in the centre of the production regime, Hall and Soskice's (2001a) *varieties of capitalism* approach tries to link industrial relations, vocational training, and corporate governance. Especially occupational pensions are a field of occupational welfare policy where these three dimensions are strongly intertwined. Altogether they all impact the outcomes of pension policies in terms of coverage and inequalities in social security, resulting in pension income inequalities (Ebbinghaus 2010; Ebbinghaus and Manow 2001).

Inadequate public pensions might increase union's interest in universal occupational provision; their strength is a pre-condition to push employers to negotiate about such binding agreements (Esping-Andersen 1996; Ebbinghaus 2005). However, unions may find it hard to agree on universal occupational plans with employer associations (Øverbye 1996); thus they show a tendency to prefer public earnings-related systems over employer provided schemes. For unions it seems more promising to reach influence directly *via* political agreements with political parties (Anderson and Meyer 2003).

Figure 1 classifies various OECD countries in pension system categories. Rein and Turner (2004) distinguish four major pathways in occupational pension scheme design: *voluntary*, *contracting out*, *labour contracting*, and *mandatory*. These four categories were also utilised in Figure 1 to signify the degree of compulsion in occupational pension systems. At the same time, a distinction of the public pension system has been introduced, referring to the main tradition (Bismarck vs. Beveridge) of the public pension pillar.

Various countries in this overview are borderline cases that make a clear classification almost impossible. The German system consists of mostly voluntary schemes and labour contracted schemes for some occupations. The French systems ARRCO and AGIRC are complementary to the basic first-pillar, labour contracted, and mandated by law; but also other labour contracted systems besides these two major schemes exist (Rein and Turner 2004).

Figure 1: Classification of public and occupational pension schemes

compulsion in occupational pension schemes: low ← → high

Classification in public pension tradition	voluntary	contracting out	labour contracting	mandatory
Bismarck (+)	Germany Italy Spain			
Bismarck (-)	Canada United States	Japan	Norway Sweden	France
Beveridge		United Kingdom	Denmark Netherlands	Australia Finland Switzerland

Notes: category Bismarck (+) refers to public pension systems with high generosity of benefits;
category Bismarck (-) refers to public pension systems with low generosity of benefits.

Sources: Behrendt 2000; Ebbinghaus and Gronwald 2011; Rein and Turner 2004; OECD 2007.

The Finnish system consists of various hybrid public-occupational schemes, resulting from tripartite negotiations about pension plans (Kangas and Luna 2011); as these systems are varying across occupation, they are considered as mandatory occupational. Canada only in the 1960s developed a state-based earnings-related system; whereas before it originated from the group of Beveridge type countries (Rein and Turner 2004). The Danish system might be considered as a latecomer with respect to labour contracted pension policies, as the voluntary solution was departed only in the 1990s when various collective agreements were implemented (Kangas et al. 2010).

The third pension pillar - variety of individualised personal pension accounts and hybrid systems

Pedersen (1999) distinguishes three main groups of individual retirement provision opportunities: financial wealth, housing wealth, and life-insurance/pension annuities. In the following, this study will concentrate on life-insurance/pension annuities, as these plans generate income flows relevant for the income mix. However, a short description of the alternative pathways for old-age protection should be given.

Financial wealth refers to the idea of accumulated savings over time through cash, deposit accounts, and financial investments, such as bonds, stocks, or mutual funds (Annex B in OECD 2013b). Housing wealth is not necessarily linked to old-age provision, however, homeownership is the main private savings mechanism; reversed mortgage regulations in various countries may allow even a dissaving option during the retirement phase (cf. Pedersen 1999).

Long-term savings products have frequently in common favourable tax treatment, encouraging take up of such plans (World Bank 1994); participation in such plans, and deferred taxation might be particularly attractive for high-income earners, who could accumulate tax-free contributions and interest rates to long-term savings products (Blinder 1982).

While in Western European countries, the US and Canada, personal pensions remained mostly voluntary long term savings plans, Latin American countries and Eastern European countries introduced mandated individual savings accounts during the 1990s (Yermo 2000; Müller 2002). One plausible explanation for mandating personal pensions rather than contributory public schemes can be seen in the mistrust of the government and the inefficiencies of the government in providing pensions (Rein and Turner 2004; World Bank 1994).

Also various hybrid systems of public / occupational / personal pension schemes have developed. The Australian *superannuation* system constitutes a hybrid case between occupational and personal pensions, as it foresees mandated contributions and voluntary contributions embedded in one account (Barrett and Chapman 2001). The British and Japanese *contracting out* structures secure mandatory contribution payments to public or private second-tier pension schemes (Shimizu 2001). The Swedish system has created personalised investment accounts (*premium pensions)*, as a mandatory deduction from the salary, where individuals could decide about individualised financial investments (Engström and Westerberg 2003; Palmer 2008).

Conclusion – extended conceptual framework for pension system design

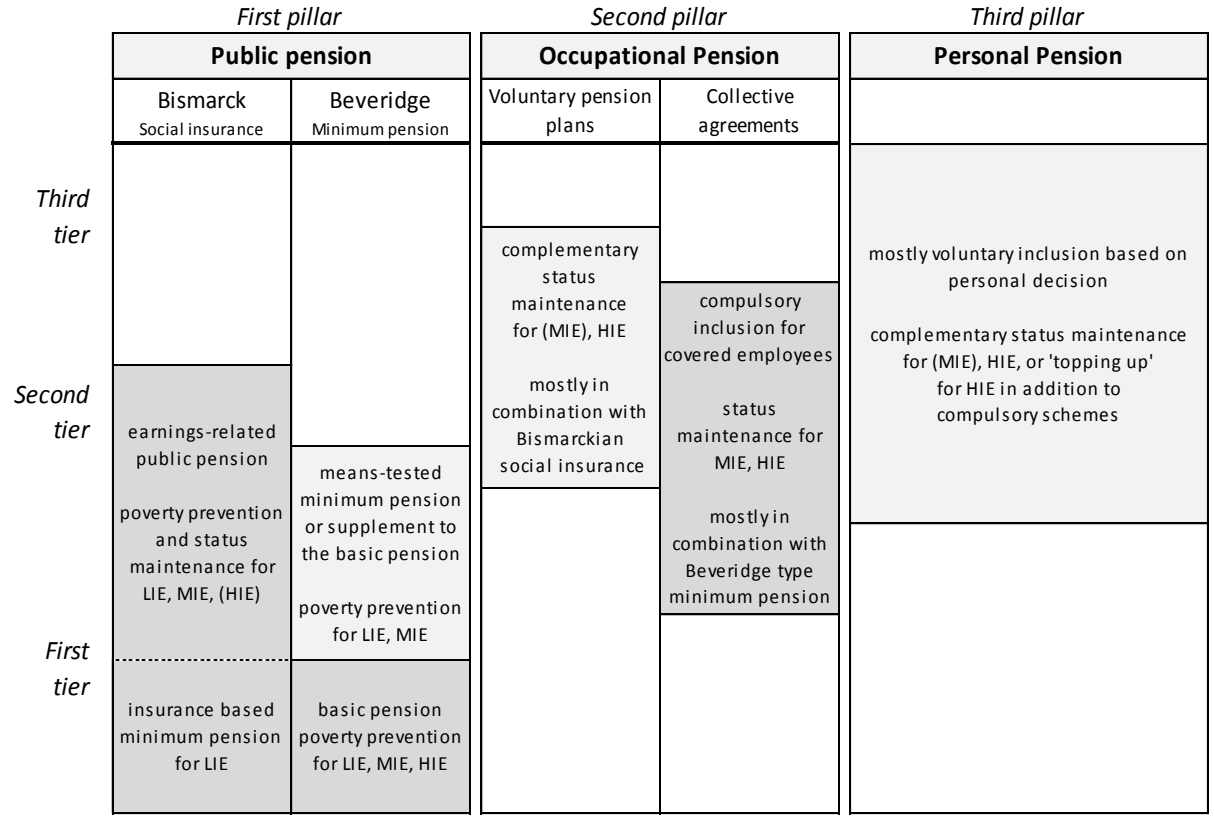
Figure 2 summarises the conceptual framework for pension system design in this study: this approach integrates the typology of Bismarckian vs. Beveridgean systems in the framework of pension pillars and income tiers of the elderly. Public first-pillar pensions by the state or in some countries also by the local governments provide either Bismarckian social insurance systems or Beveridge minimum pension schemes. The non-public pillars offer various alternative pathways of pension system design.

Bismarckian social insurance systems (for example Germany, Spain, Italy, and the United States) can be referred to as earnings-related pension schemes that secure individuals with first and second-tier benefits for the low to middle-income earners, and partly the high-income earners depending on the existence of contribution and/or income ceilings. The self-employed typically can either voluntarily contribute to earnings-related schemes or similar counterparts for the self-employed were introduced. In various contributory pension schemes minimum pensions are also foreseen (for example Estonia, Greece, Hungary, Mexico, Poland, Russia, and Spain); full amounts of the minimum pension are typically only granted when a minimum period of contributions is reached. Such contributory schemes cover typically the active population.

The first-pillar scheme in a Beverigdean pension system might foresee two types: basic pensions and/or targeted means-tested pensions. Basic pensions aim at guaranteeing the first tier of pension income for the entire elderly population; for the low-income earners these benefits possibly will also guarantee their second tier of income, when the level of the basic pension is rather high. In contrast to this, minimum pension schemes can also in general be targeted to the poor (for example Australia, Finland, Italy Spain, the United States) or foresee a means-tested supplement to the basic pension (for example Canada, Denmark, and the United Kingdom). Depending on the generosity of the amount they might provide first and second-tier benefits for the low to middle-income earners. Such non-contributory schemes typically cover the whole resident population.

Occupational second-pillar pensions mostly differ with regard to their inclusion rules; inclusion can be strongly determined by the obligation to participate in these schemes. When occupational pensions were kept mostly on voluntary decision basis by firms and individuals, this approach was frequently combined with a Bismarckian social insurance system (for example Germany, Italy, the United States). In contrast, countries that designed their public pension scheme in order to protect the poor only by providing basic and/or targeted pensions, frequently introduced collective agreements between employers and employees (Ebbinghaus and Gronwald 2011; Hinrichs 2009). Thus most initial Beveridge type pensions have developed towards Beveridge + Bismarck systems. Typically comprehensive coverage for second-tier earnings-related schemes is reached through *erga-omnes* regulations in collective agreements by employers and trade unions (for example in the Netherlands, Denmark, and Sweden), or in the case of Finland by tripartite

Figure 2: Pension pillars and pension income tiers



Notes: LIE=low-income earner; MIE=medium-income earner; HIE=high-income earner.
Light grey schemes refer to selective coverage; dark grey schemes refer to comprehensive coverage.

legislation of employers, trade unions, and the government. Notable exceptions are the pension systems in the United Kingdom and Denmark (until the mid 1990s), which hardly provided earnings-related pensions, and kept occupational pensions mostly on voluntary basis. Yet a different pathway exists in the United Kingdom and Japan, where the mandatory contributions to a state second tier can be *contracted out* to private plans (cf. Figure 1).

In some pension systems, occupational schemes may possibly also partially substitute the public targeted component. This happens when eligibility to targeted pensions is reduced as soon as other pension income exceeds a certain threshold.

Besides the provision of second-tier benefits, second-pillar schemes may possibly provide also a part of third-tier pensions as well; this is particularly true, when additional occupational schemes on top of the general earnings-related system have been introduced (for example VBL in Germany and TfR in Italy).

Third-pillar pensions can be considered a more recent development that gained further importance in the course of reforming traditional Bismarckian social insurance systems. Before personal pensions were mostly voluntary tax favoured savings plans offered by financial institutes. Nowadays more and more state regulations in third-pillar arrangements can be observed, in these recent reforms former contributions to the public system are transferred to private sector pension funds or similar investments. Embedded in this transformation can be a switch from voluntary to mandatory contributions; most notable example in Europe is the case of the *premium pension* in Sweden (cf. Engström and Westerberg 2003).

II.2. Pension reform processes and pension systems around the world

This section will focus on the historical development of pension systems. The main pathways of how public and occupational pension schemes are currently organised will be described. A second subsection will provide a worldwide overview on various pension systems around the world and try to group them along their regulatory similarities.

Country-specific and comparative pension reform processes are documented in several edited volumes (Arza and Kohli 2008a, Bonoli and Shinkawa 2005, Disney and Johnson 2001, Ebbinghaus 2011a, Immergut et al. 2007). These studies mostly elaborated nation-specific reform processes based on the national circumstances. The editors addressed mainly the following questions: How have policies been implemented, when and why have they been reformed? Are there common developments in politics? Commonly detailed argumentative country-specific chapters dealt with the political process of reformation and the interplay of actors that finally led to reforms of the systems. The following overview will highlight some of the central findings and clarify which combinations of pillars and tiers are predominant in current pension systems.

Arza and Kohli (2008a) included several studies of the political economy and sociological discussions of welfare models in their edited volume. Schludi's (2008) contribution approached partisan politics and corporatist bargaining in pension regulation from a more general analytical perspective. He argued that government's and social partner's strategies are diverse among countries and specific contexts; thus we hardly could expect clear cut pension outcomes derived from 'functional imperatives' (Schludi 2008: 66). Arza (2008) identified a general development towards individualisation of pension provision; privatisation has not only occurred in terms of strengthened regulation towards private actors, but also in the redistribution principles within statutory systems. The recent restructuring of public systems, such as reforms away from universal to means-tested minimum pensions and the cut back of early retirement incentives favoured the individualisation of benefits. Thus future beneficiaries might expect old-age pensions to be more generally closely in line with previous contributions. Frericks and Maier (2008) draw attention to the fact that pension system models and their outcomes possibly will imply gender specific inequalities. Pension system arrangements balance labour market inequalities, but generate different channels for inequalities. Individualisation of pension system regulation may have favoured economic autonomy for women, but equally put a burden of own saving on them. According to the chapter on attitudes towards the functions that statutory pension systems should fulfil (Kohli 2008), modern societies welcome efforts in poverty prevention and income maintenance by broad majority.

Ebbinghaus (2011a) was mainly interested in governance types of private pension systems and its implications for societies' risk taking structures. National studies of ten Western European economies, as well as cross-national studies documented the major steps of reformation and pre-existent forms of governance to secure individuals' contributions. Various questions were addressed: Who decides upon the introduction of complementary

systems? Who administrates these systems? What do these systems regulate? Ebbinghaus argued that 'the cross-national varieties of pension governance […] will certainly remain important for the coming years' (Ebbinghaus 2011b: 19).

In a comparative view, Ebbinghaus and Gronwald (2011) clarified which regulatory pathways were pursued across European welfare states. The authors identified three critical junctures that were similarly relevant in each country's pension system. Whereas the first juncture defined the first introduced general type of public scheme, the second juncture occurred shortly after the Second World War, setting the stage for intensified security offered by the state or private actors. Various states followed their traditions and extended pre-existent schemes. This had particular consequences for Bismarckian systems, where a crowding out of additional private schemes occurred. The situation was more diversified among the Beveridge type systems. All countries had in common a development of earnings-related schemes besides the minimum pension scheme; however, the interplay of actors and the degree of regulation differed. Whereas the United Kingdom and Denmark upheld a mostly unregulated occupational pension landscape, tripartism in Finland and Sweden favoured solutions based on broad obligation. Also the Dutch system that had switched to a minimum pension in 1949, regulated private pensions broadly mandatory through collective agreements and its extension to covered workers. Thus Beveridgean systems show a broad variation of voluntary and/or mandatory earnings-related systems, which may have manifold redistributive effects in addition to public minimum pension.

Ebbinghaus and Wiß (2011) pinpointed three major *governance modes* of complementary pensions: individual decisions, employer commitments, and collective agreements. Individual plans were typically based on own efforts to save for old age; such plans favoured portability in the case of switching jobs. Employer commitments were typically organised on prospective careers within specific firms; they were a good way to bind workers within the firm, by offering generous pension promises. They were by majority financed by the respect-tive employers and thus portability was often problematic. Collective agreements favoured universal contribution payments by both employees and employers. In addition related policies can regulate portability between employers, investment rules, minimum returns, and insolvency protection. Empirical research of these institutions showed that each country had diversified regulations, also broadly specifying a diversified risk of adequate provision.

Ebbinghaus and Neugschwender's (2011) contribution analysed the public-private mix and income inequality of current pensioners in a cross-national setting. The study of nine European countries focused on recipient rates of private pension income along the income distribution, and how important private pension income was in the income mix; analyses on the individual were contrasted against the household level. The findings showed that gender-specific inequalities were essentially reduced when taking a household perspective. However, the lower inclusion of women to private pension plans remained evident. It also was shown that in multi-pillar systems, where private pension income was also quite relevant in the income mix as a result of the limited role of the public first-pillar scheme, market inequalities were similarly reproduced like in purely Bismarckian contribution-based systems.

Disney and Johnson's (2001) edited volume is beneficial to the cross-national study of old-age income security systems and income inequalities in various ways. Mainly originated from an economist perspective the authors developed an agenda how cross-national studies help to understand outcomes of pension policies in terms of inequality and sustainability. Besides the study of pension system development in the public and private sphere and theoretical clarification of eligibility criteria for certain types of pensions, they also were interested in the financial outcomes of the elderly (Disney and Johnson 2001: 2). Major interests were coverage with private pensions and its future development, and pensioner income in relation to non-pensioner income and its inequality development over time. Lastly, future expectations for policy shifts were also part of the research agenda. The authors pointed to the effects of different indexation mechanisms of pension benefits, which can cause a decrease in pension income levels during the years in retirement.

The design of Disney and Johnson's (2001) edited volume provided a systematic approach to evaluate pension outcomes; the authors paid attention to follow a strict structure for their country-specific contributions that were written by country experts. Thus the chapters provided both expert knowledge on the country's institutions and harmonised statistics at the empirical level. Based on nation-specific findings of their edited volume (Disney and Johnson 2001), the authors concluded that there were manifold options in structuring pension systems, these different pathways however led to rather similar outcomes for the average retiree. The authors observed a general development towards a broader role of private pension schemes; these schemes generated not only a partial substitution of public pensions, they kept public pension expenditures on a rather low level. However this minimalist state plus private pension solution may have favoured also a selective situation for the middle to high-income groups; the share of persons earning above average earnings was lower under such types of regulation as compared to social insurance systems.

A world-wide perspective on pension system development might reveal substantial differences in the policy approach to pension system regulation. Whereas in most advanced economies such as Western Europe, the Anglo Saxon countries, and Japan, the development of earnings-related systems covered a broad share of the population, the problem load is quite different in less developed countries. As mentioned by the World Bank (1994) large informal sectors and tax evasion led to inefficient coverage with public pension programmes in many Latin American countries. But also voluntary private solutions were problematic in developing countries; underdeveloped capital markets and insurance market failures created restrictions for personal old-age savings (World Bank 1994).

In the following a brief overview on pension systems around the world is provided. Table 1 in the Appendix (Chapter II) describes the main elements of pension systems in 21 countries; five types of programs are distinguished:

- first-pillar targeted/basic schemes,
- first-pillar work-related schemes,
- second-pillar mandatory/quasi mandatory schemes,
- second-pillar voluntary schemes,
- and third-pillar schemes.

It is worth mentioning that the grouping into work-related schemes, rather than earning-related schemes is driven by the conceptual grouping of pensions in the Luxembourg Income Study (LIS) Database. This approach is chosen in order to keep consistency between the empirical overview in Chapter III.1 and the classification of these pension schemes.

More in detail, LIS separates out all pension schemes which require a work history in work-related insurance transfers. Thus minimum pension schemes embedded in the earnings-related pension scheme are also included in this category: such pensions are not earnings-related, as they guarantee minimum amounts when the accumulated entitlements in the earnings-related scheme remained below a certain threshold. Thus the contents of the category work-related schemes are a bit broader than the contents in a strictly defined earnings-related category would be.

In the following, I will concentrate on a description of old-age pension systems: Besides old-age pension income, the elderly may possibly also receive disability pensions or survivor pensions. Particularly in the case of survivorship there exists also a huge cross-national variation in terms of regulation. In some countries survivors are mostly covered through the old-age pension system, whereas in other countries the transfers of a formerly insured are partially transferred to the surviving family. In addition to that, there exist also systems where benefits are paid to survivors that are independent of the insurance history of the deceased and/or the beneficiary. Also disability pensions might be paid either based on a personal insurance history, or independent of any previous insurance. Frequently the right to disability pension income ceases as soon as the recipient becomes eligible to an old-age pension. For further interest the EU's Mutual Information System on Social Protection (MISSOC), the Social Security Programs throughout the World (SSPTW) reports, as well as the institutional tables from the Luxembourg Income Study (LIS) Database provide a broad overview on these areas of social security protection.

Regarding their old-age pension system, the countries show a broad variation in their combination of pension pillars and eligibility rules. Basic protection schemes exist in Canada, Denmark, the Netherlands, Japan, the United Kingdom, and partly in Brazil and Mexico, where either the rural population is covered or specific regional schemes were implemented. Besides a minimum age, eligibility to the full amounts is restricted in case of insufficient years of residence (Canada, Denmark, the Netherlands) or insufficient years of employment (Japan, the United Kingdom, Brazil).

Targeted protection schemes are more common than basic protection schemes. Australia, Brazil, Denmark, Estonia, Finland, Germany, Hungary, India, Ireland, Italy, South Africa, Spain, the United Kingdom, and the United States have incorporated targeted components in their pension systems. In Canada, Denmark, and the United Kingdom targeted schemes are set up in addition to basic schemes. Targeted pension schemes are tested against either other pension income (Australia, Estonia, Finland, Italy, Spain), or other income (Brazil, Canada, Denmark, India, the United Kingdom), or other income and assets (Germany, Ireland, South Africa, the United States), or assets (Hungary). In Australia, and Estonia eligibility to the full amount is also reduced by insufficient years of residency in the country.

The first-pillar (public) work-related component is typically related to the years of employment or insurance and employer and employees contributions during these insurance years. Some countries contain stronger redistributive elements than others, as there is less equivalence between contributions paid and final amounts received. This is particularly the case when minimum pensions are paid to the ones who did not have sufficient contributions (Estonia, Greece, Hungary, Mexico, Poland, Russia, Spain). Most of the countries have a pay-as-you-go (PAYG)-structure, where the amount is calculated on a specific formula that typically requires a cross-financing from state subsidies. Individual accounts mostly exist in Finland and have been introduced in Mexico. The Italian system, as well as the Polish and the Russian pension system have recently introduced notional defined contribution (NDC) accounts.

The main difference in the second-pillar (occupational) schemes can be identified by mandatory vs. voluntary participation in these schemes. Countries that focus more on targeted/basic protection schemes and less on public work-related systems, typically complemented the public system by (quasi) mandatory occupational systems (Australia, Denmark, Finland[1], India, Japan, the Netherlands). Exceptions from this pattern are Ireland and the United Kingdom, where the occupational systems remained on a voluntary structure.

Social partners play an important role in setting up the rules for contributions and participation in industry-wide schemes in Denmark, Finland, and the Netherlands, which cover the broad majority of the working population (more than 80 per cent) (OECD 2013a). Much more selective is the mandatory inclusion in Germany, where only some collective agreements foresee a mandatory enrolment to occupational pension schemes.

All second-pillar schemes in this overview are financed only by employer and employees contributions, but they can be further distinguished in *defined-contribution* (DC) and *defined-benefit* (DB) schemes. In DC schemes amounts are calculated through accumulated contributions and investment returns, whereas DB schemes typically provide benefits based on years of contributions and (final) earnings (Queisser et al. 2007). DB schemes are mostly common in Canada, Ireland, the Netherlands, South Africa, Spain, and the United Kingdom. However, the broad majority of countries offer DC plans. In some countries it is also common to receive lump-sum amounts instead of annuities (Australia, Denmark, India, and South Africa).

Besides the occupational schemes, many countries also established a regulated third pillar of pension provision. Hybrid schemes in Brazil, Germany, and the United States allow either employment-related contribution payments as deductions from the wage or personal contribution payments.

[1] The Finnish system is classified as first-pillar earnings-related and second-pillar mandatory system, as it is the outcome of a specific tripartite arrangement between the state, employer associations, and trade unions (cf. Kangas and Luna 2011).

II.3. Measurement of pension outcomes and inequality

Having clarified the main conceptual differences in classifying pension systems, I will now turn to the measurement of pension outcomes. The measurement of pension outcomes extends the pure knowledge about institutional variety of pension systems. Empirical analyses of pension outcomes provide important feedback on the impact of introduced pension policy measures.

In the following, I will first point out general ideas of measurement. Then I will describe findings about inequalities among the elderly. Each study that evaluates pension outcomes applies certain measurement techniques to interpret and/or compare the findings. Thus in contrast to the previous section 'pension reform processes' (Chapter II.2) that only provided an introductory overview, this section will contain a critical review of the studies.

Various measures are commonly used to evaluate living standards. Among these measures are common inequality measures, such as the Gini-coefficient, percentile ratios, and poverty rates that are in general widely used to study the inequality of the income distribution. There are also specific measures that relate more closely to the institutional settings. For example replacement rates of pensions express the generosity of the social security system and private arrangements. All these measures are indicators that measure outcomes. In addition to indicators there exist also theoretical approaches that describe pension outcomes, such as *income security* / *pension adequacy* and *horizontal* vs. *vertical* redistribution.

Myles (1989) introduced the terms *income adequacy* and *income security* conceptualising pension outcomes. He argued that *income security* of the elderly should express a certain income level of pre-retirement earnings; he stressed that a general replacement ratio between 60 and 80 per cent might provide effective security. By defining this benchmark, Myles added an indicator to measure *income security*.

Similarly *income adequacy* describes the necessity that low-income earners need additional support, as meeting *income security* did not protect them from poverty. Thus low-income groups are in need of higher replacement ratios to escape poverty, which relates to additional efforts by the state to redistribute income to the poorest of the elderly (Myles 1989: 53-57). Also *income adequacy* can be measured by an indicator; being income poor can be measured by the share of persons with income below a certain threshold, frequently expressed as a percentage of median earnings among the total society. According to the European Union and also applied by many European nation states, extreme poverty face those that have less than 40 per cent, those with less than 50 per cent are considered income poor, whereas those with financial resources between 50 and 60 per cent of median income are threatened by poverty (European Commission 2011). In contrast to this relative measurement, poverty can be similarly measured based on a nationally defined absolute poverty line.

The terms *income adequacy* and *income security* raised by Myles (1989) were similarly concepttualised by the OECD referring to *prevention of destitution in old age* and *income maintenance.* 'The first [goal] is redistribution of income towards low-income pensioners and prevention of destitution in old age. The second [goal] is helping workers maintain living standards during retirement by replacing income from work at an adequate level' (OECD 2005: 15).

The European Commission (2003) also refers to these two core functions in a similar way: *preventing social exclusion* and *enabling people to maintain living standards.* Additionally, a broader goal of *pension adequacy* that fulfils both is mentioned. The two objectives are further concretised:

Objective 1: *preventing social exclusion*

> *Ensure that older people are not placed at risk of poverty and can enjoy a decent standard of living; that they share in the economic wellbeing of their country and can accordingly participate actively in public, social and cultural life* (European Commission 2003: 23).

Objective 2: *enabling people to maintain living standards*

> *Provide access for all individuals to appropriate pension arrangements, public and/or private, which allow them to earn pension entitlements enabling them to maintain, to a reasonable degree, their living standard after retirement* (European Commission 2003: 30).

Another common approach to study pension systems and pension outcomes is the analysis of redistributive effects. Fulfilling old-age security goals, nation states provide two sorts of redistributive mechanisms: *horizontal* and *vertical* redistribution (Esping-Andersen and Myles 2009; Palme 2006). *Horizontal* redistribution describes benefit structures where providers accumulate own entitlements during their working career. Thus later pension transfers are closely related to contributions during the employment years; such transfers can be described as deferred use (*consumption smoothing*) of financial resources, referring to *income security/maintenance*. *Vertical* redistribution describes the reallocation of benefits to the poorest income group, securing *income/pension adequacy* for the poorest income group.

Besides the already mentioned indicators poverty rates and replacement rates to measure income adequacy and living standards, redistributive effects are also measured by analysing percentile ratios. Percentile ratios measure the distance of specific points in the income distribution in comparison to another point. For example the income of the median earner could be three times higher than the income of the person at the 10 per cent percentile. In order to analyse the redistributive effect for the elderly, policy analysts can evaluate if this number decreased when only looking at the elderly population as compared to the total population, indicating a redistributive effect in favour of the poorest income group of the elderly.

The OECD and the World Bank published various studies about pension system components and the financial well-being of the elderly. These studies give a brief overview on pension schemes across many developed and developing countries around the world: *Ageing and Income* (OECD 2001), *Pensions at a Glance* (OECD 2005/2007/2009/2011/2013), *Complementary and Private Pensions throughout the World 2008* (OECD et al. 2008), *Pensions Panorama: Retirement-Income Systems in 53 Countries* (Whitehouse 2007), *Averting the Old Age Crisis* (World Bank 1994). The following paragraphs will concentrate on the studies by the OECD, as these studies primarily discuss and evaluate the old-age income of advanced industrialised countries, which similarly will be pursued in the research agenda of this monograph.

The OECD's (2001) report on *Ageing and Income* focused on both current income of the elderly and simulated income based on current pension system regulation, whereas the more recent reports *Pensions at a Glance* (OECD 2005/2007/2009/2011/2013) have shifted to income simulation techniques in general. The main finding of the *Ageing and Income* report that is also in line with Disney and Johnson's (2001) study was that pension benefits were rather similar in terms of income generosity across countries. This was the case although there existed rather divergent combinations of pension income sources that were created by various pension schemes (OECD 2001). The OECD divided the income distribution in ten income deciles for which the mean disposable income was calculated. (OECD 2001: 24). During the mid 1990s, in two countries, Canada and Italy, the poorest elderly were financially much better off than the poorest individuals in working age. However this beneficial situation was already reversed for the persons in the second and respectively third income decile group; here income standards of the working-age population exceeded those of the elderly population, signifying that old-age security systems tended to generate in general lower income standards. For the highest income deciles Finland, Italy, and the United Kingdom lagged behind the relative income levels reached in the other countries.

This measurement is problematic, as it depends on the income distribution among the current working aged population. Thus if inactivity through unemployment or care responsibilities were rather high at a specific point in time or social assistance or unemployment benefits were particularly low, these figures produced rather distorted outcomes. Similarly if there existed a much higher share of elderly that were still working among the persons aged 65 and older in one country, these persons were likely to end up in high-income deciles, in particular when delayed retirement relates to high qualification. The findings by the OECD documented that this effect was non-negligible, as the replacement levels increased strongly in the highest income decile; the beneficial situation was caused by both working income and capital income (OECD 2001: 24; 27-30). However, analyses of mean pension income by decile did not allow conclusions if both income sources were equally important for the individuals who ended up in the highest decile. Work incomes as well as private pensions might be rather selectively important for a very small group of beneficiaries that at the same time received very high amounts. The major income sources for the low-income group were particularly public pensions or transfers from social assistance schemes.

The OECD also documented real income growth between the 1980s to the 1990s for the working aged and the elderly population (OECD 2001: 38-40). The results showed a mixed picture: Germany, the United States, and Japan showed higher increases for the total population than for the elderly population, whereas the other countries showed the reversed pattern. Diverging tendencies also occurred when looking at income quintiles. Whereas in Sweden and the United Kingdom particularly the high-income elderly group showed the strongest increases in income, the picture was reversed in Germany, Finland and Canada; these countries showed stronger increases among the low-income group of the elderly. The report also evaluated which income sources were driving this development. In most countries social transfers caused the increases; in contrast British retirees benefitted from higher capital income.

These evaluations can be very beneficial for the evaluation of different pension income sources received by various pension schemes; however, a further distinction in pension income components was not pursued in this OECD study. By knowing the state of maturity of various pension schemes in each nation state, one might be able to identify how these schemes affected the income distribution, e. g. the strong increases for Swedish retirees on the upper end may relate to the maturing of the earnings-related ATP scheme. Similarly, the better financial situation of retirees in the United Kingdom may possibly relate to increasing importance of private pensions.

Another chapter of the *Ageing and Income* report laid the groundwork for further studies by the OECD, documenting the outcomes of pension systems, specifically the *Pensions at a Glance* reports. In contrast to the previous setting, where financial well-being of the current elderly was shown, this OECD approach involved a pension scheme modelling for future contributors and retirees (OECD 2001: 47-65). Pension outcomes were depicted for specific working-career paths, while taking into account accumulated pension entitlements from various schemes of the pension system. Thus specific pension schemes and the entire pension system should be analysed in a standardised way in terms of generosity for specific income groups. According to the OECD the strength of the approach is the evaluation of current pension system design, whereas interpretations of current incomes are necessarily out-dated, as they were created by the pension schemes from the past.

However, this modelling approach comes with several unsatisfactory results that were mentioned by the OECD as well (OECD 2001: 49): contributions were calculated based on future scenarios, thus further reforms besides current transformations could not be taken into account. The OECD's *Pensions at a Glance* report revealed some of the basic assumptions; depending on each parameter quite different estimates could be calculated (OECD 2005: 39-46; 73-80). It becomes clear that persons with interrupted labour-market careers cannot be analysed appropriately with this generalised approach. It needs many additional modelling steps to reflect typical and atypical employment careers. The OECD's simulation of 35 instead of 45 employment years are one step in this direction, but still far too inflexible to capture relevant employment patterns within a specific society. Similarly, modelling procedures are only barely adaptable to *economies of scale* and inter/intra household redistribution; these scenarios might vary a lot in cross-national perspective, and are much better captured in a study of current pension incomes. A general problem is also to document replacement rates for the low-income group; depending on the level of the minimum pension at a specific point in time, the replacement rate varies for the recipients of the minimum amount. For minimum pension and social assistance recipients the evaluation of current income is much more appropriate, as it closely relates to the regulation in place at this point in time.

Simulation techniques have been also applied in an edited volume by Meyer et al. (2007) that contained a sample of six European countries. The editors constructed risk biographies, reflecting common employment patterns and family types (Bridgen and Meyer 2007a); simulated working careers for single mothers, two parent families, and interrupted

employment careers were included. These profiles were simulated according to their contribution payment and their future pension income. The authors found the Dutch system scoring best in terms of social inclusion which is measured as percentage of the elderly receiving higher income than 40 per cent of average earnings, the severe poverty indicator. Countries that had left private pensions on voluntary participation showed problematic income gaps, which, if not filled by private pensions, were not closed by the mandatory schemes. Therefore, the authors concluded that the type of private pensions is an essential feature for social inclusion (Bridgen and Meyer 2007b).

Similarly to the critique of the simulation approach, Bridgen and Meyer's (2007a) modelling can be seen as problematic. Although the editors took up the main critique of insufficient possibility to capture interrupted employment careers in the OECD's technique, the design showed an additional weakness. The calculated risk profiles did not take cross-national variation into account. The proposed risk biographies were not based on actual employment careers; the risk profiles were predicted employment careers of the future. Thus the findings may be misleading; some modelled groups which were found to be at risk may reflect an idealised problem that possibly is irrelevant for a specific society, as the modelled group did barely match the typical career patterns.

The most systematic approach to bring together the study of institutional variety and pension outcomes has been undertaken by Disney and Johnson (2001) that has been already described in Chapter II.2. However a few shortcomings remained. The country selection was primarily concentrated on the liberal tradition of welfare states; the conservative countries are represented by Germany, France, and Italy. However, there was only one case representing encompassing pension provision: the Netherlands that combined a universal minimum pension with broad obligation to participate in complementary pensions. Lacking in this edited volume were the Nordic countries that also implemented rather compulsory private schemes that affected strongly the outcomes of the income mix of the elderly; the Nordic countries offered various other important alternatives for pension provision that would have been beneficial for the analyses. The second shortcoming lies in the use of national data sets and the evaluation by country experts. This proceeding can limit data comparability across countries if not the same standards in data preparation and analysis were applied.

II.4. Pension systems and social protection – a comprehensive perspective

The following paragraphs try to establish a comprehensive perspective for the study of pension systems and redistribution. This framework contains three components (1) *pension system characteristics*, (2) *individual labour market attachment*, and (3) *living arrangements*. All three areas have in common that risk groups can be better conceptualised, as compared to a purely empirical study on pension income inequalities. Although pension systems in general may be able to reduce poverty and inequalities among the elderly, their design may still involve strong stratification mechanisms (Palme 2003). Thus to interpret inequalities in pension income, one needs to first understand the redistributive potential of specific schemes.

Distributional consequences of a combination of public and private pension pillars can be expected to be twofold. First-tier schemes may include a high degree of *vertical* redistribution towards the poor, whereas second-tier schemes entirely provided by private actors may distort redistributive outcomes again. Korpi and Palme (1998) concluded from a cross-national study that there might be a *paradox of redistribution*: 'The more we target benefits at the poor only and the more concerned we are with creating equality via equal public transfers to all, the less likely we are to reduce poverty and inequality' (Korpi and Palme 1998: 681-82). The authors claimed that earnings-related schemes should thus be considered as a pre-condition for reducing inequality structures.

(1) Pension system characteristics

Historically, nation-specific pension systems have developed along various paths, redistributing income differently across the aged. Whereas some elements of pension systems, like earnings-related social insurance systems may have favoured reproduction of market inequality, other benefit structures such as minimum pensions or derived benefits may have redistributed income among the elderly in favour of the poor. Besides public policies, social partners or firms can also substitute or complement to the old-age provision of individuals. Particularly the role of private pensions is less studied in a comprehensive and cross-national perspective; occupational and personal pension's effects on income inequalities among the elderly are controversial and need further clarification. One major feature is the regulatory power of corporatist actors; these actors may or may not be in charge to regulate complementary pension schemes. Thus the degree of participation of non-state actors has created multiple paths of pension system design.

In addition to the core earnings-related pension scheme, many states have implemented redistributive elements and/or derived pension claims to protect specific elderly risk groups, such as non-working spouses and survivors. Such redistributive elements and derived pension transfers across European countries have for example been documented by Monticone et al. (2008). The authors analysed minimum pension regulation, means testing, care credits and survivor benefits. In the sphere of care benefits, further sub-distinctions can be made into maternity and child-rearing, and credits for caring for disabled persons. In addition, survivor benefits can be regulated; entitlement criteria are e. g. duration of marriage and minimum age to claim such benefits. In general, old-age and survivor benefits can be income-tested and reduced depending on other household member's income.

These redistributive elements and derived benefit regulations concern mostly the public pension schemes; redistributive policies were implemented less in occupational and personal schemes. On the contrary, if not regulated-well, occupational schemes might not only relate to no contributions during periods of inactivity, but also result in a loss of entitlements, when an employee changes jobs or the employer goes into bankruptcy (Pedersen 1999). Thus periods of inactivity are expected to be more disadvantageous in pension systems, where public welfare state activity was substituted by occupational welfare policies. Nowadays, many advanced countries have addressed issues of portability and insolvency, and

introduced insolvency protection agencies (Ebbinghaus and Wiß 2011), but portability and insolvency could remain a central problem in developing countries. Pension systems that were lacking these redistributive elements and/or private pension protection, might leave more persons at risk, and also create more inequality across the elderly.

(2) Individual labour market attachment

Financial security of elderly individuals has to be understood as a result of a specific life course process before actual retirement. This process starts with education opportunities and policies strengthening equality of chances, and then continues with the individual working career and varying opportunities to be continuously included in particular occupations. Hereby, active labour market policies may help to (re)-integrate inactive persons such as the unemployed, mothers and homemakers.

The *new social risks* theory argues that industrial change and its consequences cause high labour market risks and insufficient social security for specific groups of the population nowadays (Armingeon and Bonoli 2006; Bonoli 2006; Bonoli 2007; Taylor-Gooby 2004a). Staying in a secure job, which is also well paid, has become more problematic in recent decades (Taylor-Gooby 2004b); this specific risk faces the low-educated group, in particular. *New social risks* proponents argue that further adjustments are needed to protect various risk groups better as compared to the current pension system design. Therefore, Hinrichs and Jessoula (2012) propose a new analytical approach that brings together research on instability of employment and social protection, pension systems and its consequences for social protection in old age. Non-standard employed persons may find it hard to contribute to private pensions (Turner and Rajnes 1998), which in turn means, the more persons were affected by instable working conditions, the more under-secured they can be in old age.

In the past, early labour market exit has been on the other hand rather important for older workers; early-retirement policies in public and private schemes were attractive means for employers and employees to retire early (OECD 2001). Such options were taken back more and more in the second half of the 1990s; also incentives to work longer than statutory retirement age were introduced (OECD 2001; Ebbinghaus 2006a).

Particularly in systems where minimum benefits are paid only when reaching the statutory retirement age, occupational and personal pensions might work as a bridge for senior workers who were excluded from the labour market before reaching statutory retirement age (OECD 2001: 12; 35-37). Yamada and Casey (2002) identified such partial pension recipient patterns for example in Canada, the Netherlands, Sweden, the United Kingdom, and the United States. It is worth mentioning that partial early or partial retirement, most likely is accompanied with reduced pension system contributions and pension benefits. On the other hand, if workers choose belated retirement, they possibly will accumulate further entitlements to pensions. Recent reforms of the pension systems frequently reward prolonged working career decisions (OECD 2013a).

Thus the individual period of contribution payments and the individual retirement decision has become more flexible. If a person for example chooses early exit, this person might

consider that an earlier exit and a potentially lower percentage of replacement of the previous earnings than the one at statutory retirement age might be as good for him/her as a continued employment and the higher replacement at statutory retirement age. However, in this example the person who retires early might not only expect a lower pension from the public system, but also from the occupational and personal systems.

Similarly, the belated retirement decision could be linked to unaffected benefits in the public system (in the case of minimum pensions), but to longer contribution periods in private schemes that shift the public-private mix to a stronger relevance of private benefits.

These simple considerations show, the more individual decisions shape the general pattern of retirement, the less might a pension income distribution reflect the intended ideal set up of the established pension system. This is particularly true, when flexible retirement age regulations exist.

(3) Living arrangements

The sphere living arrangements can be subdivided in two dimensions: the situation during the working career and the situation during retirement. The situation during the working career is closely tied to the argument of labour market attachment; couple households may show a shorter period of full-time labour market participation for one partner, particularly when raising children; thus also contributions to specific pension schemes differ by household type.

The *male-breadwinner model* (Esping-Andersen 2002; Lewis 1992; Lewis 2001) supported the idea that the head's provision in social security was sufficient for the whole family. Thus spouses were less secured on their own and frequently dependant on the partner's social benefits. Although the *male-breadwinner model* is less pronounced in current societies due to increased labour market participation by women, in couple households men are more likely to have un-interrupted full-time labour market integration than women. Women in partnership are more engaged with homemaking and taking care of the children, elderly, and disabled than their partners; thus they are more likely to interrupt their working career and to be exposed to atypical/part-time work arrangements (Fagan and O'Reilly 1998; Fagan and Rubery 1996). As contributions are lower during phases of inactivity or part-time employment and other atypical employment contracts, pension entitlements in earnings-related schemes can be expected to be lower as well.

The situation during retirement describes the potential resource sharing with a partner and/or other household members (*economies of scale*). In many OECD countries it is common that the elderly are living on their own, either as single or couple household; more than 80-90 per cent of the elderly live in single or couple households, exceptions being Italy and Japan where multiple generation patterns are more common (Yamada and Casey 2002). Related to the analysis of income packaging among elderly households this means that such analyses foremost relate to the study of single and couple households, where all members are elderly persons and potential pension recipients.

Pension systems and redistribution – a comprehensive perspective

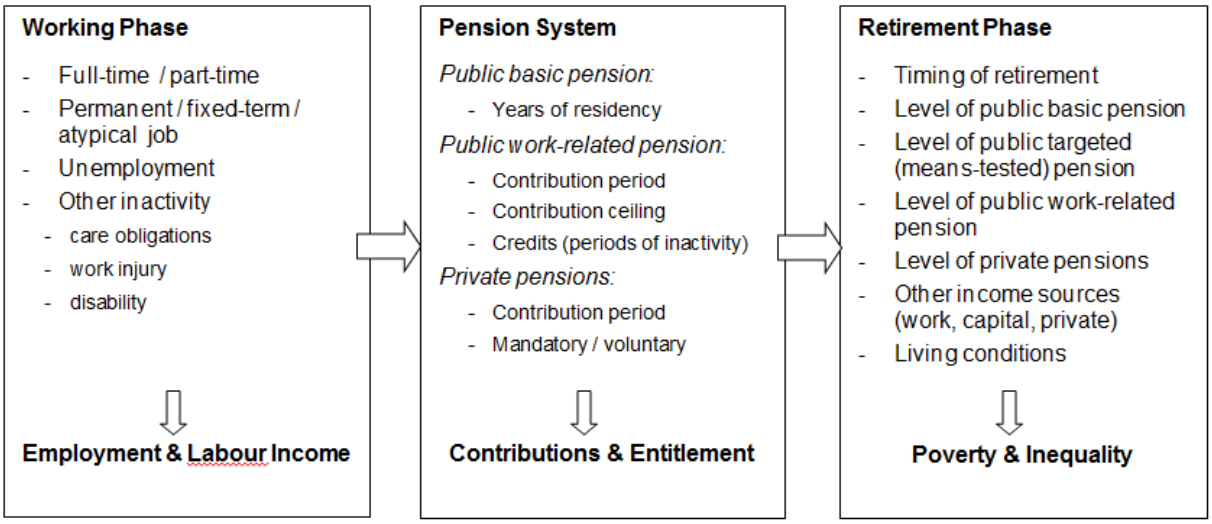
Figure 3 establishes a stylised model how to interpret pension system design, labour market attachment, and inequalities of pension outcomes jointly. The main focus of this comprehensive perspective is to show how contributions and entitlements during the working phase relate to pension income during the retirement phase. The various combinations of the features in the boxes either reveal a strong link between the three elements or limit the link between the boxes for a specific population group or group at risk. This conceptual framework broadens the scope for comparative studies explaining inequality of pension income.

The first box (working phase) describes the stability of labour market participation during the working phase. The more this continuity is disrupted by instable working conditions and periods of unemployment, or periods of inactivity due to care obligations, or work injury, or disability, the stronger can be the repercussions for the accumulated contributions to earnings-related pension schemes and later entitlement to pension income.

The second box (pension system) summarises the main characteristics of various pension schemes on which the entitlements to later benefits are built. Thus longer periods of inactivity might result in lower contributions and reduced pension entitlements. However, many public earnings-related schemes also foresee credits for periods of inactivity (for example unemployment and motherhood) that make up for the interrupted or reduced contributions during periods of inactivity. In private pension schemes inclusion can be strongly influenced by the obligation to participate in private pension plans offered by employers (second pillar) or financial institutes (third pillar).

The third box (retirement phase) includes the main components that characterise incidence of poverty and inequality of pension outcomes during the retirement phase. In general the individual retirement decision might influence the generosity of pension annuities from various pension schemes. Each of the pension schemes may possibly secure a different part

Figure 3: Stylised model of retirement income



Source: Ebbinghaus and Neugschwender 2011: 392, adjusted.

of the population. For example the existence of a public residency-based basic pension entirely unlinks the working phase from the retirement phase, as it provides a minimum benefit as universal right to the whole population.

The link between stability of employment, accumulated contributions, and later benefits remains much stronger in earnings-related schemes. Here *defined-benefit* or *defined-contribution* plans structure the pension outcomes. Depending on their regulation, contributory pension schemes include further redistributive elements, or simply serve as savings schemes (World Bank 1994). In general, other income sources such as labour income, capital income, income from private sources, and also incomes of other household members further reduce pure dependency on individual pension rights.

Individual labour market attachment and *living arrangements* during the working career and during retirement can have strong repercussions on *pension system characteristics* itself. Inequalities during the working phase and regulation of public and private pension schemes are expected to strongly affect poverty and inequality of retirement income.

Different risk profiles require different pension system regulation to be protected in old age; this protection is organised in various ways depending on the national approach to take action securing the population against social risks and the strategy to set up comprehensive pension systems that prevent poverty and social exclusion.

A specific risk group in public contribution-based schemes were mostly women that still showed a lower labour market attachment in the second half of the 20th century in most advanced societies. Therefore, in various states, specific regulations granted access to pensions of the former divorced or deceased spouse and/or take into account periods of inactivity (maternity, unemployment) when the final pension annuity was calculated. These redistributive policies might particularly favour women for two reasons: First, mostly women interrupt the working career for raising children. And second, women frequently outlive their spouse and thus might partially inherit the insurance-based pension of the deceased spouse.

A cross-national study of past and current pension system legislation and the current public-private mix will reveal how outcomes of pension systems compare and in how far these outcomes guaranteed a minimum living standard and/or maintained the previous income level. A key feature of this analysis is a detailed study of public, occupational, and private pension systems and their combined effects on the outcomes, as each component of the pension system can be expected to affect the income distribution in a quite particular way, which will be elaborated further in the research agenda (Chapter III.3). An over-time comparison that is studying pension outcomes by birth cohorts will clarify how far the pension income mix is changing, and which consequences this change has for the income distribution and inequality among the elderly.

Appendix (Chapter II)

Table 1 : Overview on pension systems around the world (Australia-Denmark)

Country	First pillar (public)		Second pillar (occupational)		Third pillar (personal)
	Targeted/Basic	Work-related	Mandatory/quasi mandatory	Voluntary	
Australia	***Age pension*** Eligibility: aged 65 or older, and 10 years of continuous residence or 5 years if the total residence period exceeds 10 years; income-tested; reduced if other pension income sources are received. Financing: taxation.		***Superannuation funds*** mostly defined contribution; employee is not required to contribute to the pension plan. Frequently partly paid as lump sums. Financing: employer and employee contributions.	***Superannuation funds*** must be an employed person with a superannuation through your company or with a separate plan. Frequently partly paid as lump sums. Financing: employer's and employee's contributions.	***Retirement savings accounts (RSA's)*** provided by deposit-taking institutions or life insurance companies.
Brazil	***Old-age benefit from LOAS (Lei Orgânica de Assistência Social)*** Eligibility: aged 65 or older and without remunerated work, and with family monthly earnings less than 25% of the minimum monthly wage. Financing: taxation. ***Previdencia Rural (Rural Pension)*** Eligibility: men aged 60 / women aged 55 who have at least 180 months of work in rural areas. Benefits are equal to the minimum wage. Financing: taxation.	***Regime geral de previdência social (RGPS)*** full pension paid when 35 years of contributions (men) or 30 years of contributions (women): Amount: 80% of monthly earnings since July 1994, multiplied by the Factor Previdenciario. Financing: employer and employee contributions.		***Regime de previdência complementar (RPC)*** Non profit-organisations offer open/closed private pension schemes which employers/labour unions can establish; not strictly linked to employment. Financing: employer and employee contributions.	
Canada	***Old age security (OAS)*** Eligibility: aged 65 or older and 10 years of residence; reduced amount if less than 40 years of residence. Financing: taxation. ***Guaranteed Income Supplement (GIS)*** Eligibility: must be receiving OAS; the GIS is reduced against income other than the basic pension at a 50% rate. Financing: taxation.	***Canada pension plan (CPP) and Quebec pension plan (QPP)*** Amount: replacement rate of 25% of earnings up to the Yearly Maximum Pensionable Earnings (YMPE), based on average lifetime salary (excluding the 15% of years with the lowest earnings). Financing: employer and employee contributions.		***Registered retirement income funds (RRIFs)*** mostly defined benefit plans Financing: employer and employee contributions.	***Voluntary pension savings (RPPs)***
Denmark	***Folkepension (basic amount)*** Eligibility: aged 65 or older with at least 3 years of residence between the ages of 15 and 65 or older; reduced amount if less than 40 years of residence. Financing: taxation. ***Folkepension (supplement)*** Eligibility: must be receiving folkepension; supplement is reduced based on the income of pensioner the spouse's/cohabiting partner's income. Financing: taxation.	***Arbejdsmarkedets tillægspension (ATP)*** all wage-earners in Denmark with more than 9 hours of paid work per week pay low contributions to complement the national scheme. Financing: employer and employee contributions organised in industry-wide funds.	***Labour market pensions*** funded defined-contribution schemes agreed between the social partners (quasi mandatory; more than 90 % coverage). Lump sum withdrawal possible. Financing: employer and employee contributions.		***Special savings accounts***

Sources: MISSOC, SSPTW, LIS (institutional files), OECD (2013a), Pension Funds Online (2015)

Appendix (Chapter II)

Table 1 (continued): Overview on pension systems around the world (Estonia-Greece)

Country	First pillar (public)		Second pillar (occupational)		Third pillar (personal)
	Targeted/Basic	Work-related	Mandatory/quasi mandatory	Voluntary	
Estonia	***Rahvapension*** Eligibility: aged 63 or older with at least 5 years of residence, and not entitled to Vanaduspension. Financing: taxation.	***Vanaduspension*** Amount: base amount plus amount depending on contributions/ years of service. Financing: employer and employee contributions	***Kogumispension*** (born 1983 or after): additional 2 % of contributions are paid in funded mandatory individual plans managed by private institutions. Financing: employer and employee contributions.		***Voluntary pension funds***
Finland	**Kansaneläke** Eligibility: aged 65 or older with at least 3 years residence after age 16; full pension paid when 80 % of time residing in Finland between the age of 16 and 65 or older; reduced by 50% of the difference between other pension income and a small disregard. Financing: taxation. **Takuueläke (since 2011)** paid if national and earnings-related pension together remain under a certain threshold. Financing: taxation.	***Vanhuuseläke*** Tripartite (state/employer/associations/trade unions) system decentralised to pension providers such as insurance companies, organised in company pension funds and industry-wide pension funds. Partly PAYG-systems and partly funded; Amount: calculated on accrual rate of annual earnings. Financing: employer and employee contributions.			***Voluntary occupational pensions*** mostly defined benefit plans with the same accrual rates as the Vanhuuseläke. ***Group insurance schemes***
Germany	***Grundsicherung im Alter*** Eligibility: aged 65 or older; part of the social assistance scheme with less strict rules for the income and asset-test. Financing: taxation.	***Altersrente (GKV/Beamtenversorgung)*** PAYG system. Amount: based on pension points calculated on the average earning National Accounts average earnings. Financing: employer and employee contributions and government subsidies.	***Betriebliche Altersversorgung*** some groups of private sector employees are covered through mandatory collective agreements; various ways of funding. Financing: employer and employee contributions.	***Betriebliche Altersversorgung*** counterpart to the mandated plans. ***Riester pension plans*** provided by the employer; inclusion increased through partially automatic enrollment. Financing: employer and employee contributions.	***Riester pension plans*** provided by banks, insurance companies or investment funds; subsidised by the government.
Greece		***Old-age pension IKA-ETAM*** PAYG system. Amount: 80% of pensionable income if insured before 1993; 2% of the income for the entitlement to the pension for each year of insurance if insured after 1993. Includes a minimum pension amount. Financing: employer and employee contributions and taxation. ***Old-age pensions for rural areas from the Organisation for the Social Insurance of the Farmers (OGA)*** Eligibility (After 1998): 65 years or older & 15 years of contributions. After 1998, partly financed through contributions and tax subsidies.	***Supplementary pensions*** additional mandated contributions. Financing: employer and employee contributions.	***Pension funds*** organised in single-employer or a profession-wide pension funds. Financing: employer and employee contributions.	

Sources: MISSOC, SSPTW, LIS (institutional files), OECD (2013a), Pension Funds Online (2015)

Appendix (Chapter II)

Table 1 (continued): Overview on pension systems around the world (Hungary-Italy)

Country	First pillar (public)		Second pillar (occupational)		Third pillar (personal)
	Targeted/Basic	Work-related	Mandatory/quasi mandatory	Voluntary	
Hungary	***Időskorúak járadéka*** Eligibilty: aged 62; not entitled if the property of his/her family exceeds the limit defined by law. Financing: taxation.	***Öregségi nyugdíj*** PAYG system. Amount: 33% of the reference income for the first 10 years of insurance period, + 2% for each of the insurance years between 11-25,+ 1% for each of the insurance years between 26-36, + 1.5% for each of the insurance years between 36-40,+ 2% for each of the insurance years after 40 years. Includes a minimum pension amount; contribution history of at least 20 years; a partial pension without a minimum is paid after 15 contribution years.		***Voluntary pension funds (VPFs)*** defined contribution accounts managed by the employer's insurance companies or financial institutions.	
India	***National old age pension*** Eligibility: aged 65 or older and have no viable source of subsistence either through own income or through financial help available from other family members. Financing: taxation.	***New pension system (since 2004)*** defined contribution individual account system targeting at a replacement rate of 50% of the final wage. There exist mandatory and voluntary accounts. Financing: employer and employee contributions.	***Pensions from the employees provident fund scheme (EPF)*** defined contribution scheme; provides lump-sum benefits at the time of retirement. ***Pensions from the employees pension scheme (EPS)*** defined benefit scheme; in the case of 10 years coverage, benefits are received as monthly pension based on the length of coverage and salary; with less than 10 years coverage lump sums are paid. ***Other specific funds for occupational groups***	***Superannuation funds*** defined contribution plans. Can be partly withdrawn as lump sum. Financing: employer and employee contributions.	
Ireland	***Non-contributory state pension*** Eligibility: aged 66 or older; must not qualify for contributory state pension; income and asset-tested. Financing: taxation.	***Contributory state pension*** flat-rate scheme for persons who fulfill the eligibility. Amount: average of 48 weeks contributions or credits per year throughout the working life; amount reduced for incomplete contributions. Financing: employer and employee contributions.		***Occupational pensions*** partly defined benefit plans, and partly defined contribution plans; employees are required to allow access to a PRSA arrangements. Financing: employer and employee contributions.	***Personal retirement savings accounts (PRSAs)*** defined contribution plans provided by investment managers, insurance companies and credit institutions. Financing: employer and employee contributions. ***Retirement Annuity Contracts (RAC)*** defined contribution plans for persons with no access to occupational pensions. Financing: employer and employee contributions.
Italy	***Assegno sociale*** Eligibility: aged 65 or older; supplements pensione di vecchiaia if below a certain threshold. Financing: taxation.	***Pensione di vecchiaia*** PAYG system. Amount: based on total lifelong contributions and the transformation coefficient. Includes ***Notional defined accounts (NDCs)*** for persons who got insured after 1996.		***Closed collectively agreed funds*** defined contribution plans organised in single company or as industry-wide pension funds	***Open pension funds*** defined contribution plans provided by insurance companies, banks or registered asset management companies. ***Individual pension plans (PIPs)***

Sources: MISSOC, SSPTW, LIS (institutional files), OECD (2013a), Pension Funds Online (2015)

Appendix (Chapter II)

Table 1 (continued): Overview on pension systems around the world (Japan-Netherlands)

Country	First pillar (public)		Second pillar (occupational)		Third pillar (personal)
	Targeted/Basic	Work-related	Mandatory/quasi mandatory	Voluntary	
Japan	***National pension*** Eligibility: aged 65 or older; full basic pension requires 40 years of contributions, reduced amounts if shorter contribution period. Since Oct 2015, 10 minimum years of contributions. Financing: residents, employer contributions, and state subsidies.	***Employee's pension*** PAYG system. Amount: based on the insured's average monthly wage over the full career multiplied by a coefficient determined by insured's date of birth multiplied by the number of months of coverage; 25 minimum years of contributions. Financing: employer and employee contributions.	***Contracting out (employee's pension funds)*** employers with more than 1000 employees can opt out of the employee's pension scheme, and cover their employees their self, if they offer pensions which provide more than 150% of the state system. Financing: employer and employee contributions.	***Pension funds*** defined contribution plans established by one or multiple employers. Financing: employer and employee contributions. ***Contract type plans*** defined contribution plans that require a pension contract between the sponsoring employer(s) and their employees. ***Corporate/individual defined contribution plans*** established by single employers implemented through a contract with a pension management organisation.	
Mexico	***Social pension programs organised by states*** 12 out of 32 states operate such systems: eligibility age ranges between 65 and 70. Financing: taxation. ***Programa 70 y mas adultos mayores*** Eligibility: aged 70 or older and living in rural areas with less than 30,000 people. Financing: taxation.	***Pensión por vejez*** currently transformed from a PAYG to a fully funded individual account system, mandatory for all workers entering the labor force since 1997. Amount (old system): percentage of the insured's average earnings in the last 250 weeks of contributions, plus an increment for each year of contributions exceeding 500 weeks; the pension is increased by 15% if the insured is assessed as requiring assistance. Amount (new system): based on the value of the accumulated capital plus accrued interest; annuity or withdrawals based on life expectancy. Includes a guaranteed minimum pension. Financing: employer and employee		***Occupational pension plans*** defined benefit, defined contribution, and hybrid plans. rare, typically through automatic enrollment by employers offering such plans. Financing: employer and employee contributions.	***Individual retirement accounts*** provided by authorized companies (Administradoras de Fondos para el Retiro, AFOREs)
Netherlands	***Algemene ouderdomswet (AOW)*** Eligibility: aged 65 or older and years of residence in the Netherlands between the ages of 15 and 65; reduced by 2 % for each year abroad. Joint amount calculation with occupational pension. Financing: employer and employee contributions and government subsidies.		***Occupational pensions*** mostly industry-wide funds with defined benefit (final salary) plans organised through compulsory enrollment via collective agreements (quasi mandatory); employers can opt out from the industry-wide funds if they offer their own funds. Joint amount calculation with public pension. Financing: employer and employee contributions.		

Sources: MISSOC, SSPTW, LIS (institutional files), OECD (2013a), Pension Funds Online (2015)

Appendix (Chapter II)

Table 1 (continued): Overview on pension systems around the world (Poland-South Africa)

Country	First pillar (public)		Second pillar (occupational)		Third pillar (personal)
	Targeted/Basic	Work-related	Mandatory/quasi mandatory	Voluntary	
Poland		***Emerytury*** mixed PAYG and funded scheme based on a notional defined contribution (NDC) accounts and mandatory individual accounts; individual accounts are ***open pension funds (OPFs)*** managed by a pension fund society. Amount: based on the total value of contributions to the NDC divided by average life expectancy at the age of retirement and the contributions to the individual account; Includes a minimum pension; minimum 20 years (women) or 25 years (men) of insurance from full-time employment.		***Voluntary occupational pension plans (PPE)*** defined contribution plans; plans must be offered to more than 50% of employees in the company. Financing: employer and employee contributions.	***Individual retirement accounts (IKE)*** defined contribution plans
Russia		***Old-age labour pension*** mixed PAYG and funded scheme based on a notional defined contribution (NDC) accounts and mandatory individual accounts; individual accounts are organised in ***non-state pension funds (NPFs)/pension fund of the Russian Federation (PFR)*** ; Amount: based on the total value of contributions to the NDC divided by average life expectancy at the age of retirement and the contributions to the individual account; must have a minimum of 5 years of insurance coverage. Includes a minimum pension. Financing: employer and employee		***Voluntary occupational pension plans*** mostly defined contribution plans; organised by non-state pension funds and insurance companies. Financing: employer and employee contributions.	
South Africa	***State old-age pension*** Eligibility: aged 60 (women)/aged 65 (men) or older; income and asset-tested; reduced to 25 percent of the maximum amount if the pensioner resides in a care facility under contract to the state for more than 3 months. Financing: taxation.			***Employer pension plans*** defined benefit and defined contribution plans; when employers offer these plans employees must join them; provided through provident funds or a pension funds. provident funds allow one lump sum payment while pension funds are only allowed to provide one third of the total value as a lump sum. Financing: employer and employee contributions.	

Sources: MISSOC, SSPTW, LIS (institutional files), OECD (2013a), Pension Funds Online (2015)

Appendix (Chapter II)

Table 1 (continued): Overview on pension systems around the world (Spain-United States)

Country	First pillar (public)		Second pillar (occupational)		Third pillar (personal)
	Targeted/Basic	Work-related	Mandatory/quasi mandatory	Voluntary	
Spain	***Pensión de jubilación no contributiva*** Eligibility: aged 65 or older, and who have not acquired enough pension contributions or are not entitled to a contributory old-age pension; requires at least 10 years of residence after reaching the age of 16 and for five consecutive years just before claiming the pension. Financing: taxation.	***Pensión por jubilación*** PAYG scheme. Amount: at least 15 years of earnings and contributions; after 15 years contributions, it is 50% of the earnings base; for years 16-25 3% is accrued, for years 26-35 2% is accrued. Full pension after 35 years of contributions (100% accrual reached). Includes a minimum pension amount. Financing: employer and employee		***Voluntary occupational pension plans*** typically defined benefit plans sponsored by the employer. Financing: mostly employer and partly employee contributions.	
United Kingdom	***State pension*** Eligibility: aged 60(women)/65(men) or older, and 39(women)/44 (men) years of qualifying years of National Insurance contributions. Financing: employer and employee contributions and state subsidies. ***Pension credit*** Eligibility: aged 65 or older and whose income is below the standard minimum guarantee amount. Financing: taxation.	***State second pension (S2P) that since 2002 gradually replaces the state earnings-related pension scheme (SERPS)*** PAYG scheme. Amount: based on the band of earnings each year between the 'lower earnings limit' and the 'upper earnings limit'. Financing: employer and employee contributions.	***Contracting out to occupational plans*** Note no type of occupational pension is mandatory, however if contracting out is chosen it requires a mandatory minimum contribution. contracting out to an occupational pension plan instead of the contribution to S2P/SERPS (since Apr 2012 contracting out to defined contributions plans has been abolished).	***Group personal pensions (GPPs)/Group stakeholder pension (GSHPs)*** defined contribution plans; employers negotiate special terms with a pension provider, and pay a regular contribution. Financing: employer and employee contributions. ***Self administered plans (pension funds)*** defined benefit of defined contribution plans mostly for self-employed individuals; investment managers have to be authorised. Financing: employer and employee contributions.	***Contracting out to personal plans*** requires that person provides through a personal saving plan instead of the contribution to S2P/SERPS (since Apr 2012 contracting out to defined contributions plans has been abolished). ***Personal pension plans/ Stakeholder pensions (SHPs)*** defined contribution plans; provide by banks, life assurance companies, or building societies.
United States	***Supplemental social security (SSI)*** Eligibility: aged 65 or older and income and asset-tested. Financing: taxation.	***Retirement benefits from old-age, survivors, and disability insurance (OASDI)*** PAYG scheme. Amount: calculated on a progressive formula based on the average of the insured's 35 highest years lifetime earnings. Financing: employer and employee contributions and state subsidies.		***401(k) plan / 403(b) plans / 457 plans / thrift savings plan / employer-sponsored IRAs / defined benefit plans*** various pension funds covering specific occupational groups; most of the occupational plans are defined contribution plans, but defined benefit is also common. Financing: employer and employee contributions.	***Individual retirement arrangements (IRAs)*** defined contribution plans; provided by financial institutions.

Sources: MISSOC, SSPTW, LIS (institutional files), OECD (2013a), Pension Funds Online (2015)

III. Pensions and inequality: world-wide overview & research agenda

III.1. Living arrangements, labour market participation, and income mix of the elderly around the world using the Luxembourg Income Study (LIS) Database

> *Living arrangements of older persons are part and parcel of the challenges that the ageing of populations are posing for Governments and families in the twenty-first century. Governmental policies need to include a combination of measures that promote self-reliance among older adults, provide services for those who are in need, and encourage continued involvement of family members in the care and well-being of the older generations.* (United Nations 2005: xvii)

A study by the United Nations (2005) revealed that living arrangements of elderly persons aged 60 and over vary strongly around the world; in Europe and Northern America, elderly couple households were the most observed household type, whereas in Latin America and the Caribbean, Asia, and Africa elderly persons mostly were living in households with their children or grandchildren. The United Nations refer to variation in 'cultural norms and values, and by economic and social conditions' (United Nations 2005: 5) that help to explain these cross-national differences in living arrangements.

The stronger independence of elderly households in the recent decades might be clearly linked to the establishment of welfare state systems, particularly through regular pension benefits. However, elderly women remained a major group at risk for various reasons: not only are they likely to outlive their partner and thus more likely to live alone, but they are also likely to accumulate less of their own pension entitlements, as they were less integrated in the labour market as compared to men in recent decades (Burtless 2008; Yamada and Casey 2002).

This chapter will further investigate living arrangements, labour market participation, and inequalities in the income mix of the elderly around the world. Various statistics and indicators are evaluated in a cross-national comparative perspective to reflect inequalities across current societies. The main aim of this overview is to determine similarities and differences across countries to rationalise a specific country selection for in depth studies of pension systems and pension outcomes. This chapter is structured as follows.

A first section will present the primary data of the Luxembourg Income Study (LIS) Database that are used for the analyses and describe generic data preparation procedures that were applied to the data. The next section will analyse in how far the countries differ in terms of living standard of the elderly compared to society's standard. Various figures will show the living arrangements of elderly persons, their poverty incidence, and the inequality of elderly households compared to total population. These household level measures address the following questions: Which countries show the highest income for the elderly? Are the elderly living alone, or are they also living with other household members that allow a sharing of the resources? Which income sources do elderly households have? Are these households poor? Is inequality among elderly households lower, or equal, or higher compared to total society's inequality?

In a second step individual level measures are shown. This section on elderly persons also includes a section on cross-national differences in employment patterns by gender and age-group. Are the elderly still working? And if they are not working, are there gender-specific differences? Another section raises questions which are more closely related to the structure of pension systems and its outcomes. Which type of pension income do the elderly receive? Are they receiving only old-age pensions or also disability and survivor pensions? From which provider do the elderly receive their pensions - the state, employers, or financial institutes? Thus these analyses of the income mix and recipient rates of the elderly will analyse variation in public, occupational and personal pension income across countries.

Data and data preparation

For the descriptive analyses of this chapter the Luxembourg Income Study (LIS) Database was used. The database offers a broad range of countries that allow a worldwide comparison of countries that are at a varying stage of development, covering various geographic regions. For the analyses preferably the LIS Wave VIII (around 2010) datasets have been chosen, in order to have a unique reference point in time. In some cases the older points in time have been used to enrich the focus of the study. The analyses include primary data analyses for 34 different countries from the Luxembourg Income Study (LIS) Database (see Table 1).

For the following household level analyses an elderly household is defined as a household that contains at least one household member who is aged 65 or above. For individual level statistics all persons above age 65 were selected.

Various generic data preparations were applied in order to provide better cross-national comparability of the figures. A specific treatment of negative values has been applied: The main income sources were bottom coded, and respectively the disposable income was increased by the negative income: By doing so no negative incomes were taken into account. From a cross-national perspective this allows better comparison of the distribution of positive incomes, which is a restriction by various datasets which do not capture losses from capital investments and/or self-employment activity. Thus the analyses capture the distribution of positive income. This procedure is also necessary to be able to calculate income shares of specific income sources in relation to total income.

Table 1: Countries and datasets used from the Luxembourg Income Study (LIS) Database

Nordic countries:	Denmark (dk10), Finland (fi10), Iceland (is10), Norway (no10)
Middle European countries:	France (fr10), Germany (de10), Ireland (ie10), Luxembourg (lu10), Netherlands (nl10), United Kingdom (uk10)
Eastern European countries:	Estonia (ee10), Hungary (hu09), Poland (pl10), Serbia (rs10), Slovak Republic (sk10), Slovenia (si10)
Mediterranean countries:	Greece (gr10), Italy (it10), Spain (es10)
Latin American countries:	Brazil (br10), Colombia (co10), Guatemala (gt06), Mexico (mx10), Peru (pe04), Uruguay (uy04)
Other countries:	Australia (au10), Canada (ca10), Egypt (eg12), India (in04),Israel(il10), Japan (jp08), Russia (ru10), South Africa (za10), United States (us10)

It is worth mentioning that this correction hardly affected the income distribution, in all countries under study it increased the mean income by less than 0.5 per cent, and implications for the sensitivity of the Gini were minimal (it only affected the third digit, at maximum by .002)

Also disposable income values (LIS variable DHI) that were equal to zero income were excluded from the analyses; a standard approach also applied by LIS when calculating aggregate figures. This procedure typically excluded less than one per cent of the sample, slightly more for Russia 2010 and South Africa 2010. Therefore exclusion of zeros in DHI also hardly affected the results, as compared to keeping them in.

In a last step, when age was not available for all household members, these households were deleted from the sample, as in these households it cannot be stated whether the household contained a person above 65 years or not. Also this generic preparation hardly had an effect on the country-specific samples, as age is commonly available for all household members with exception of Norway (43 households; 0.02 per cent), South Africa (12 households; 0.21 per cent), and Japan (25 households; 0.74 per cent). Similarly, for the individual level analyses persons with missing age were excluded.

Living arrangements and presence of other household members allow for a sharing of resources within the household. In this chapter the typically used approach of full sharing of income sources across all household members is assumed; the standard approach in inequality research (Jenkins and van Kerm 2009; Salverda et al. 2009). Thus each individual gets assigned a specific share of disposable household income, which is additionally equivalised. This means it is assumed that larger households can share resources better and need less resources compared to smaller households, they thus achieve *economies of scale*. In this chapter the common approach by LIS is applied, which divides the household income by the square root of number of household members.

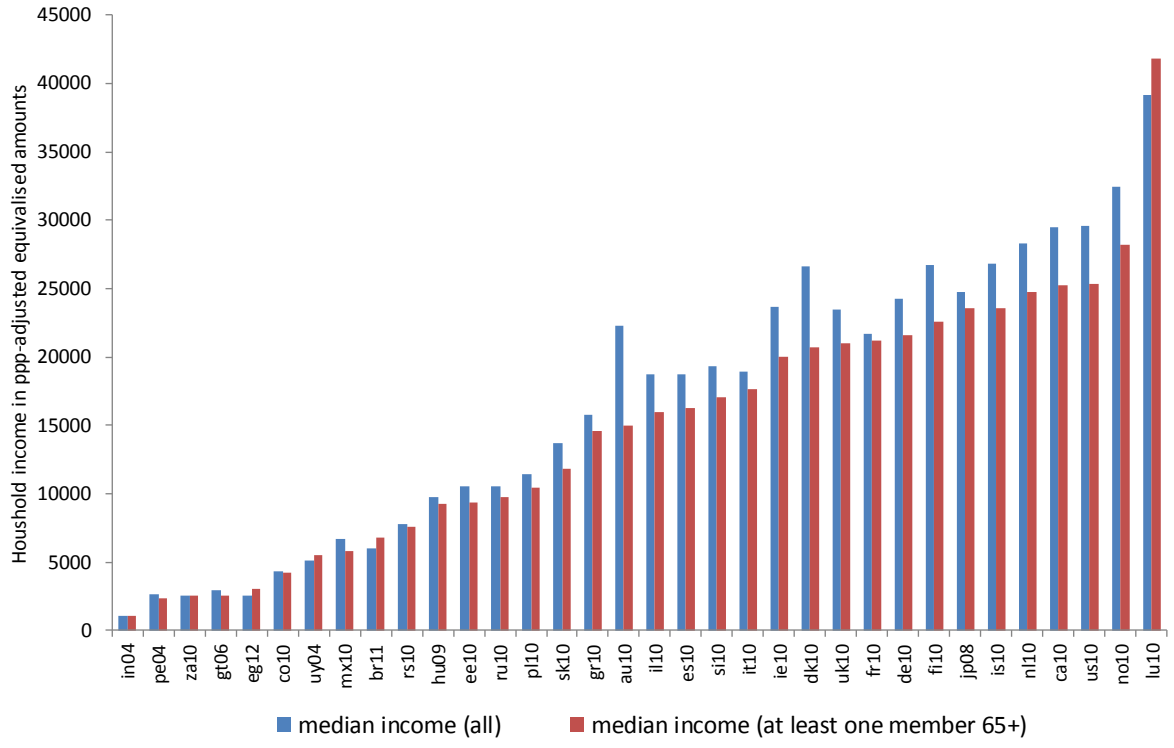
All amounts were expressed in ppp-adjusted values using the World Bank tables for 2010. Thus, some of the developed countries were excluded from the analyses as the income levels of the older datasets were not comparable to the newer ones. However, for the developing countries some older datasets were kept, as they ended up at a substantially lower level of income, anyway. Note the ranking of developing countries in Figure 1 should thus be interpreted with care.

The results of the following figures are calculated on household level for the median incomes, the share of specific households, the income mix, whereas the inequality measures poverty and Gini coefficients are expressed at individual level. This means in the latter all household members are considered in the calculation, however taking the equivalised household income as the reference value.

Evaluation of household level indicators

Figure 1 shows the median income level of equivalised ppp-adjusted disposable household income. Blue bars depict the amount for the total society, red bars show the amount for the 65+ households. A major finding from this overview is that 65+ households were less well off in many countries. There were a few exceptions from this rule; Luxemburg, Brazil, Uruguay, and Egypt. In general, the differences between the living standards of the total population and the elderly population were smaller in developing countries than in developed countries. Particularly high differences could be observed in Denmark (22 per cent) and Australia (33 per cent). The highest ppp-adjusted median equivalised income existed in Luxembourg, followed by Norway, the United States, Canada, and the Netherlands. Among the group in the middle developed countries such as Germany, France, the United Kingdom, Denmark, and Ireland could be found. Slightly lower was the living standard of the elderly in the Mediterranean countries, followed by the Eastern European countries, of which Slovenian adjusted income already exceeded Spanish and Greek income. The living standard was far lower in Latin American countries; please note that the incomes in Uruguay, Guatemala, Peru, and India were comparatively low, as the values were calculated based on the LIS Wave VI (around 2004) data sets, whereas most of the other datasets were taken from the LIS Wave VIII (around 2010). The newer ppp-adjusted values particularly for Uruguay would most likely exceed the values of Brazil and Mexico.

Figure 1: Median income of total population and 65+ households



Source: own calculations based on Luxembourg Income Study (LIS) Database.

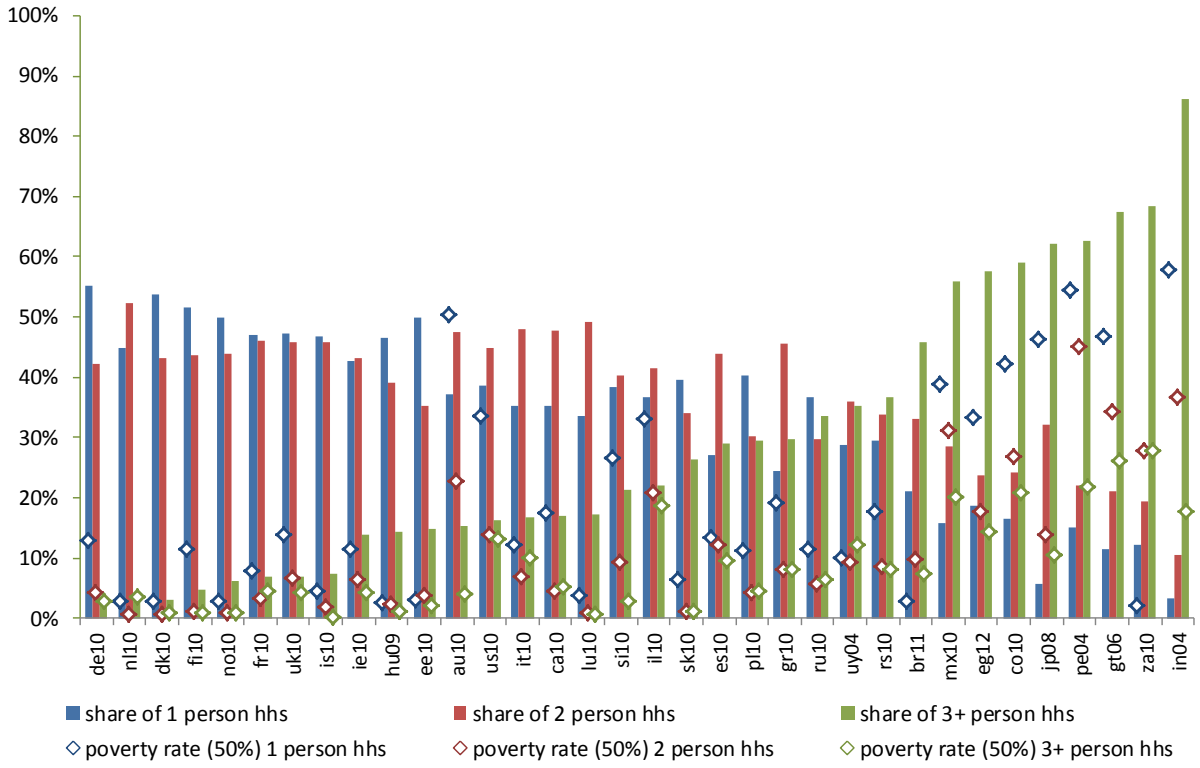
Figure 2 depicts two analyses. First, 65+ households were divided in three groups: single person households, two person households, and 3+ person households; bars show the percentages reflected by each group. The figure is sorted by the highest share of 3+ person households; the higher this share, the further on the right a country is placed.

On the left-hand side is Germany (2.8 per cent) that had the lowest share, on the right-hand side is India that had the highest share (86 per cent). Besides Germany, it was also quite uncommon for elderly persons in the Netherlands, France, the United Kingdom, and the Nordic countries to live with other household members than their spouse/partner.

A next set of countries ranged between 14 and 30 per cent of 3+ person households; this set of countries included mostly less rich countries of the developed world, among which were the Eastern European countries and the Mediterranean countries, but also Canada and the United States. In North America approximately one sixth of the households of the 65+ households were classified as 3+ person households.

Considerably higher was the share of 3+ person households on the right-hand side of Figure 2. But also in this country group the order could be linked to the level of ppp-adjusted income. The lower the median income, the higher the share of 3+ person households among the 65+ households, with the high-income countries Russia and Uruguay on the left, the middle-income countries in the middle, and the low-income countries on the right (cf. Figure 1 and 2). Quite unique was the pattern in Japan; the country had a rather high ppp-adjusted income, but also a rather high share of elderly persons living in households with more than two persons.

Figure 2: Living arrangements of 65+ households and poverty rates by household size



Source: own calculations based on Luxembourg Income Study (LIS) Database.

In the same figure poverty rates (defined as headcount ratio, i. e. the share of the elderly population living in households with income below 50 per cent of median income) are also plotted; each square shows the poverty rate for single, two, and 3+ person households separately. In general living in larger households tended to substantially lower the poverty rate. In some countries this finding was less pronounced (Brazil, Russia, Spain), whereas in others it showed even the opposite effect; poverty rates in 3+ person households were slightly higher in South Africa and Uruguay.

Differences between single person and two person households can again be mostly clustered in two groups, developed and developing countries. Most developed countries showed substantially lower poverty rates for two person households as compared to single person households, with exceptions of Israel and Australia that showed with 20 per cent still rather high levels. In contrast to this, several middle and low-income countries (India, South Africa, Guatemala, Peru, and Mexico) also revealed considerable poverty for two person households.

The next analyses focus on the income mix received by elderly households. Figures 3.1/3.2/3.3 show again single, two, and 3+ person households separately. It keeps the same information that has been shown in Figure 2. The shares of one, two, and 3+ person households in a specific country are shown below the respective country. The squares within the figures reflect the poverty rates. For example in Guatemala almost 50 per cent of single person households were poor; however living in single person households was a rather rare situation, only 12 per cent of the 65+ households were living in single person households.

The income mix is split in five major sources:[2] labour income from dependent employment, labour income from self-employment, social security income, capital income, and private & other income (including also income nowhere else classified). The countries are sorted by the percentage of income from social security income, with the highest percentage on the right hand side.

[2] The distinction by this five major income sources is taken from the main set of current incomes in the Luxembourg Income Study (LIS) Database: labour income from dependent employment (HILE) includes basic wages as well as all supplements and the value of non-monetary fringe benefits; labour income from self-employment (HILS, in this chapter bottom coded at 0) includes all profits/losses minus expenses from any self-employment activity, as well as the value of goods and services produced for own consumption. Capital income (HIC, in this chapter bottom coded at 0) includes interests and dividends, rental income, royalties, and also individual pension plans. Social security income includes all monetary transfers received through an institutional arrangement between the recipient and the government and/or the employer and the value of respective non-monetary goods and services. Thus occupational pensions are included here. Private & other income includes all incomes of a private nature that do not involve any institutional arrangement between the individual and the government or the employer and the value of respective non-monetary goods and services. Such transfers are for example received from non-profit institutions and inter-household transfers (remittances and alimony). To the category private & other income also some remainders were added that in the LIS data were directly allocated to the LIS variables HI,HIL,HIT.

Figure 3.1: Income sources and poverty rate (single households 65+)

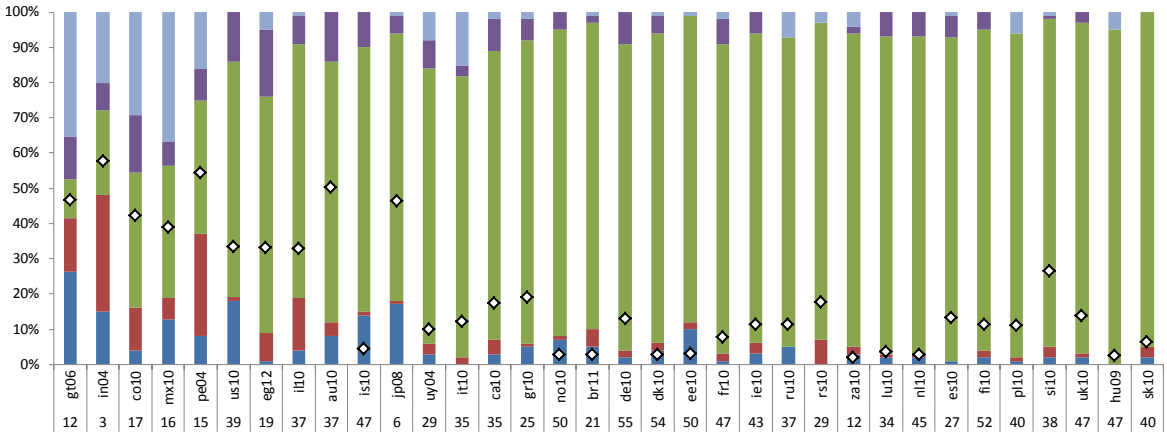


Figure 3.2: Income sources and poverty rate (two person households 65+)

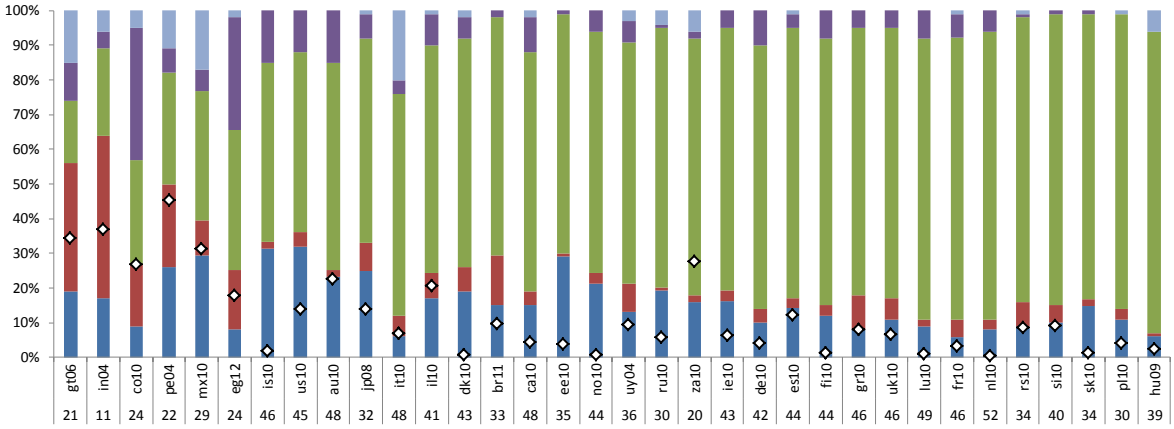
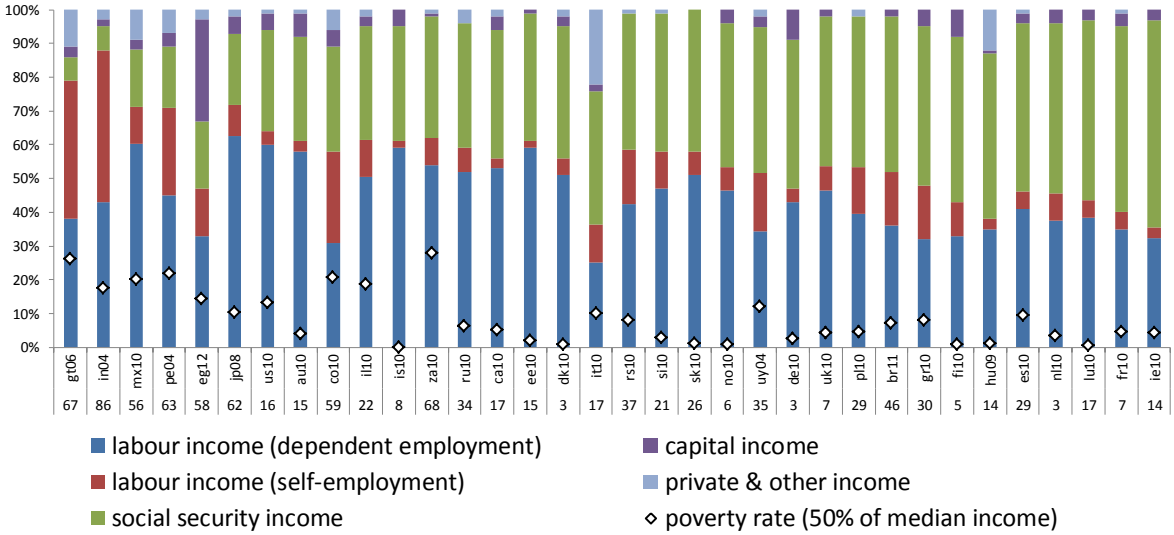


Figure 3.3: Income sources and poverty rate (3+person households 65+)



Notes: numbers below the country abbreviation refer to the percentage of single, two person, 3+ person households in the respective 65+ household sample as shown in Figure 2; income sources were reported net of social security contributions and income taxes in eg12, hu09, in04, mx10, ru10, rs10, si10, uy04, net of contributions and gross of income taxes in fr10, and gross of social security contributions and income taxes in all other datasets.

Source: own calculations based on Luxembourg Income Study (LIS) Database.

Among single person households of the 65+ households (Figure 3.1) the highest percentage of social security income existed in the Eastern European countries, where other income sources besides social security income were negligible (less than five per cent). An exception from the Eastern European countries was Estonia, where labour income accounted for 10 per cent of the income mix, which can be explained by a comparatively high share of postponed retirement in the Eastern European country group (see Appendix 1).

All other European countries showed a slightly lower percentage. Mostly the higher share of capital income distinguishes them from the Eastern European countries. Also South Africa, Brazil, and Uruguay had a similar income mix. A bit further left on the chart ended up a group of countries that had yet a higher share of capital income: the United States, Canada, Australia, but also Israel and Egypt. Note in Canada and Australia the share of capital income is underestimated, as in the original data individual and occupational pensions were not separable, and hence in the LIS data both sources were included in occupational pension income among social security income.

Besides Estonia, also Japan, Iceland, the United States, and Mexico moved further left on the chart due to their comparatively high relevance of labour income from dependent employment. Similarly, Serbia, Israel, Peru, and Colombia moved to the left due to their comparatively high share of labour income from self-employment. In India and Guatemala both types of labour income strongly contributed to the income mix.

The position of each country in Figure 3.2 and the income mix did not substantially change among two person households compared to the single person households. The major observed difference can be seen in greater importance of labour income from dependent employment, which may indicate that one partner of the couple was still working. In Estonia, Iceland, and the United States, the share of income from dependent employment was the highest. Denmark, Estonia, Brazil, and South Africa moved further to the left as compared to the results in Figure 3.1 due to a higher relevance of self-employment income and/or dependent employment income. In contrast to this, the share of social security income became relatively more important in particularly in Uruguay.

The situation for 3+ person households is less clear (Figure 3.3), showing a rather heterogeneous picture in cross-national perspective. The income mix of these households was even more influenced by the relevance of labour income in these households. In 3+ person households, in many of the countries the income received by pensioners only contributed to the total income. Labour income was the main income source in many countries. However, this overview reveals that in the broad majority of countries still a quite substantial part of the income mix came from social security benefits. For half of the countries the share was larger than 40 per cent. Only in six countries, Japan, Egypt, Peru, Mexico, India, and Guatemala, the share of social security income was below 30 per cent.

In 3+ person households, the Eastern European countries could no longer be distinguished from the rest of the world. As discussed earlier in several of the countries the elderly were living typically alone or with their partner only; thus in these countries the 3+ person

household group is rather rare and reflect very particular family structures. The measurement of social security income is quite broad for this group as it not only includes pensions, but also unemployment benefits, family related benefits, and any other social assistance benefits.

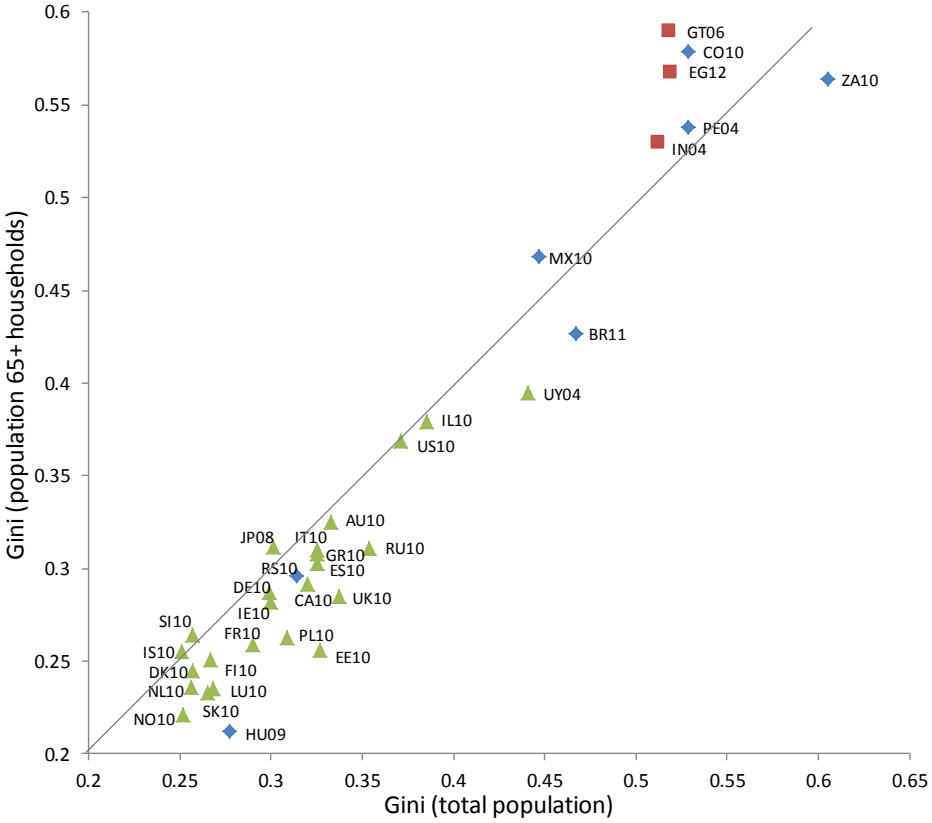
It is evident from this balanced income mix from work income and social security benefits that inequality of the income distribution was much less influenced by the structure of the pension system as compared to single and two person households. The higher the share of 3+ person households is in the country, the higher is the complementary influence of labour income and other income sources besides pensions for the income distribution of the elderly. Consequently, it is much more problematic to link the structure of the pension system to income inequality in the developing countries than in the developed countries, where most of the elderly live independently.

In terms of poverty evaluation one can conclude the following (cf. Figures 3.1/3.2/3.3): For one and two person households a high relevance of social security income protected these households rather well against poverty, whereas countries with lower shares of social security benefits showed comparatively high poverty rates above 35 per cent in single person households and above 25 per cent in two person households. Also the high relevance of self-employment income and private income sources did not effectively reduce the risk of poverty. This might indicate that these countries were lacking a comprehensive social security system.

Quite interesting are also the findings for the relevance of capital income in the income mix. In many of the countries with a higher share of capital income this was not connected with a lower poverty rate. On the contrary, these countries showed even comparatively higher poverty rates. This shows a rather insufficient protection by the social security system. However, capital income, which includes also individual pensions, favoured only the non-poor part of the population and at the same time may have increased inequalities. In general, at least for the OECD countries, work income and capital income were mostly linked to a higher rank in the income distribution, whereas the low income quintile was mostly dependent on the generosity of the public social security system (OECD 2013a).

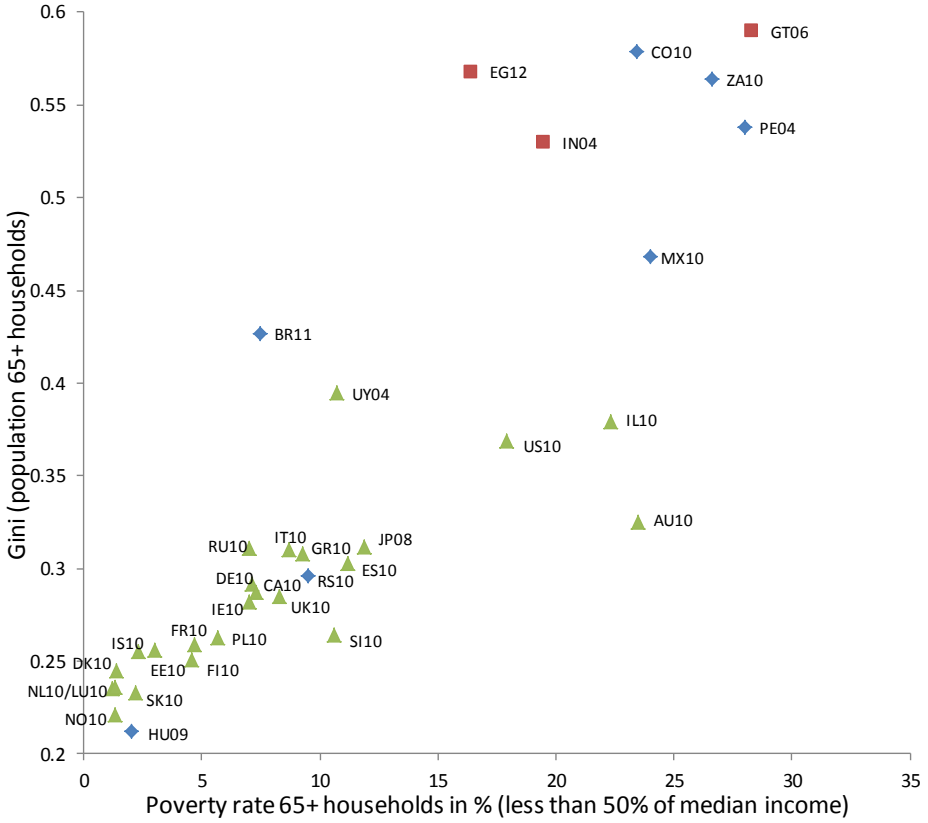
Figure 4 focuses on the comparison of Gini coefficients for total population against Gini coefficients for 65+ households. Gini coefficients were calculated on the individual level taking equivalised household income as a reference. The diagonal reflects the situation where inequality of total population is equal to inequality of 65+ households. Countries above the diagonal show a higher inequality among the elderly, whereas countries below show a lower inequality. In order to provide a better overview, the selected countries have been grouped in lower middle-income economies, upper middle-income economies, and high-income economies, following the World Bank (2015) grouping that calculates level of GNI per capita for 2015.

Figure 4: Gini coefficients of total population and 65+ households



Source: own calculations based on Luxembourg Income Study (LIS) Database.

Figure 5: Gini coefficients and poverty rates of 65+ households



Source: own calculations based on Luxembourg Income Study (LIS) Database

First of all income inequality for both groups remained at a rather similar level, reflecting the idea that market income inequalities were also transferred to the retirement phase. Countries with low inequality might show low income inequality for the elderly as well, as the retirement income might replace a certain percentage of the previous labour income. However, this cannot be shown clearly by this graph, as ideally the inequalities of the current elderly population would need to be compared against the inequality during their working career, and not against the market income inequalities of the current society. Still the current inequality is considered a good approximation of these inequalities before.

In most of the countries inequality for elderly households was slightly lower than inequality for total population. This was particularly true for European countries, with exception of Slovenia. Within European countries the strongest differences existed in the Eastern European countries, where considerably lower market income inequality during the communist period might explain the magnitude of these differences.

The most unequal countries in the developed world were the United States and Israel. Both countries had shown in Figures 3.1/3.2/3.3 substantially lower shares of social security income complemented by a comparatively high share of labour and capital income which also resulted in rather high poverty rates.

Among countries with high inequality two country groups could be identified. One group of developing countries where inequality of the elderly households was even higher: Guatemala, Colombia, Peru, Mexico, Egypt, and India. This group had in common that social security income played a minor role in the income mix. In another group of countries, Brazil, Uruguay, and South Africa, social security income was far more important in the income mix. This seems to be linked to a lower inequality among elderly households. Particularly single person households were much better secured against poverty in these countries as compared to the other group of developing countries, where social security income was less relevant (cf. also Figures 3.1/3.2/3.3).

From the previous analyses one would expect a clear link between level of income inequality and magnitude of poverty. This bivariate relation is plotted in Figure 5. For European countries this relation by and large seemed to exist, it can less clearly be observed in countries with higher levels of inequality. Outliers in this graph on the one hand seem to be Brazil and Egypt where poverty was rather low given their high level of inequality. On the other hand also Australia showed a relatively high poverty incidence for the moderate level of inequality.

Evaluation of person level indicators

Up to now inequalities have been mostly evaluated at the household level. As could be shown, particularly in the 3+ person elderly households a substantial share from other household member's income could be observed. It has been assumed that financial resources were pooled within the household and then equally redistributed among the household members. Thus household level statistics cannot sufficiently depict elderly's individual

income mix. Therefore, the following analyses will further evaluate measures at the individual level, such as employment participation, pension income by function (old age, disability, survivors) and type (public work-related pensions, public targeted/basic pensions, occupational, personal pensions).

Table 1 in the Annex depicts employment rates of specific age groups 60 to 64, 65 to 69, and 70 to 74 split by gender. The columns on the right hand side show the gap of women's employment rate in comparison to men's; expressed in per cent. Table 2 in the Annex shows for the same breakdown the importance of pensions in the personal income mix.[3] Thus, one would expect a high percentage of pension income in those countries, where the share of employed persons is low and vice versa. Figure 6 plots the employment rates and income shares by the three age groups and gender. The more on the right-hand side a country point is in each figure the more this specific male/ female age-group relied on pension income. The closer a country point to the y-axis is the lower was the share of employed persons.

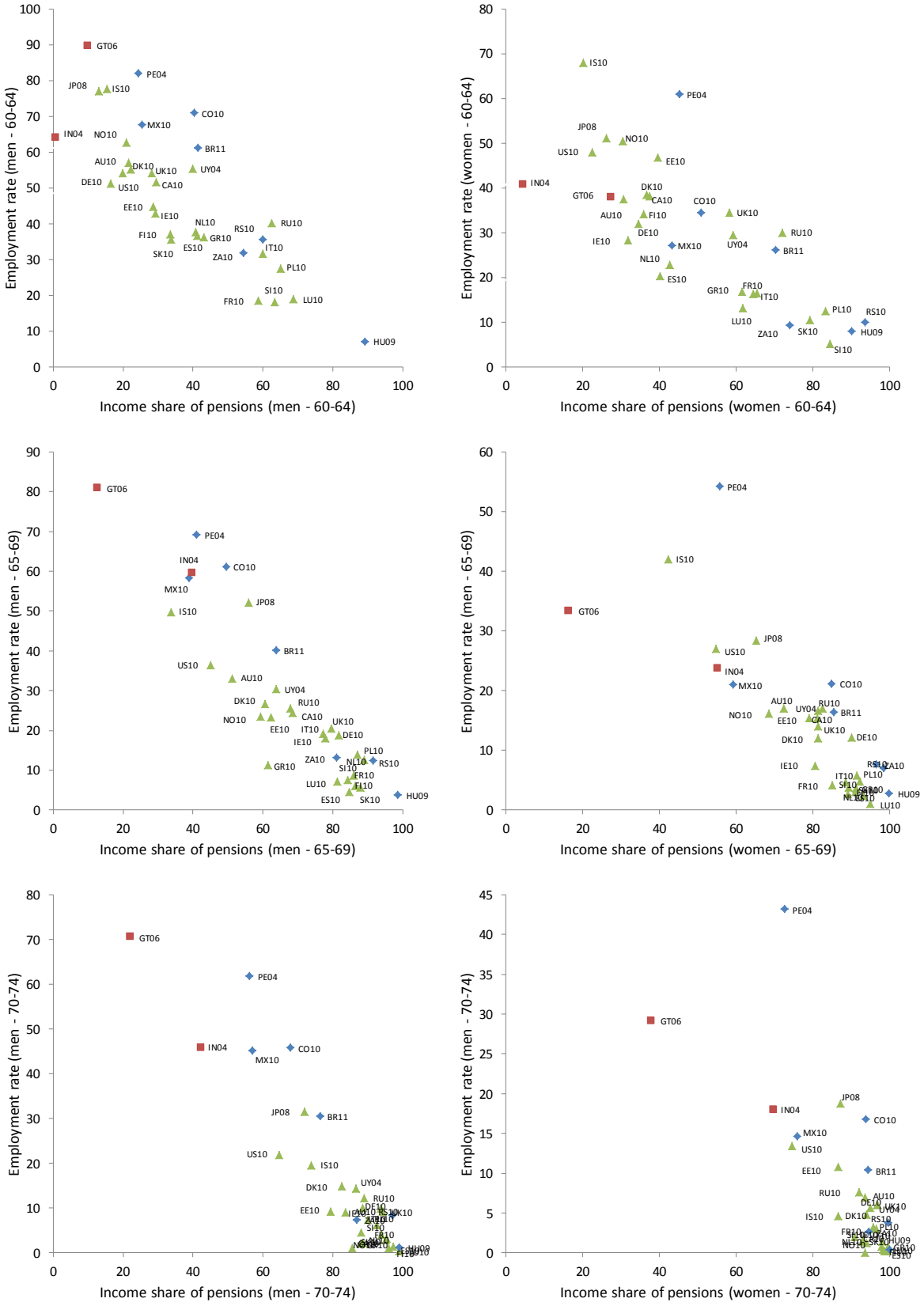
For age group 60 to 64 clear gender differences could be observed. Employment rates for women were particularly lower in the Eastern-European countries, with exception of Estonia and Hungary, where employment rates were similarly high (Estonia) respectively similarly low (Hungary). The highest differences (around 70 per cent lower employment rate for women) were observed in Serbia, Slovak Republic and Slovenia; in all three countries employment rates were rather low with rates below 10 per cent or slightly above. A similar structure showed also South Africa, and at a somewhat higher level of employment also Egypt.

Women in the Latin American countries showed higher employment rates (26 per cent in Brazil up to 61 per cent in Peru). Again in this country group gender differences were strongly pronounced, women's employment was around 50 per cent lower, with exception of Peru. The Mediterranean countries showed similarly high gender differences, but with a slightly lower level of employment.

In the remaining set of countries there were countries with high employment (Japan, Iceland, Norway, and India), moderate employment (Denmark, Estonia, Finland, Germany, the Netherlands, Ireland, the United Kingdom, the United States, Australia, Canada, Russia, and Israel), and low employment (France and Luxembourg).

[3] For data comparability reasons not all personal level incomes that were available have been taken into account at the individual level. Only labour income (dependent and self-employment income) and pensions were treated as personal incomes. Thus the income mix shows a partial picture that at the same time deliberately has been restricted to these three income sources. It is argued that other social security income, capital income (except pensions) and private income sources were redistributed to all household members. Since not in all countries all self-employment incomes were available at the individual level, the self-employment income has been reallocated to the individual level.

Figure6: Employment rates and income share of pension income by gender and age group



Note: the income sources were reported net of social security contributions and income taxes in eg12, hu09, in04, mx10, ru10, rs10, si10, uy04, net of contributions and gross of income taxes in fr10, and gross of social security contributions and income taxes in all other datasets.

Source: own calculations based on Luxembourg Income Study (LIS) Database.

As shown in Figure 6, the lower employment activity was linked to a higher relevance of pension income for the respective age group. This is true for men and women. By moving from the age-group 60 - 64 to 65 - 69 and similarly also from 65 - 69 to 70 - 74, all countries move down and to the bottom right in the graphs for women and men. This signals that persons were less employed with increasing age and vice versa pensions became more important as an income source.

Although employment rates of women were already at a lower level, employment activity dropped for the average of the 34 countries stronger for women than for men (55 per cent for women and 48 per cent for men (from 60 - 64 to 65 - 69); 54 per cent for women and 51 per cent for men (from 65 - 69 to 70 - 74)). At the same time, the share of pension income increased more for men than for women (104 per cent for men and 70 per cent for women (from 60 - 64 to 65 - 69); 29 per cent for men and 21 per cent for women (from 65 - 69 to 70 - 74)).[4] This signifies that men were exposed to a more structured transition from work to retirement, which can most likely be linked to statutory retirement age.

The magnitude of this transition differs across the countries; most advanced societies showed a rather clear age-related transition for both men and women, whereas the Latin American countries revealed a less clear transition; employment rates remained relatively high in this comparison. To some extent a less clear transition existed also in the United States and Iceland for both sexes, but also for Japanese women. In Iceland this situation can be linked to a substantially higher employment rate for age group 65 to 69. In the United States and Japan, employment income remained a relevant income source also for age group 70 to 74. Especially in this age group, differences could be observed between Latin American and all other countries. Additionally, differences within the Latin American group became more apparent.

The next sections will more closely focus on the structure of old-age security systems. For a descriptive overview of the pension systems see Chapter II.2. In the following the Luxembourg Income Study (LIS) Database is evaluated comparatively based on its availability of information on pension income, and different types of pension income. First, it will be shown which function (old age, disability, survivor) pensions fulfil among the 65+ persons. Then similarly, the type of pension income (targeted/basic, work-related, occupational, personal) will be analysed.

Table 2 reports for each country's elderly sample the respective income share received by the 65+ population as a percentage of total social security income by the 65+ population. Thus the reported percentages add up to 100 per cent. The income sources are distinguished in the various functions they cover: old age, disability, survivors, and other social security. Note not all income sources are received at the individual level in all countries, for consistency of the presented figures, family benefits and social assistance transfers were not considered at

[4] From the average excluded is India that showed due to the marginal share of the income groups an increase of more than 1000 per cent. Also excluded are Egypt and Israel for which no data on pensions were available on the individual level.

Table 2: Structure of pension income mix by function

country	dataset	old-age transfers / social security benefits in %	disability transfers / social security benefits in %	survivor transfers / social security benefits in %	other social security transfers / social security benefits in %
Nordic countries					
Denmark	dk10	95.3	0.2	--	4.5
Finland	fi10	89.4	0.9	6.9	2.8
Iceland	is10	97	1.6	0.8	0.5
Norway	no10	94.6	3.8	0.2	1.5
Middle European countries					
Germany	de10	--	--	12.2	--
Ireland	ie10	86.7	0.7	9.7	2.9
Luxembourg	lu10	81.2	1	16.6	1.2
Netherlands	nl10	99.9	0	0	0.1
United Kingdom	uk10	91.7	5.6	0.2	2.5
Eastern European countries					
Estonia	ee10	98.4	1.3	0.2	0.1
Hungary	hu09	88.2	0.9	1.4	9.6
Poland	pl10	87.5	1.8	10.4	0.3
Slovak Republic	sk10	88.6	0.4	10.9	0.1
Mediterranean countries					
Greece	gr10	83.1	0.4	13.6	2.9
Italy	it10	81.7	0	15	3.4
Spain	es10	81.4	1.9	16.4	0.3
Other countries					
Australia	au10	93.1	0.9	4.5	1.5
Russia	ru10	82.3	14.7	0.6	2.4
United States	us10	88	3.9	5	3.1

Source: own calculations based on Luxembourg Income Study (LIS) Database.

the individual level, even when available in various countries. In all countries under study from the Luxembourg Income Study (LIS) Database, pensions were entirely reported at the individual level.

By far the main function covered by social security was old age. In all countries pensions for old age exceeded a percentage of more than 80 per cent of total social security transfers; in 7 out of the 19 countries the share was even larger than 90 per cent. Less important were disability pension transfers, which can be explained by the fact that eligibility frequently expires as soon individuals become eligible for old-age pensions; only the United Kingdom (5.6 per cent) and Russia (14.7 per cent) had a share higher than five per cent. A series of countries allocated also reasonable share of benefits to survivors (Germany, Greece, Luxembourg, Poland, Slovak Republic, Spain). All these six countries have an old-age pension system in common that is strongly based on a public work-related component.

Table 3 evaluates for the 65+ population the type of pension income received, distinguished in targeted/basic, work-related, occupational, personal, and other pension income. For each component the income share as a percentage of the total pension income was calculated. Unfortunately, in various countries no distinction in occupational and personal pensions can be made; in these cases the income share is reported in the column private pensions. Figure 7

Table 3: Structure of pension income mix by type

country	dataset	public pensions (1st pillar)			private pensions (2nd+3rd pillar)			other pensions*
			of which			*of which*		
			targeted/basic	*work-related*		*occupational*	*personal*	
Nordic countries								
Denmark	dk10	67.7	*91.3*	*8.7*	32.3	.	.	0
Finland	fi10	96.2	*10.7*	*89.3*	2.0	.	.	1.8
Middle European countries								
Germany	de10	86.3	*0.8*	*99.2*	8.5	*83.5*	*16.5*	5.5
Ireland	ie10	66.1	*19.8*	*80.2*	33.9	*93.8*	*6.2*	0
Luxembourg	lu10	98.9	*1.6*	*98.4*	0.9	*66.7*	*33.3*	0.2
Netherlands	nl10	52.1	*100*	*0.0*	47.9	*99.8*	*0.2*	0
Norway	no10	75.9	.	.	24.0	.	.	0
United Kingdom	uk10	55.9	*6.1*	*93.9*	44.2	*86.9*	*13.1*	0
Eastern European countries								
Hungary	hu09	100	*0.3*	*99.7*	0.0	.	.	0
Poland	pl10	99.7	*0.0*	*100*	0.0	.	.	0.2
Serbia	rs10	100	*0.0*	*100*	0.0	.	.	0
Slovak Republic	sk10	99.9	*0.0*	*100*	0.1	.	.	0
Mediterranean countries								
Greece	gr10	92.2	*24.4*	*75.6*	5.8	.	.	1.9
Italy	it10	97	*3.4*	*96.6*	2.7	*88.9*	*11.1*	0.3
Spain	es10	91.8	*2.3*	*97.7*	8.2	*85.4*	*14.6*	0
Latin American countries								
Brazil	br11	97.5	*3.0*	*97.0*	2.6	.	.	0
Other countries								
Australia	au10	67.6	*100*	*0.0*	24.4	.	.	8
Canada	ca10	55.6	*54.7*	*45.3*	44.3	.	.	0
India	in04	4.3	*100*	*0.0*	95.7	*100*	*0.0*	0
Japan	jp08	88.2	.	.	11.8	*100*	.	0
Russia	ru10	100	*6.5*	*93.5*	0.0	.	.	0
South Africa	za10	42.6	*100*	*0.0*	57.4	*100*	*0.0*	0
United States	us10	78.7	*3.3*	*96.7*	20.3	*90.1*	*9.9*	1

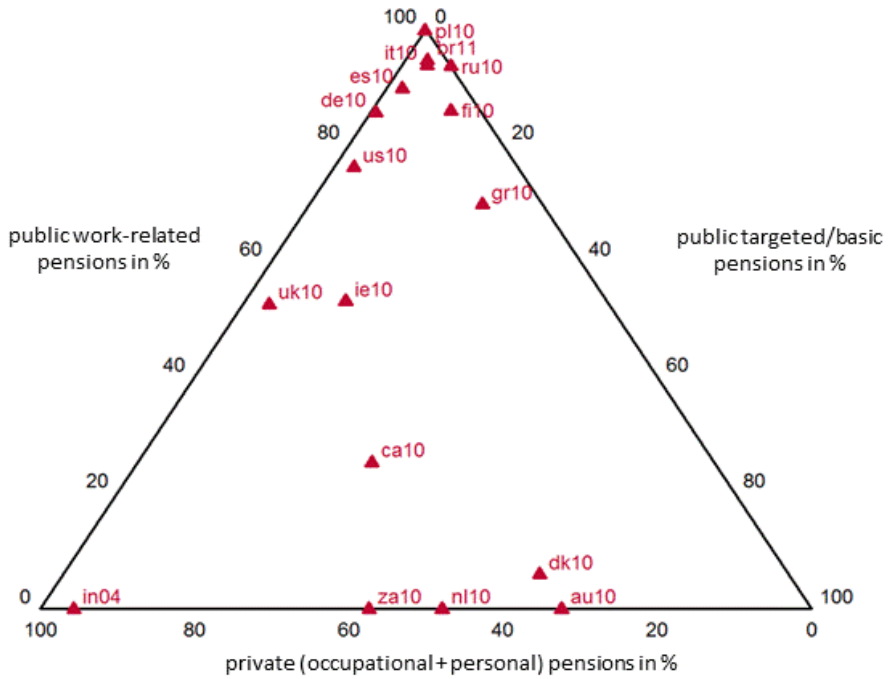
* the column other pensions includes pension income for which its nature is unknown; for example foreign pensions and unspecified other

Source: own calculations based on Luxembourg Income Study (LIS) Database.

reports the three columns targeted/basic, work-related, and private pensions in a trilinear-diagram; unfortunately without the Japanese and Norwegian data, for which the two types of public pensions could not be distinguished. The data point in the upper corner (pl10) does represent not only Poland, but also the whole Eastern-European country cluster and the Luxembourgish situation.

The analyses by pension income type reveal a large cross-national variation. By and large the main income source was public pension income. It was still almost the only source in Russia and the Eastern-European country group. Public pensions accounted for almost 99 per cent of the total pension income also in Luxembourg. Also the Brazilian complementary private pensions hardly characterised the pension income (2.5 per cent). In this overview the hybrid work-related pensions in Finland are classified as first-pillar pensions; they were also by far the main income source.

Figure 7: Structure of pension income mix by type



Source: own calculations based on Luxembourg Income Study (LIS) Database (Table 3).

In the Mediterranean countries the share of private pensions was slightly higher (Italy: 2.7 per cent, Greece: 5.8 per cent, Spain: 8.2 per cent). The Italian and Spanish figures show that financial outcomes among current pensioners were mostly driven by the development of occupational pensions (more than 85 per cent of the private pensions).

Slightly lower was the importance of public pensions in Japan (88.8 per cent), Germany (86.3 per cent), and the United States (78.7 per cent). Again, it is mostly occupational pension schemes that explain the more diverse public-private mix. All above mentioned countries ended up in the upper part of the diagram, reflecting the major importance of the public (first) pillar. Countries that were more on the right-hand side contained a larger share of targeted/basic pension schemes. For example in Finland 10.7 per cent of the public pensions were received by targeted schemes; for Greece 24.4 per cent came from basic schemes mostly covering farmers. In all of these countries the work-related component accounted for more than 70 per cent of the elderly's pension income.

A little bit lower, approximately 55 per cent was the share of work-related pensions in Ireland and the United Kingdom. In Ireland the other half of the income mix was received by targeted schemes and occupational schemes, in the United Kingdom mostly by a higher share of occupational schemes, but partly also by personal schemes. The most diverse public-private mix in this overview existed in Canada; approximately 45 per cent were received from occupational pensions, 30 per cent from targeted/basic schemes, and 25 per cent from public work-related schemes.

The countries on the bottom of the graph have in common that public work-related pensions were either non-existent, or in the case of Denmark negligible in the income mix due to low

contributions to this scheme (Andersen 2011). Again, the further on the right-hand side a country ended up in the diagram, the more important was the targeted/basic income component. In Denmark and Australia targeted/basic income was the major pension income source. In the Netherlands such transfers were as relevant as occupational pensions, and in South Africa they were slightly less relevant than occupational/personal pensions. In India the split of public and private pensions was reversed; occupational pensions were the major pension income source.

It is worth mentioning that targeted/basic pension income is particularly relevant for the low-income group. Therefore analyses by income quintile/decile would generate quite different clustering of countries (which is not shown in this here). Also since amounts received from targeted/basic protection schemes are relatively small as compared to total pension income, evaluation of income shares seemingly diminishes the high relevance of these incomes for poverty prevention. Therefore it is beneficial to also study recipient rates of the various different income sources to understand if certain schemes are covering the majority of the population or only a small fraction.

Figure 8 evaluates recipient rates of different types of pension income, again distinguished in transfers from targeted/basic, work-related, occupational, and personal schemes. The country-specific graphs reflect cross-national differences with regard to gradual age-related transition to retirement; for each age from 60 to 80 recipient rates were calculated. The lines are plotted separately by gender; as shown before there existed strong cross-national differences in labour market participation, thus recipient rates are expected to considerably differ by sex. In those countries, where occupational and personal pensions were not available in the LIS data, a line 'private pensions' is included that contains both types.

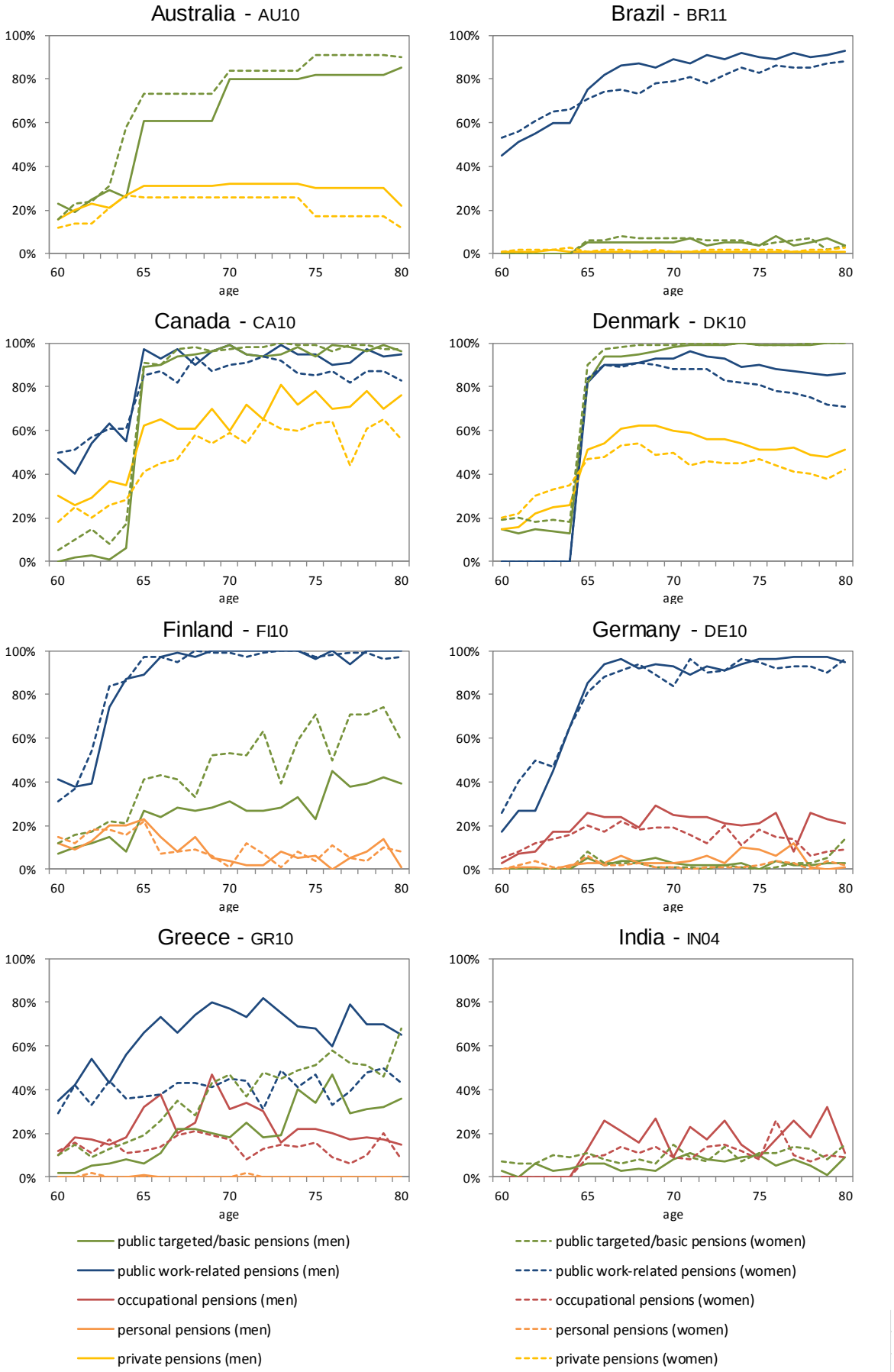
Various countries reveal a clear age-related transition to retirement respectively show a specific age, when individuals become recipients of targeted/basic schemes. In Australia, Canada, Denmark, and the Netherlands this eligibility age has been 65, whereas in South Africa it was 60 and hence note visible in this graph.

Nearly universal coverage of basic/targeted schemes existed in Canada, Denmark, and the Netherlands, followed by high recipient rates also in Australia (ca.70 per cent for men and ca. 80 per cent for women) and South Africa (ca.60 per cent for men and ca. 70 per cent for women). In Finland recipient rates at retirement age were much lower (ca. 30per cent). Yet again lower was coverage in Greece (ca. 15 per cent).

In Australia, Finland, and South Africa one higher recipient rates for the oldest age groups were observed, reflecting the nature of an income tested pension. As older age-cohorts were not as well secured through work-related schemes as younger ones, they become more easily eligible for income-tested pensions. But also the share of single women households gets larger in older age groups, who can be expected to be the main group of recipients of income-tested pensions (Behrendt and Woodall 2015; Zaidi 2007).

In general, throughout the entire selection of countries and age groups, women showed in fact higher recipient rates in targeted/basic protection schemes. As women tend to have

Figure 8: Recipient rates of pension income types by gender and age



Source: own calculations based on Luxembourg Income Study (LIS) Database.

Figure 8 (continued): Recipient rates of pension income types by gender and age

Source: own calculations based on Luxembourg Income Study (LIS) Database.

lower benefits from the work-related schemes, targeted schemes become more easily accessible for women. These gender-specific differences were most pronounced in Finland, Greece, Ireland, South Africa, and Australia. They might also exist for the targeted pension schemes in Denmark and Canada; however this could not be observed due to already higher coverage through basic schemes in the mixed targeted/basic pensions category.

For the public work-related schemes only two countries showed a rather fixed age-related transition to retirement respectively a clear age for receiving work-related pensions, Ireland and the United Kingdom. In the United Kingdom early retirement is not possible before the statutory retirement age (60 for women and 65 for men). In Ireland early retirement seems not to be considered an attractive option, as only a small percentage of the elderly received pensions before the age of 65. Also Canadian and Danish retirees seem to link their retirement decision more structurally to their eligibility to basic pensions; like the basic pension also the work-related pension jumped to nearly universal coverage at the age of 65. In the other countries there existed not such a clear transition to receiving work-related pensions, reflecting a much more flexible retirement decision.

Notable are also extensive gender-specific differences in recipient rates of work-related pensions. Particularly in the Mediterranean countries recipient rates were substantially lower for women. In Spain the differences were most pronounced (above 90 per cent for men and ca. 50 per cent for women), followed by Greece (ca. 75 per cent for men and ca. 40 per cent for women) and Italy (ca. 95 per cent for men and ca. 70 per cent for women). This can be linked to low labour market attachment of women in the past, and their low contribution period, which partly excluded women entirely from eligibility to work-related pensions. In contrast to this pattern, Brazilian figures revealed much less gender-specific outcomes with regard to recipient patterns; currently retired women needed to accumulate only five years of contribution payments in order to become eligible to the work-related pension.

In contrast to public pensions, private pensions showed much lower recipient rates in most countries. Coverage of 50 per cent and above existed only for men and women in the Netherlands and Canada, and for men in the United Kingdom and Denmark. Recipient rates between 30 and 50 per cent were observed for men in Ireland, Greece, and South Africa, and for women in the United Kingdom and Denmark. In Australia, Germany, the United States, and India pensions only selectively covered the population (recipient rates around 20 per cent). Gender-specific patterns could be identified particularly in those countries, where inclusion to occupational schemes remained entirely a voluntary decision: Ireland, the United Kingdom, and the United States. The Netherlands reflects a quite particular situation of unequal gender-specific outcomes. This situation was created by two circumstances (cf. Anderson 2011). First, until the 1980s, married women and part-time workers have been excluded from occupational pension contributions. Second occupational benefits are fully substituted by the basic pension component, if contribution payments were not resulting in occupational pensions above the minimum pension.

Conclusion

This worldwide perspective on living arrangements, labour market participation, and inequalities in the income mix of the elderly revealed remarkable differences around the world. The short study showed that the major factors (pension systems, labour market attachment and living arrangements) which might explain cross-national differences in the elderly's financial resources were of varying importance in specific country clusters.

In Latin American countries, but also in other developing countries, particularly living arrangements differed as compared to European and Anglo-Saxon countries. In less developed countries the elderly were frequently not living independently, but living with other family members. Consequently, in multi-generational households elderly's income mix not only contained pension transfers; income was substantially complemented by labour income, other social security transfers, and private transfers by other household members. Thus, inequality in Latin American countries and other developing countries was much less influenced by the pension system as compared to the European countries, where the elderly were mostly living independently. Also in North America, Japan, and the Mediterranean countries multi-generational households could be more frequently observed; consequently, the share of pension income in the income mix was also lower as compared to the European countries.

More generalised, the higher the share of non-elderly persons in 65 + households, the more relevant might be other sources of income, particularly labour income, in explaining financial inequality between elderly households. However, this argument is problematic, as it rests on the assumption that elderly persons benefit from intra-household redistribution of pooled income resources. This also signifies limitations in measurement of poverty risk and inequality among elderly persons living in multigenerational households, and among the elderly population in general.

It is worth mentioning that the comparison of developed and developing countries differs also with regard to two other aspects which strongly impact on inequalities: First, the income poor in developing countries rely in general more on non-monetary transfers and consumption of self-produced goods; this has by and large been accounted for with the LIS data, as most surveys specifically include non-monetary transfers as well. Second, many developing countries have large informal sectors, which means that many workers are excluded from mandatory pension system contributions (World Bank 1994). Thus, in old age they may become eligible to basic pensions, however with low contribution periods to contributory systems; this pension package may not be enough to lift them out of poverty.

However, it was revealed that in countries, where the importance of social security income was comparatively high, this essentially limited observed inequality among elderly households. Elderly households in Brazil and Uruguay were better off as compared to total society, which resulted also in comparatively low poverty incidence and decreased income inequality for elderly persons in these countries. More developed social security systems may have also influenced comparatively high shares of independently living (single and couple) elderly households as compared to other Latin American countries.

Also labour market participation of the elderly differed in cross-national perspective. Particularly in European countries, the majority of elderly persons were already retired before reaching the age of 65, which again created a stronger relevance of pension system characteristics primarily explaining inequality between elderly households. In contrast to this, prolonged employment after statutory retirement age was particularly common in Latin American countries, India, Japan, and the United States. Again, those countries showed lower importance of pension income in their income mix.

The observed gender-specific differences in recipient rates of various types of pension income point to different insurance profiles during the labour market career. Low labour market attachment restricted particularly in the Mediterranean countries eligibility to public work-related pension schemes. In general, throughout all countries, particularly private second-tier pensions showed a strong gender divide. Pronounced gender-specific inequalities were found for the purely voluntary occupational schemes in the United States, the United Kingdom, and Ireland that mostly benefitted men. Additionally, occupational and personal pensions can due to their close link between contributions and later benefits be expected to foster labour market inequalities, as these schemes may particularly favour middle-to-high income earners.

In general, the transition to retirement was more flexible with the existence of a pension system that mostly focused on work-related contributory or and/or occupational schemes. In contrast the existence of basic pensions created a retirement pattern that was closely linked to the eligibility age to the basic pension; this could be observed in Canada and Denmark.

Summing up, this study revealed that comparative analyses of inequalities of income of elderly households need to capture various dimensions that altogether explain the outcomes. Income inequalities among the elderly were shaped by a mixture of past labour market attachment, current labour market inequalities and pension system characteristics. Labour market inequalities might work in two ways; first through prolonged working careers beyond statutory retirement age, and second, through other household member's work income from which elderly persons might profit in multi-generation households. Past labour market attachment influenced the contribution period to public and private pensions, and therefore structured primarily work-related pension income of the income mix. Contributory pension systems might be considered the main source explaining inequalities in most advanced societies such as Western Europe, and the United States. Additionally, targeted and basic pensions might offer specific risk protection or complementary non-work-related financial resources; such incomes reached comparatively high relevance for example in Canada, Denmark, and the Netherlands.

III.2. Research questions

The previous Chapters I, II, and III.1 introduced the fundamentals for the study of pension systems and income packaging by elderly households. In a cross-national perspective there is broad variation in terms of pension system regulation and coverage through various established public and private schemes (see literature review in Chapter II and data

evaluations in Chapter III.1). In most countries, various providers were involved in regulating individual pension schemes that cover groups of the active and/or non-active population, leading to quite diverse saving profiles within and between countries. Although the comprehensive framework also stressed the importance of labour market attachment and living arrangements for explaining cross-national differences in old-age income, this study will particularly concentrate on pension system characteristics. As will be further explained in the research agenda (Chapter III.3), the comparative studies are restricted to advanced European societies. The main institutional differences in pension system arrangements can be summarised as follows.

Public pension policies should protect individuals against permanent loss of work income and prevent poverty. Accordingly, there are two main types of public social security programmes: *poverty prevention* and *income maintenance* programmes (European Commission 2003; OECD 2005; Myles 1989; World Bank 1994).

Poverty prevention might typically be achieved with a first-tier Beveridge type system that provides minimum pension benefits to either a targeted group or to the whole population. Public basic pensions and/or targeted pensions, as well as minimum pensions embedded in earnings-related Bismarckian pension system could set up a minimum living standard. The public minimum pension approach substantially unlinks financial security of the elderly strongly from previous labour market attachment. At the same time, at least for the low-income group, it shifts regulatory power to current regulation rather than regulation in the past.

Income maintenance is expected to be achieved through a first and second-tier Bismarckian social insurance system. In contrast to minimum pension legislation, in public contribution-based schemes the final pension income is usually strongly tied to accumulated contributions during the working phase. Generosity of pension income strongly depends on the stability of previous work income, insurance coverage and contribution payments. Thus a strong labour market attachment, combined with no or only short periods of inactivity during the working phase, typically increase pension claims.

As long as a Bismarckian system does not contain contribution and/or income ceilings, all workers are secured by the social insurance system. If such ceilings existed a *crowding in* of selective additional private schemes for high-income earners could be observed (Ebbinghaus and Gronwald 2011). Bismarckian social insurance systems for the dependent employed were in many countries either extended to the self-employed or separate counterparts for the self-employed were introduced.

The more a state focuses on a public pension system that provides only minimum pensions, the more this system concentrates to redistribute only to the income poor (Zaidi et al. 2006). As mentioned by Korpi and Palme (1998) this public approach might favour a *paradox of redistribution*, as it might result in even less unequal pension outcomes.

The public emphasis on basic/targeted schemes created a *crowding in* of well-established comprehensive occupational schemes in many European countries, which led to a balanced

public-private mix of pension income. On the contrary, the existence of well-established Bismarckian social insurance hampered the development of private pension counterparts (Ebbinghaus and Gronwald 2011; Ebbinghaus and Neugschwender 2011, Hinrichs 2009).

Various complementary second and third-tier schemes by employers and/or financial institutes typically supplement pension income received by the state. Depending on the country-specific institutions, private pension schemes function either as second and/or third tier of pension income. Like the earnings-related public scheme, these non-public/private (occupational and personal) pension schemes similarly aim at *income maintenance* during old age (World Bank 1994). When mandated by law their structure may be similarly comprehensive for the working population like in the public Bismarckian social insurance system; though, the non-existence of income and/or contribution ceilings might even more closely reproduce labour market inequalities.

However, various private (occupational and personal) complementary schemes do not imply comprehensive coverage; collective agreements and legislated schemes can also leave persons uncovered (for example the Swiss system enforces mandatory contributions only above a certain income threshold (Bonoli and Häusermann 2011). Also various occupational second-tier schemes were structured on voluntary basis (for example in the United Kingdom and the United States); thus coverage with such voluntary schemes can be very selective and drive inequality of pension income, particularly leaving the low-income group uncovered.

Most personal pensions with financial institutes were in the past rarely mandated by law, and thus might show very selective recipient patterns. Manifold reforms in Latin American countries and Eastern Europe, and Sweden which utilised mandated personal savings accounts show that this selectivity of third-pillar arrangements will be reduced in the future.

An interesting research endeavour arises with the co-existence of public and private schemes in multi-pillar pension systems; alternative options in the private sphere may possibly again limit state efforts in providing benefits. But also the balanced public-private structure might enhance income security (cf. Goodin and Rein 2001).

Given this variation of pension system regulation, my main research interest in this monograph is to evaluate and explain inequalities in pension income of the elderly. There exist various interdependencies between pension incomes from public and private pension schemes. Rein and Turner (2001) for example refer to the potential substitution of public benefits by occupational ones, and emphasis the need for studies that focus on studying the interdependencies between public and private pensions.

This comparative study emphasizes the importance of past and current pension system legislation for the current public-private income mix received by the elderly. Each pillar of the pension system affects the income distribution in a quite particular way. Cross-national comparisons of pension outcomes help clarifying in how far the national pension system guaranteed a minimum living standard and/or maintained the previous income level. The key feature of this comparison is a detailed study of public, occupational, and private pension schemes and their combined effect on the current income package received by the elderly. Four major research questions (RQs) will be addressed:

- *RQ 1: Why is there cross-national variation of income received by the elderly?*

In high-income countries pension income has by and large replaced the importance of market income and private income; in most of the high-income countries, nowadays pension income is the major income source (above 80 per cent, see Figure 6 in Chapter III.1) among the elderly population. However, national institutions and cultural differences may create cross-national differences in the importance of other incomes in the income mix: for example labour income resulting from belated retirement, importance of capital income through rental income and investments, and other social security income for example disability-related transfers for the disabled or housing benefits for low-income households.

Pension income of the elderly is affected by past and current regulation. In public contribution-based Bismarckian pension schemes, the contribution rules in place when the individuals entered the working phase and subsequent reforms, set up jointly the conditions for the later pension income; personal and/or employer's contributions were accumulated during the whole working phase (for example Germany, Italy, Spain, the United States, Brazil). Ultimately, these contributions serve to replace a certain share of the previous work income before retirement.

In addition, many countries have considered the elderly population as a particular group at risk, and embedded specific minimum protection programmes for the elderly in their social security system. Such poverty prevention policies (non-contributory pensions) primarily secure the financial well-being of the income poorest elderly, these benefits are be paid based on years of residence (Canada, Denmark, the Netherlands), or on years of employment (Japan and the United Kingdom), or targeted to the poor. Eligibility to such targeted schemes could be restricted when pension income, or other income, or other income and assets (Autralia, Estonia, Finland, Germany, Ireland, Italy, Spain, the United Kingdom, the United States, Brazil, India, South Africa,) are above a certain threshold. Generosity and eligibility criteria for receiving such universal or targeted assistance transfers differ strongly in cross-national perspective (see for cross-national variation of pension systems around the world also Chapter II.2.), and thus also recipient rates show broad variation across countries (see also Figure 8 in Chapter III.1).

Consequently the research agenda in this monograph includes a theoretical discussion on the variety of approaches to pension system regulation and its evolvement over time.

- *RQ 2: What implications do different institutional pathways of pension systems have for the income situation?*

A detailed study of national pension system arrangements might further explain the observed variation in the income mix; it should be explained in how far redistributive elements of pension schemes effectively reduced poverty and inequality. Analogously, unregulated private pension systems are expected to exacerbate market income inequalities as compared to the working age population.

Arza and Kohli (2008b) pointed out that old-age security may 'produce new social and political cleavages by creating actual and potential beneficiaries' (Arza and Kohli 2008b: 2); it

is the corporatist arena that opens up various regulatory alternatives. But also the state can foresee second-tier schemes besides the universal and/or targeted minimum protection schemes (for example S2P in the United Kingdom, or ATP in Denmark). Thus in order to analyse the income mix of the elderly it is crucial to analyse both public and occupational second-tier pension schemes, and in how far these schemes provide comprehensive respectively selective coverage.

The mix of earnings-related/contributory income maintenance schemes and non-contributory poverty prevention schemes both structure the income and income inequality within a society. Strong attachment to the labour market and therefore stable contributions to pension schemes reduce the likelihood of dependency on social assistance transfers or minimum pensions in old age. However, much depends on the amount of overall contributions made to different pension schemes, and how these amounts/contribution years are valued in the final calculation of the pension annuity. At the same time, this also means that a poor contribution history (for example through low paid jobs, or contribution free job contracts, or long periods of inactivity) increases the risk of poverty in old age, and creates the need of poverty prevention schemes securing a minimum living standard in old age, a scenario that is particularly relevant for women, who throughout the world still show essentially lower labour market attachment as compared to men (Arza 2015).

Rein and Behrendt (2004) emphasised that both types of public approaches (Bismarck and Beveridge) can provide satisfactory or insufficient poverty prevention; the authors argue that effective poverty prevention does not need to be necessarily linked to a strong public pension, but alternatively can also be explained by the institutional arrangement of public and private pensions. Particularly the implications of different pathways for the adequacy of pension incomes for the middle and high-income group need to be further addressed.

- *RQ 3: What role do non-public pension systems play in the income-mix and for the development of inequalities?*

Besides public social security, employers and financial institutes offer manifold alternative options for additional contributions to individual pension plans. Their institutionalised structure depends strongly on the nature of the public pension scheme but also on other factors, such as the self-perception of employers and unions as alternative providers of pension transfers, the relations between the government, employers, and trade unions, setting up the regulatory framework for occupational pensions, and the incentives by the state to encourage take up of private pension plans. Altogether these factors affect the potential and actual contributions to complementary pension schemes. An interesting case is the Finnish pension system that offers a tripartite *hybrid* public-private solution between the state, employers, and trade unions; the mandatory contributions are frequently made to pension funds run by financial institutes.

A well-established public pension system may have already *crowded out* a general need of complementary pensions, and limited the role of private pensions to *fringe benefits* for the high-income group (see Chapter II.2). This concentration of private pensions on the upper

end of the income distribution might exacerbate market income inequalities as compared to the working age population. But also advanced multi-pillar pension systems can more strongly replicate market income inequalities as compared to mostly public pension dominant systems, as in the private pension systems redistributive elements are less pronounced. Also recent reform trends towards strengthened incentives for belated retirement and a stronger reliance on private pension plans can increase inequalities (OECD 2013a).

- *RQ 4: Which developments can be observed in the public-private income mix and generosity of the pension system?*

In many countries the structure of the public-private income mix is developing towards a more balanced pension income from public and private sources. This development can be expected from the maturing of multi-pillar pension systems. Whereas many public pension schemes had already been extended in the 1950 and 1960s, particularly in the second half of the twentieth century, occupational and personal pension schemes have also become more regulated and structured as complementary component of the public-private old-age provision mix (for example in Finland and Sweden since the 1960s, in Denmark since the 1990s, and in Germany since the early 2000s) (cf. Ebbinghaus and Gronwald 2011). Thus, younger birth cohorts are expected to show broader and longer coverage with private pensions, affecting the income mix and inequality of outcomes. At the same time, in the 1990s and 2000s many public pension systems have been reformed and adjusted to the needs of demographic ageing, which resulted in an expected decrease in future public pension replacement rates (see Chapter 1 in OECD 2013a). Thus, the perspective of birth cohorts and their respective income mix can bring additional insight in the development of poverty and income inequality trends.

III.3. Research agenda, country selection, and data

In order to interpret current inequality of pension income, a detailed study of historical path-developments of various country-specific pension schemes from each pillar is a pre-condition to interpret empirical findings on income received by the elderly. Old-age income partly results from individual decisions based on the regulations that had been in place 50 years before actual retirement when a person entered the working phase. Thus individual saving profiles differ by birth cohorts and need to be analysed in light of the maturing phase of contributory pension schemes. Particularly the broad cross-national variation of second-tier schemes provides a promising field of study.

Cross-national comparative studies on institutional differences and its outcomes provide an essential understanding about consequences of specific pension system regulation in the past and future reform needs. Such evidence based policy advice is beneficial for future pension policy. In this vein I will embed national findings on pension outcomes in a comparative cross-national perspective. The following studies will also point to the achievement of the two main goals of old-age systems: *income maintenance* and *poverty prevention*. In the following these two goals are measured by comparing *income replacement* and *pension adequacy* across countries.

Income replacement is primarily reached via *horizontal redistribution*[5] over time; this concept is in line with the idea of a *replacement ratio*, i.e. pension annuities maintain a certain percentage of the average life-time earnings. In principle it is assumed that old-age income inequality mirrors pre-retirement income inequalities. *Income replacement* is expected to be higher for the low-income group than for the middle and high-income group, as the low-income group might additionally be protected by *vertical redistribution* in order to prevent poverty, for example through minimum pensions or credits for periods of inactivity.

A second criterion can be best described as *pension adequacy.* This dimension describes that the income of the elderly should meet a certain income standard in relation to society's living standard. *Pension adequacy* is expressed as the income level of a certain income group in relation to median earnings of the respective society. For the low-income group this means that, although the criterion *income replacement* is met, these groups can be still considered as poor or threatened by poverty due to their low *pension adequacy*. Similarly, the high-income group still may be adequately protected in terms of their *pension adequacy*, although they did not achieve a reasonably high *income replacement*.

Rein and Behrendt (2004) summarised various difficulties that arise when studying the public-private pension income mix, poverty and income inequality: Among these difficulties are issues of classification between public and private schemes that not only arise from the fact that the state serves as pension system regulator and employer, but also from the institutional arrangements of various schemes that become hybrid in nature, as they are the result of state, employers and unions (the most prominent case is Finland, where partly funded systems were introduced based on a tripartite solution). Additionally the state may shift over the funding and administration of private pensions to the private financial sector; nevertheless, such privatised pension schemes can involve major public regulations, for example investment rules and/or minimum rate-of-return conditions. Also take up of personal pension accounts is frequently strongly incentivized by the state through favourable tax treatment and direct subsidies for personal pension accounts. The authors conclude: '[S]ince it is not possible to unambiguously identify the private domain, then it is difficult to establish a plausible causal analysis of the interplay between public and private spheres' (Rein and Behrendt 2004: 190).

This concern is similarly shared by the author, and thus the establishment of causal interpretations between the interplay of public and private pensions, labour market attachment, and inequality is not the primary objective of the following cross-country studies in this monograph. Nevertheless, by studying different pension system paths in a comparative cross-national perspective, various consequences of different country scenarios can be compared; thus a comparative study allows much more interpretation than a single

[5] In the following *horizontal redistribution* is conceptualised by (public and occupational) contributory earnings-related schemes and personal pension plans with financial institutes; *vertical redistribution* is conceptualised by non-contributory minimum pension schemes that foremost are provided by the state or in some countries by the local government (cf. Esping-Andersen and Myles 2009; Palme 2006).

country case study focused on one cross-section or time-series. Although other countries' scenarios do not serve as direct counterfactual cases, these country comparisons mirror a counterfactual scenario, when they share similar characteristics except for one, for example compulsion to occupational pension schemes.

In order to reflect this idea, the following studies will concentrate on studying different systems within a similar set of countries focusing on European societies. This pre-selection by area follows the idea of a *most similar design* with regard to living arrangements. The data evaluation in Chapter III.1 had shown that most European countries have in common a strong pattern of elderly households living on their own. Also pension income was the one and almost only source of income. Thus differences and inequality of old-age income can be best explained within this similar group of countries.

Within this group of European countries a *most different system design* combined with *Mill's method of agreement* is pursued (cf. Levi-Faur 2006); the *most different system design* reflects 'variation in aspects of the system' (Levi-Faur 2006: 58), whereas *Mill's method of agreement* considers a 'comparison of similar aspects of different cases that differ in outcomes' (Levi-Faur 2006: 58). Applied to pension policy this means that quite different public approaches to protect the elderly can be revealed. This variation (*different system design*) can be determined even in seemingly similar Beveridge tradition countries; universal, income-tested, and insurance based minimum pensions describe three alternative pathways. *Agreement* can be seen in the regulation and development of important second-tier pensions. This *agreement* is coherent also in the public Bismarckian tradition, where second-tier pensions are embedded in the earnings-related insurance system. At the same time, Bismarckian pension systems constitute another important case in the *most different system design.* Thus by selecting on the variation of public pension policies, it can be detected best which differences in second-tier pension arrangements can explain differences in outcomes.

In this monograph it is argued that country-specific patterns of *income replacement* and *pension adequacy* can be best analysed by a cross-national comparative study that puts country-specific outcomes in perspective to other countries. During the empirical analyses the inequality of pension income will be linked back to the regulation of first and second-tier benefits. By particularly clarifying the role of second-tier pension schemes in the income mix of the elderly, this study can shed light on the potential implications of an implementation or extension of complementary second-tier schemes.

The following empirical Chapters IV to VI in this monograph will consist of three separate chapters/studies. The common aim of each cross-national comparative comparison is to study pension outcomes; sections on specific pension system regulations from the past will help to explain these national outcomes. Thus I will approach the study of pension outcomes from a comparative historical welfare state tradition perspective. Two of the studies will be structured in two main parts: a historical overview of the development of country-specific pension systems and an evaluation of inequality patterns across the elderly, applying standardised inequality measures across the countries. The third study will primarily focus on the over-time development of inequality patterns that will be linked to the pension systems in place.

Primary data analyses with the Luxembourg Income Study (LIS) Database will analyse the income distribution of the elderly and present various income inequality indicators. These standardised indicators facilitate the direct cross-country comparison, explaining the cross-national differences in poverty prevention and income maintenance through the various combinations of public and private respectively first, second, and third-tier schemes.

It is argued that pension outcomes can be best studied when combined with an analysis that breaks down the group of elderly in population subgroups, particularly income percentiles (for example quintiles or deciles). The breakdown of the elderly in income percentiles might clarify which income groups are mostly affected by the recipient patterns of complementary private pensions.

Research agenda

In order to analyse cross-national variation in income (RQ 1) and the implications of different institutional pathways of pension systems for the income mix (RQ 2), the following sub-questions emerge:

- *Which pension schemes are provided simultaneously?*
- *How should these nation-specific schemes be classified?*
- *Which group of beneficiaries does each pension scheme cover?*

The theoretical institutionalist overviews in Chapters IV and V clarify the historical development of various country-specific pensions systems. It will be shown which pension schemes were introduced to cover potential contributors. The individual schemes will be classified with the pillars and tiers approaches. It will be studied if and when second-tier/pillar pension were implemented and in how far a comprehensive coverage can be expected. Lastly, current implications for the income distribution will also be discussed.

In a second step the actual redistributive consequences among the already retired population will be studied. In order to study the role of non-public pensions in the income mix (RQ 3) and on-going developments (RQ4), the following sub-questions will be addressed:

Related to the coverage:

- *Who benefits from second-tier pension schemes?*

Related to the income replacement and pension adequacy:

- *How well are the elderly secured against poverty?*
- *How do the elderly fare in terms of income level?*

Related to the national developments:

- *Can there be shifts in the public-private mix observed?*
- *Are the on-going developments increasing or decreasing inequalities?*

Related to the cross-national comparative view:

- *In how far are differences in pension scheme regulation also transferred to differences in the pension income distribution?*

Each of the three empirical studies will contain a specific focus, addressing these research questions. The first study (Chapter IV) concentrates on presenting countries from the Beveridge type public pension tradition, i.e. minimum pension schemes that offered a broad scope for various second-tier schemes to develop. This study analyses in how far countries from the Beveridge tradition reveal different outcomes, which primarily can be linked back to cross-national variety in second-tier regulation. The analyses include an evaluation of recipient rates and income shares of private pensions in the income mix along various socio-demographic characteristics (sex, age, and household size) and along the income distribution by income deciles. The study also clarifies in how far individuals benefit from intra-household redistribution; therefore recipient rates and income shares are evaluated on individual and household level. Also for each decile of the elderly population the income-mix is first compared relatively to society's median disposable income, and second to income received by each decile in the total population in order to interpret relative income levels of the elderly.

The second study (Chapter V) aims at contrasting the outcomes of Bismarckian and Beveridge type systems. Different outcomes can be expected, as Bismarckian systems offer first and second-tier benefits, whereas in Beveridge type systems two separate schemes developed side by side, which provide first and second-tier benefits separately. Similarly as in Chapter IV recipient rates and income shares of private pensions in the income mix along various socio-demographic characteristics (sex, age, and household size) and along the income distribution are evaluated. A special focus is placed on the development of various indicators between two points in time. Evaluated indicators are poverty rates, poverty gap, Gini coefficient, and relative income level of the low, middle, and high-income group of the elderly in comparison to society's median disposable income split by various income sources.

In contrast to the repeated cross-sectional designs of the first two studies, the third study (Chapter VI) will apply a longitudinal data design, which is motivated due to measurement problems embedded in the cross-sectional design when analysing over time development. Disney and Whitehouse's (2002) study exemplifies these various measurement inaccuracies:

- It is likely that younger birth cohorts received a higher real income during their life career than older cohorts, thus pension income can also be expected to be higher.
- Younger pensioner cohorts may still receive labour income. These incomes are either received in addition to pensions or refer to belated retirement; in both situations labour income increases younger birth cohort's income. In addition to this, it the early retirement trend of the 1980s and 1990s is currently reversed; therefore a prolonged labour market participation of elderly workers might have also increased the pension income of the younger cohorts compared to the older cohorts.
- The socio-demographic composition in older cohorts shifts towards single women households, as women tend to outlive their partners. Thus, average earnings of older age cohorts can also be lower due to the increased share of women and single person household and their lower pension benefits compared to men and two person households.

- Maturity of pension systems developed only slowly over time in contribution-based pension schemes. Thus if individuals accumulated pension entitlements five years longer under a newly introduced scheme this group receives higher benefits from this pension scheme.
- Pension income may only be indexed partially to inflation; this is particularly relevant for private pension benefits.

Therefore the main focus of the third study (Chapter VI) is analysing the current shifts in the income mix and the income distribution by birth cohorts. First recipient rates and income shares of private pensions in the income mix are presented. Then absolute income levels from public and private pensions are compared by deciles and over the cohorts; these national findings are compared cross-nationally. An evaluation of two specific birth cohorts of the elderly that are ten years apart, clarifies the development of the income mix over time. In a last step, a specific birth cohort is studied in order to assess *pension adequacy* of pension income along the income distribution by deciles; similar as in the earlier chapters pension income is shown in relative terms in comparison to each society's median income; the analyses focus on comparing the ranking of countries by income deciles before and after taxes.

Country selection

The country selection slightly varies with the research question to be analysed in each of the three studies. In the following a quick overview of the country selection for each study will be provided, clarifying its motivation for the cross-national comparisons within each study.

The first study (Chapter IV) includes a comparison of three Beveridge type countries: Denmark, Finland, and the United Kingdom. Although all three countries introduced a Beveridge type first tier, focusing on poverty prevention, the country-specific schemes differ strongly regarding their eligibility rules: Denmark introduced a universal basic pension based on years of residency in Denmark. Also Finnish minimum pensions used to be universal until the reformation in 1996 to an income-tested benefit. In the United Kingdom entitlement to a full basic pension is tied to sufficient years in employment. But more importantly, all countries show also strong variation regarding their second-tier schemes. Denmark's private pension schemes have been mostly based on voluntary plans; only since the beginning of the 1990s various collective agreements were introduced that enforced broadly mandatory coverage with occupational plans. Current pension outcomes will therefore capture a system which is currently under transition with a strongly increasing importance of occupational schemes. In Finland, already in the 1960s administration of occupational schemes was early on shifted to the various social partners; compulsory enrolment ensures comprehensive coverage. The United Kingdom foresees a second tier that contains a mixed structure of public and private pension benefits. A *contracting-out* option of the state earnings-related system (SERPS) favoured the development of various occupational and personal pension plans; the contracting out structure is considered as a partly mandatory inclusion to occupational schemes.

The second study (Chapter V) aims at capturing broad variation in terms of pension system design in order to contrast the Beveridge minimum protection approach from the Bismarckian social insurance approach. This study analyses Denmark, Germany, Sweden, and the United Kingdom. The Danish and the British systems are proponents of the Beveridge path as presented in the previous paragraph. The analyses are extended by Germany and Sweden. The German social insurance system is the prototype of the contribution-based Bismarckian approach; the public social insurance system was broadly extended in the late 1950s, securing also the living standard up to a certain income ceiling. As a consequence, occupational schemes were only relevant for selective occupational groups. The Swedish system can be considered as a hybrid system incorporating both a Beveridge type scheme and a limited Bismarckian scheme. Besides minimum pensions, the Swedish state also regulates contributions to earnings-related public schemes. Due to the low contribution ceiling in the public scheme, private pension schemes might be important for the high-income group. Already in the 1960s and 1970s various universal industry-wide collective agreements were implemented, which emphasised the general role of private pensions in the Swedish pension system.

The third study (Chapter VI) extends the broad institutional variation in terms of pension system design from Chapter V by adding the Finnish and Italian systems. Thus the study incorporates analyses of six Western European countries: Denmark, Finland, Germany, Italy, Sweden, and the United Kingdom. The Finnish system had already been studied extensively in Chapter IV; Finland exemplifies a regulatory approach that focused on tripartist solutions, which formalised various occupational schemes that contain a strong link between contributions and later benefits. In contrast to this, the Italian system represents a pure Bismarckian system that almost exclusively provides rather generous public benefits. Both countries Finland and Italy are interesting study cases, as they contain in the case of Finland no income ceiling and in the case of Italy a comparatively high income ceiling (OECD 2013a).

Table 3 summarises the main pension system characteristics of the countries that will be studied in the following; this overview focuses also on the importance of public vs. private pensions in the income mix among elderly households. Particularly the Nordic countries have substantially reformed their pension systems in the 1990s (cf. Kangas et al. 2010), thus they are interesting study cases for the development across time (cohort studies in Chapter VI). Additionally, the Nordic countries provide alternate scenarios that had not been studied by Disney and Johnson's (2001) edited volume on pension policies and outcomes. The German system underwent a major reform in the early 2000s; however, the introduction of *Riester* pensions will hardly be relevant for the observed elderly population in this study.

Table 3: Main characteristics of the pension system and public-private income mix

	Denmark	Finland	Germany	Italy	Sweden	United Kingdom
by pension pillar						
tradition of public pension pillar	Beveridge	Beveridge	Bismarck	Bismarck	Beveridge + Bismarck	Beveridge
structure of occupational pillar	labour contracting	mandatory by law	voluntary + (labour contracting)	voluntary	labour contracting	contracting out
by income tier						
poverty prevention (first tier)	basic MP	targeted MP	none; SA	income-tested MP	guaranteed MP	targeted MP
status maitenance (second+third tier)	(public)+ occupational	occupational	public+ (occupational)	public	public+ occupational+ (personal)	public + occupational+ personal
by income source						
share of public pension	medium-high	low	high	high	high	medium
share of occupational + personal pension	low-medium	high	low	marginal	low	medium
recipient rate of occupational + personal pension	low-medium	high	low	marginal	high	high

Sources: Behrendt 2000; Ebbinghaus and Gronwald 2011; Rein and Turner 2004; OECD 2007; Figure 1 in Chapter II.1.

Data, comparability, and limitations

For the comparative cross-national analyses in each of the empirical sections of the three studies various datasets from the Luxembourg Income Study (LIS) Database by LIS have been utilised. LIS is a data provider that transforms national survey/register data to a common data template. In this role LIS applies a unified definition of annual disposable household income based on regular income transfers, enforcing standardisation of income data for comparative cross-national research; contents and definitions of individual incomes are closely linked to the international recommendations by the Canberra Group (Canberra Group 2001, UNECE 2012).

Since 2011, LIS has extended its focus capturing systematically also counterparts to purely monetary transfers such as values of goods and services received, and own consumption of self-produced goods. However, due to data comparability the applied analyses will be restricted to monetary components only. Therefore the studies may particularly underestimate the living standard of households that for example benefit from consumption of own-produced goods or home ownership. The exclusion of values of non-monetary transfers and imputed rent is a clear restriction in this study, which can be considered a worthwhile attempt to add in later studies.

All LIS datasets provide annualised income data for a specific cross-section in time. Due to the missing panel structure and data availability for each year, it is not possible to analyse work-to-retirement transitions. This restriction is not problematic for the analyses in this monograph; instead of analysing individual replacement rates, income levels are evaluated relative to the median living standard of the society.

It is worth mentioning that the direct study of individual replacement rates would offer also an interesting insight for the study of pension outcomes, however this approach would require at best detailed information on individual working careers; the study of work-to-retirement transitions from a panel design might capture only final salary policies but not the benefits from contributory schemes which are linked to contributions over the whole working career.

Since the evaluation of individual working careers would have required detailed and accurate data preparation of various comparable national datasets, it has not been pursued in this monograph. Again this individualised perspective can be a valuable extension to the studies in this monograph, as inequality of pension income could be better linked to individual risk profiles and insufficient protection.

In the following, the samples are always weighted with the weight provided by LIS that inflates the sample to the total population. The creation of weights is done by the original data provider, and it has not been adjusted further for the selected subsamples. Therefore, depending on the accuracy of the construction of the weights, the provided figures might not accurately capture the income position and income distribution of the elderly samples. Adjustments of the weight are not done in this study, as it is a very technical study by itself. However, it is argued that weighting in general yields better results, as specific data collection biases are accounted for.

For Chapter IV the following datasets were used (see Table 4): Denmark (1995, 2000, 2004), Finland (1995, 2000, 2004), the United Kingdom (1994, 1999, 2004). Chapter V is based on datasets for two points in time: Denmark (2000, 2004), Germany (2000, 2004), Sweden (2000, 2005), the United Kingdom (1999, 2004). Chapter VI includes various datasets for Denmark (1992, 1995, 2000, 2004), Finland (1995, 2000, 2004, 2007, 2010), Germany (1994, 2000, 2004, 2007, 2010), Italy (1995, 1998, 2000, 2004, 2008, 2010), Sweden (1995, 2000, 2005), and the United Kingdom (1994, 1999, 2004, 2007, 2010).

Table 4: Datasets used from the Luxembourg Income Study (LIS) Database

	Chapter IV	Chapter V	Chapter VI
Denmark	dk95,dk00,dk04	dk00,dk04	dk92,dk95,dk00, dk04
Finland	fi95,fi00,fi04	-	fi95,fi00,fi04,fi07, fi10
Germany	-	de00,de04	de94,de00,de04, de07,de10
Italy	-	-	it95,it98,it00,it04, it08,it10
Sweden	-	se00,se05	se95,se00,se05
United Kingdom	uk94,uk99,uk04	uk99,uk04	uk94,uk99,uk04, uk07,uk10

Appendix (Chapter III)

Table 1: Employment rate by gender and age group (in %)

country	dataset	men			women			gap men/women in %		
		age group			age group			age group		
		60-64	65-69	70-74	60-64	65-69	70-74	60-64	65-69	70-74
Nordic countries										
Denmark	dk10	55.2	26.6	14.8	38.6	12.0	4.8	-30	-55	-68
Finland	fi10	37.2	7.6	1.0	34.2	3.8	0.8	-8	/	/
Iceland	is10	77.8	49.8	19.6	68.0	42.0	4.6	-13	-16	-77
Norway	no10	62.8	23.4	2.2	50.6	16.2	1.2	-19	-31	/
Middle European countries										
France	fr10	18.6	5.6	2.8	16.4	4.2	2.0	-12	/	/
Germany	de10	51.2	18.8	9.8	32.0	12.2	6.0	-38	-35	-39
Ireland	ie10	43.0	19.2	10.0	28.4	7.4	3.0	-34	-61	-70
Luxembourg	lu10	19.0	7.2	0.4	13.2	1.0	0.4	-31	/	/
Netherlands	nl10	37.8	12.6	3.2	22.8	2.4	1.6	-40	-81	/
United Kingdom	uk10	54.2	20.4	9.2	34.6	14.0	6.0	-36	-31	/
Eastern European countries										
Estonia	ee10	44.8	23.2	9.2	46.8	15.4	10.8	4	-34	17
Hungary	hu09	7.2	3.8	1.2	8.0	2.8	0.4	11	/	/
Poland	pl10	27.6	14.0	7.4	12.6	5.8	3.2	-54	-59	/
Serbia	rs10	35.6	12.4	8.4	10.0	7.0	3.8	-72	-44	/
Slovak Republic	sk10	35.6	6.0	4.6	10.6	4.8	0.2	-70	/	/
Slovenia	si10	18.2	8.6	4.0	5.2	3.0	1.4	-71	/	/
Mediterranean countries										
Greece	gr10	36.2	11.2	2.0	16.8	3.6	0.8	-54	-68	/
Italy	it10	31.8	18.0	6.2	16.6	4.6	1.4	-48	-74	/
Spain	es10	36.6	4.6	1.4	20.4	2.6	0.2	-44	/	/
Latin American countries										
Brazil	br11	61.2	40.2	30.6	26.2	16.4	10.4	-57	-59	-66
Colombia	co10	71.0	61.2	45.8	34.6	21.2	16.8	-51	-65	-63
Guatemala	gt06	89.8	81.0	70.6	38.0	33.4	29.2	-58	-59	-59
Mexico	mx10	67.8	58.4	45.2	27.2	21.0	14.6	-60	-64	-68
Peru	pe04	82.0	69.2	61.8	61.0	54.2	43.2	-26	-22	-30
Uruguay	uy04	55.4	30.4	14.4	29.6	16.6	5.6	-47	-45	-61
Other countries										
Australia	au10	57.2	33.0	9.0	37.6	17.0	7.0	-34	-48	/
Canada	ca10	51.6	25.6	1.0	38.2	15.4	0.0	-26	-40	/
Egypt	eg12	48.6	31.8	26.8	19.4	3.8	4.6	-60	-88	-83
India	in04	64.2	59.6	45.8	40.8	23.8	18.0	-36	-60	-61
Israel	il10	61.2	36.4	20.0	40.8	18.0	5.6	-33	-51	-72
Japan	jp08	77.2	52.2	31.6	51.2	28.4	18.8	-34	-46	-41
Russia	ru10	40.2	24.4	12.2	30.0	17.0	7.6	-25	-30	-38
South Africa	za10	32.0	13.2	7.4	9.4	7.6	2.6	-71	-42	/
United States	us10	54.2	36.4	21.8	48.0	27.0	13.4	-11	-26	-39

Source: Luxembourg Income Study (LIS) Database

Missing information in the employment section was recovered by using the income information. Thus if a person did not indicate the employment status, and had no personal labour income from dependent employment or self-employment activity, and did receive personal pension income, that person was considered as not employed. Vice versa if a person did not indicate the employment status, and received personal labour income from dependent employment or self-employment activity, and had no personal pension income, this person was considered as still employed. Persons for whom the employment status still was not defined after applying these two conditions were excluded. Unfortunately, in Canada employment characteristics were only available for persons up to age 69; the employment status could not be proxied well enough by using the income information, as a substantial share of persons received both pension and labour income.

Appendix (Chapter III)

Table 2: Income share of pension income by gender and age group (in %)

country	dataset	men			women		
		age group			age group		
		60-64	65-69	70-74	60-64	65-69	70-74
Nordic countries							
Denmark	dk10	22.2	60.6	82.5	36.8	81.4	94.0
Finland	fi10	33.4	84.2	96.1	35.9	89.4	97.9
Iceland	is10	15.3	33.8	73.9	20.1	42.3	86.7
Norway	no10	21.0	59.3	88.8	30.5	68.5	94.1
Middle European countries							
France	fr10	58.7	88.0	95.1	64.6	85.1	91.0
Germany	de10	16.4	81.8	93.6	34.6	90.2	97.0
Ireland	ie10	29.2	77.2	88.5	31.8	80.7	96.6
Luxembourg	lu10	68.6	81.2	99.0	61.7	95.1	98.3
Netherlands	nl10	40.7	88.9	95.4	42.7	93.3	93.0
United Kingdom	uk10	28.2	79.5	94.3	58.2	81.5	96.7
Eastern European countries							
Estonia	ee10	28.5	62.4	79.4	39.6	79.0	86.7
Hungary	hu09	89.1	98.5	99.0	90.1	99.8	100.0
Poland	pl10	65.0	87.1	90.1	83.4	91.5	95.7
Serbia	rs10	59.9	91.6	97.1	93.6	98.6	99.6
Slovak Republic	sk10	33.7	86.5	88.1	79.2	92.3	99.4
Slovenia	si10	63.3	85.9	93.8	84.5	91.1	93.1
Mediterranean countries							
Greece	gr10	43.1	61.4	87.9	61.5	91.4	99.7
Italy	it10	59.9	77.8	92.6	65.4	88.6	98.2
Spain	es10	41.2	84.6	97.3	40.2	89.2	98.7
Latin American countries							
Brazil	br11	41.4	63.9	76.4	70.4	85.4	94.5
Colombia	co10	40.3	49.4	67.9	50.9	85.0	93.9
Guatemala	gt06	9.8	12.6	21.9	27.3	16.4	37.8
Mexico	mx10	25.3	38.9	56.9	43.4	59.2	76.0
Peru	pe04	24.4	41.0	56.2	45.2	55.7	72.7
Uruguay	uy04	39.8	63.9	86.7	59.2	81.4	95.1
Other countries							
Australia	au10	21.5	51.3	83.7	30.6	72.4	93.6
Canada	ca10	29.5	67.8	85.6	37.5	81.2	93.7
Egypt	eg12	.	.	.	.	.	.
India	in04	0.6	39.7	42.2	4.5	55.1	69.7
Israel	il10	.	.	.	.	.	.
Japan	jp08*	13.1	55.8	71.8	26.2	65.3	87.2
Russia	ru10	62.5	68.4	88.9	72.0	82.6	92.1
South Africa	za10	54.3	81.0	86.8	74.0	96.6	94.7
United States	us10	19.8	45.1	64.6	22.6	54.7	74.7

*The Japanese data refer only to elderly which were classified as head or spouse.

Source: Luxembourg Income Study (LIS) Database

IV. The Beveridge path: occupational welfare policies in Denmark, Finland, and the United Kingdom

IV.1. Introduction[6]

Pension policies fulfil two main goals: *poverty prevention* and *income maintenance*. Particularly in the 1950s two ideal typical paths of public-private mix designs emerged. Several nation states followed the *Bismarckian* path (e. g. Germany, Italy, Belgium). These countries extended their group-oriented earnings-related security systems further, guaranteeing a certain replacement rate of previous incomes for the majority of contributors to these schemes. Thus income maintenance was primarily achieved by public pensions. Occupational and private provision had been crowded out subsequently.

Another group of countries maintained or extended their *Beveridge* type minimum pension schemes (e. g. Sweden, Finland, Denmark, the Netherlands, and the United Kingdom). Eligibility criteria to basic pensions were made less restrictive, and levels of guaranteed (income-tested) pensions were increased. Income maintenance policies developed as a second tier of provision. Regulations were set up by various constellations of actors such as the state, social partners, and firms. These schemes were crowded in to replace the income of middle-to-high income earners.

The broad variation of implemented policies for second-tier benefits provides a multiple field of study in comparative cross-national research. Different combinations of the public-private provision mix might generate various social inequalities within and between nation states. Therefore, I will analyse the income mix of the elderly in each of these countries to clarify what role private pension income plays for the public-private mix of income and in how far private pensions can be linked to income inequalities across the elderly.

In this chapter, I will take a closer look at the public-private mixes of the United Kingdom, Denmark, and Finland. The three welfare states show a commonality in their public first-tier programme to poverty prevention – all countries introduced a minimum pension according to the Beveridge tradition. However, the eligibility criteria differ: Denmark organised the pension as a social right to the whole population based on residency in Denmark. The United Kingdom has linked the basic pension to years in employment. In Finland the minimum pension used to be provided to the whole population, but it was transformed in 1996 to a pension income tested transfer.

Strong differences occurred in the country's approaches to provide income replacement (second tier) of retirement income. The Finnish occupational pillar is strongly influenced by its corporatist nature. Administration was early on shifted to the various social partners in the 1960s. Their decision for compulsory enrolment based on employment yielded to one of the highest private pension expenditures among the OECD (2009a: 42). In the United Kingdom broad compulsion was reached through *contracting out* of the State Earnings

[6] Chapter IV is a further development of Neugschwender (2011), LIS Working Paper No. 561.

Related Pension System (SERPS). The second-tier scheme came into effect in 1978. SERPS was compulsory as long as someone did not contract out in favourable occupational pensions or since 1986 also personal pensions. Denmark's private pension regulation has been based traditionally on voluntary solutions. Tripartite negotiation between the state and the social partners proved to be difficult at first, but since the beginning of the 1990s occupational plans became influential. Various mandatory collective agreements were introduced since then, yielding to a high coverage among current workers. The delayed maturing in Denmark allows an evaluation of a purely voluntary private pension path that only recently shifted to a quasi-mandatory occupational scheme. This three country comparison will analyse these different approaches to occupational pension regulation and analyse the consequences for income inequalities of the elderly.

This chapter is structured as follows. First, the reform processes in the three countries will be documented in order to derive hypotheses about the development and spread of private pensions. In the empirical part of the chapter, I will analyse the on-going developments in the public-private mixes. A selection of descriptive figures will be presented, exemplifying the differences in inequality. A first set of figures include recipient rates of private pensions and the income shares of private pensions in the public-private mix. Then the income sources will be analysed by income deciles. Most of these estimates will be presented for men and women separately to account for differences in employment careers of men and women. The analyses are based on personal and household level data in order to signify how these differences are mitigated by living arrangements. The last empirical section concentrates on the income distribution of the elderly in relation to the total population's income distribution. The findings will be summarised in a conclusion.

IV.2. Historical pension system development

Denmark

Danish old-age assistance started off with liberal residual policies in 1891 which only in 1956 became universal; however, also these transfers remained means-tested (Andersen 2011). In 1964 a part of the universal national pension scheme was transformed to a basic pension (*people's pension*). The other part of the first tier was designed as a complementary income-tested amount. As a public second tier, the *arbejdsmarkedets tillægspension* (ATP) was introduced. This scheme is based on working hours and reached broad coverage, but is less important in terms of contributions and benefits (Green-Pedersen 2007; Davies 1996). ATP is a funded scheme that is enforced by law, but administered by the social partners. It is at the edge of first and second-pillar classification. Due to data limitations in the LIS data ATP will be treated as part of the public scheme. National pensions and ATP together provided around 60 per cent of replacement for the low-income earners, therefore satisfying the need for additional private pensions for the low-income group almost completely, but leaving a higher gap for the high-income group (Kangas et al. 2010; Kangas and Palme 1991). As a result of the reforms in the 1960s, poverty across pensioners decreased strongly during the second half of the 1980s (Pedersen and Smith 2000).

In the following, the complementary public pensions were designed more income-tested in the 90s. Benefits were cut as soon as other personal pension income (also including ATP and occupational pensions) exceeded an income threshold, however, still in favour for occupational pension recipients (Kangas et al. 2010; OECD 2009b). Second-pillar pensions remained broadly unregulated and scattered at first. The major reason was unsuccessful negotiations between the Labour Organisations (LOs) and the government on the question who should regulate occupational pensions. In this unregulated scenario almost exclusively civil servants and a small group of white collar employees were protected with occupational pensions (von Nordheim Nielsen 1996). Until the beginning of the 90s, Danish tripartite bargaining remained unresolved. But then policies shifted to self-administered collective agreements. It became obvious that the primary goal of universal occupational pension could not be reached through tripartism (Green-Pedersen 2007). Fixed temporary regulations in the public sector finally guided the way for further sector-based collective agreements, initiated by the Danish metal industry (Andersen 2011; Kangas et al. 2010).

Due to broad extension of compulsory enrolment in occupational schemes, future generations will benefit strongly from additional occupational pension benefits. Thus income-tested national pensions might lose their important role in counterpart of a earnings-related labour-contracted occupational schemes for the middle-to-high income earners. Stunning from an institutionalist point of view is that, although the Danish labour relations system is well developed and influential (Green-Pedersen 2007), social partners failed for a long time to structure occupational pension agreements. This issue has been viewed as a matter of public decision making. The LO's priority of a universal solution was transferred to industry-wide plans, however the goal of general extension over the whole workforce was still upheld (Davies 1996). During this reallocation of power, industrial relations gained in power in the political arena. The process also led to an increase in earnings-related occupational pensions as a substitute of and complement to public benefits.

Finland

Finland redesigned its pre-existent national pension in 1956. The reformation entailed a citizenship-based basic pension benefit (*National Pension*) and an income-tested supplement. In addition two major reforms were enacted in the public scheme (Kangas 2007). Since 1985 the complementary part of the national pension was only tested against other legislated pension income. Thus the income test was restricted. Ten years later, in 1995, tremendous cuts were decided. Taking back universalistic policies, the national basic pension was abolished. Hence, the entire national pension became targeted security, tested against other pension income. Basic pensions are already effectively cut for moderate levels of other pension income (OECD 2009b), diminishing the role of these benefits further. Whereas the replacement rate until the 1970s first increased, wage-development overwhelmed basic pension levels in the following, hence leading to a less important role in old-age income (Jäntti and Ritakallio 2000).

The development of the public first tier was accompanied by an increasing role of several hybrid earnings-related second-tier pensions which were introduced during the 1960s and 1970s. The various schemes that are organized across occupational and sectoral lines (TeL, LeL, KvTEL, VeL, YeL, and MyEL) will be interpreted as occupational pensions according to the definition of Goodin and Rein (2001), as these schemes are administered by the social partners and run by financial institutes. The strong corporatist structure in Finland is a key element of pension policy design. This contrasts Finland from other countries in terms of bargaining influence through statutory regulations: Finnish social partners were directly involved in the design of occupational pensions and their reformation (Kangas 2007; Kangas and Luna 2011). The majority of these negotiated schemes were organized as pay-as-you-go schemes, thus yielding a strong linkage of earnings-related contributions and benefits. The schemes aimed at a replacement of 60 per cent of previous earnings for private sector employees respectively 66 per cent for public employees. Since there is no income ceiling, the need for further private pensions was *crowded out* for decades by these rather generous schemes for all income groups (Barr 2012). This scenario is changed through various reforms that will decrease the replacement level in the future (Kangas and Luna 2011). However in 2011, the Finnish government also introduced a guaranteed minimum pension that is tested only against other pension income (Barr 2012).

Summing up, the Finnish case can be interpreted in two ways: First, as a system almost exclusively based on hybrid public-occupational welfare regulation combined with a meager targeted first-tier public pension. Second, if earnings-related pensions are considered as public transfers, as a system where occupational and personal pensions have been effectively crowded out due to the non-existence of contribution ceilings. This interpretation has been applied by Korpi and Palme (1998) by referring to an *encompassing* system. This understanding reflects the Finnish pension system design as an arrangement similar to a Bismarckian social insurance type in an idealised shape. The main difference occurs in the administration by social partners instead of the state. During the last decades, the balance in the pension income mix was shifted gradually towards a higher importance of the various earnings-related pensions. Given that guaranteed replacement will decrease, Finnish providers may successively need additional private savings plans to attain adequate pensions. These additional demands could be satisfied again by coordinated political influence *via* industrial relations (Kangas and Luna 2011).

The United Kingdom

The British pension system is one of the most discussed systems in nation-based studies on inequality and poverty across the aged and political insufficiencies of restructuring the individual pension scheme components (Bridgen and Meyer 2007a). The introduction of the first basic pension occurred 1946 coming into effect in 1948. The design was strongly inspired by the Beveridge report. Pension entitlement was calculated on the basis of the male working career, treating married women as dependants irrespective if working or not (Bridgen and Meyer 2011). Full benefits were paid if 90 per cent of potential employment records (16-65) were documented; phases of unemployment and maternity were taken into account. In the

area of occupational pensions the various British governments followed first a liberal path, keeping occupational pensions fairly unregulated based on voluntary employer's decisions to offer such schemes and voluntary employees' choice to provide in such plans. The low level of the public basic pension left a broad scope for the maturation of occupational and private pension schemes (Bridgen and Meyer 2007a). Occupational schemes provide besides annuities, also lump sums and benefits for widows/widowers covering also dependent children (ABI 2000).

The introduction of the State Earnings Related Pensions Scheme (SERPS) in 1975 envisaged a paradigmatic reform in British public pension saving. This scheme tied public and occupational pension components closely together. First of all SERPS was introduced in efforts to construct a second-tier public pension related partially to previous earnings. As the government feared a crowding out of existent occupational pension plans, the *contracting out* option was introduced. Thus second-tier entitlements can be either accumulated in the SERPS or in occupational plans if these non-public plans were favourable for the individual. In principle, inclusion to the British second-tier scheme was mandatory for all employees, however, those earning below the lower earnings limit (LEL) stayed excluded. The scheme came into being in 1978. The full effect of the SERPS was intended to come in effect twenty years later offering around 25 per cent of national average earnings by the re-valued calculation of the best 20 years of employment earnings (Blake 2003; Blundell and Johnson 1998). Since the implementation of occupational pension plans remained a decision by the employers, *contracting out* was not a real option for a part of the society until 1986.

The Social Security Act 1986 dealt with the various consequences initiated by the introduction of the SERPS. Beginning from 1988 all individuals gained a *contracting out* option as long as they held *Approved Personal Pensions*. This meant that providers had to pay at least a minimum contribution to private pensions, the *contracted-out rebate* which had been already a feature of occupational *contracting out* from the SERPS (Dilnot et al. 1994). Furthermore, the SERPS benefits were withdrawn to 20 per cent of average earnings based on lifetime earnings. As a result the SERPS became less attractive for low-income earners and workers with interrupted careers (Schulze and Moran 2007).

Given the fixed criteria on public pensions, the public benefits from the basic pension and the SERPS were expected to be still meagre for most employees without supplementary plans. The SERPS excluded persons below the LEL; low-income earners and disabled persons were not covered with private pensions, which created an everlasting discussion on further necessary reforms of the SERPS (Schulze and Moran 2007; Taylor-Gooby 2005). Coverage with occupational pensions decreased from 53 per cent to 46 per cent the late 1960s to 2000 revealing opposite trends for men and women; whereas men were less covered in 2000, women were more frequently covered (The Association of British Insurers (ABI) 2000).

Since 2003, a means-tested Pension Credit was introduced. This scheme not only increased the public minimum income, but also rewarded to a certain degree modest savings in the occupational schemes (Blake 2003). Also the newly introduced Stakeholder Pensions aimed at increasing the savings of those with low occupational savings. However, take-up rates

remained low in the early 2000s. In order to prevent an increasing share of persons with incomes at the bottom level of the Pension Credit, the government decided a gradual transformation of the SERPS to the State Second Pension (S2P) (Bridgen and Meyer 2011; Disney and Emmerson 2005). This means that starting from 2002 over the next 50 years a transformation takes place that will result in a stronger flat-rate character of the second tier.

The UK's complex pension system in a nutshell: Besides the public schemes (basic pension and SERPS), two major ways of private provision coexisted since the introduction of SERPS. First, private pension plans that resulted from an approved *contracting out* either on occupational or individual level, including also Stakeholder pensions. Second, private pension plans that were not approved, the important market for life insurances included. Government policies can be best described as 'exhausted voluntarism' (Bridgen and Meyer 2011), where voluntary mechanisms were pursued to its limits and the SERPS introduction was soon regretted as a means of interference in the liberal tradition. Interest group influence on collective solutions in private pensions has been low due to the decentralized and fragmented landscape of union involvement. The Trade Union Congress, the umbrella organisation of the unions, has been solely an advisor in the stately reform process (Schulze and Moran 2007). This low influence was accompanied by a majority of employer representatives in the governing private pension authorities (Davies 1996).

Summing up, we can detect various institutional linkages between public and occupational schemes among the three countries under study. The timing of reforms in the pension schemes have affected the crowding in/out of private pension schemes differently. The British and the Finnish system have developed a mature multipillar structure; the Danish system is a latecomer with respect to occupational pension policies. Whereas British occupational pensions are mostly voluntary, Finnish occupational pensions are highly regulated and are the major source of income. In Denmark, quite generous basic pensions and the introduction of ATP partially satisfied the demand for occupational pensions at first, however also kept the middle-to-high income earners in a highly unregulated private pension market. In this scenario portability of occupational pensions in the case of job change might be highly disadvantageous.

Social partners fulfilled different regulatory functions in cross-national perspective. In British politics consultation was the main channel, whereas in the coordinated economies in Finland and Denmark collectively self-administered and self-regulated second-pillar solutions were implemented. In Finland the involvement of social partners early on became an important veto point in politics (Kangas 2007). The Danish system only recently shifted to self-administered collective agreements, when it was recognised that Danish tripartite solutions had failed to govern occupational pensions.

Therefore British social partners are by far less influential and less involved in the current occupational scheme regulation than in both Nordic countries. Consequently coverage with occupational pension plans across the current work force is by far higher in the Coordinated market economies Finland and Denmark (both above 90 per cent) than in the Liberal market economy United Kingdom (ca. 60 per cent) (OECD 2009b: 141).

IV.3. Inequalities in recipient rates and private income shares

The following analyses will analyse the current recipient rates of private (occupational and personal) pensions across the elderly population; defined as elderly persons are those who are aged 65 or older. Partners and household members below age 65 were excluded from the sample population; however since the analyses are based on household level income, the income of partners below age 65 and/or other household members is taken into account.

Previous studies primarily evaluated one cross-section (Behrendt 2000 and 2007; Callegaro and Wilke 2008; Casey and Yamada 2004; Ebbinghaus and Neugschwender 2011; Pedersen 2004; Yamada and Casey 2002); in the following repeated cross-sections will be presented. This proceeding allows an additional interpretation of current shifts in the public-private mix across the elderly.

The data source for the analyses is the Luxembourg Income Study (LIS) Database. LIS provides a harmonised database that transforms national survey or register data to a common variable template; the datasets have a repeated cross-section structure. For the analyses the following datasets were evaluated: Denmark (1995, 2000, 2004), Finland (1995, 2000, 2004), and the United Kingdom (1994, 1999, 2004).

Total pension income includes payments for all three functions old age, disability, and survivors. It is worth mentioning that all three systems hardly implemented systems for survivorship, therefore entitlement is mostly individualised, and less influenced by derived transfers. Due to data restrictions, occupational and personal pensions were combined to private pensions; if a split had been possible it would have made a clear difference only in the United Kingdom, whereas in both Nordic countries the importance of the third pillar is negligible.

The LIS data evaluations in Table 1 and 2 document private pension recipient rates and the importance of private pensions in the public-private mix at three points in time: mid 1990s, around 2000s, and mid 2000s. Recipient rates are calculated on the personal and household level. Private income shares are presented at the household level, as this is the common measurement for living standards. All household income statistics are equivalised by dividing the household income by the number of household members. Full intra-household redistribution of income is assumed; this is the standard approach in income inequality research (Jenkins and van Kerm 2009; Salverda et al. 2009).

Intra-household redistribution increases recipient rates among couples. Partners/spouses who personally do not receive private pensions might profit indirectly from other private pension beneficiaries in the household. Due to the lower labour market attachment of women, primarily female spouses might be affected by this indirect recipient pattern.

The Finnish private pension recipient rates were by far the highest in this comparison (see Table 1). The recipient rates were fairly stable over time signifying the maturity of the system; even women's recipient rates reached values close to 80 per cent on the individual

Table 1: Recipient rate of private pension income by socio-demographic characteristics (65+)

		United Kingdom			Finland			Denmark		
		mid90s	around 00	mid00s	mid90s	around 00*	mid00s*	mid90s	around 00	mid00s
Individual level	total	50.7	49.7	52.3	80.6	79.4	80.3	20.8	25.2	28.9
gender	men	70.9	65.9	66.0	85.2	84.7	85.1	23.7	27.9	32.1
	women	36.1	38.5	42.0	77.0	75.3	76.5	18.9	23.3	26.7
age-group	65-74	54.5	51.3	52.0	81.5	81.1	81.3	23.1	27.6	31.6
	75-84	47.8	51.4	54.6	80.8	78.1	80.7	20.5	25.4	28.9
	85+	36.1	39.1	48.2	69.7	69.2	68.4	11.9	15.0	18.6
household size	1	52.5	54.9	55.7	79.1	75.5	78.0	18.6	22.8	26.2
	2	50.7	48.2	51.7	79.9	79.8	80.1	23.1	27.9	31.6
	> 2	43.0	41.0	43.3	85.3	83.4	83.9	19.4	19.0	25.7
Household level	total	68.0	69.9	75.2	97.8	96.4	97.5	38.3	42.6	48.0
gender	men	74.4	74.8	79.8	99.2	98.5	99.0	38.9	43.6	49.4
	women	62.9	65.9	71.3	96.9	94.8	96.3	37.8	41.8	46.8
age-group	65-74	73.1	73.0	77.8	98.9	98.4	98.7	41.3	45.3	51.0
	75-84	61.7	68.4	74.0	96.8	93.5	96.7	37.0	42.1	47.2
	85+	50.7	53.5	64.2	93.2	92.6	91.5	24.7	29.3	33.3
household size	1	52.5	57.2	60.8	94.6	90.3	93.3	29.2	33.0	35.9
	2	75.4	77.0	82.1	98.8	98.7	99.1	43.4	48.2	54.2
	>2	61.3	60.9	65.5	98.9	96.8	97.3	33.7	34.8	42.1
income decile	1st(lowest)	25.2	29.3	31.9	87.9	86.5	85.9	18.2	20.5	24.0
	2nd	27.4	31.8	46.5	95.3	89.1	96.1	8.5	4.0	6.0
	3rd	50.3	61.0	62.6	97.5	96.5	96.5	3.6	4.6	7.2
	4th	65.6	62.4	74.7	97.5	96.5	99.0	5.9	7.4	13.3
	5th	71.3	72.3	81.5	100.0	97.5	98.9	8.3	17.4	24.5
	6th	77.6	79.9	80.1	100.0	99.6	100.0	36.6	51.0	65.1
	7th	82.3	82.1	87.7	100.0	98.4	99.6	56.0	57.9	65.2
	8th	88.3	86.8	91.2	100.0	100.0	100.0	65.0	76.4	82.0
	9th	92.4	96.0	96.4	100.0	100.0	99.2	86.7	90.5	94.1
	10th(highest)	98.4	97.5	99.3	100.0	100.0	99.7	94.1	96.3	98.1

Notes: *LIS coding for the public and private pensions was changed in Finland in wave 5, on the household level employment-related pensions were considered private pensions; this information was not available on the individual level, values for 2000 and mid 2000s were calculated on the household level.

Source: own calculations based on Luxembourg Income Study (LIS) Database.

level. The lowest recipient rates existed in the age group 85 or older, but even this group received nearly half of their household income from private schemes (see Table 2).

In the United Kingdom, especially women were more and more also receiving private pensions, whereas men's recipient rate slightly decreased. However, there remained a positive development on the household level: three quarter of the households received private pensions, the recipient rate increased by 7 percentage points over the 10 year period. The increase was mostly driven by higher recipient rates of elderly persons aged 75 or older; in contrast to this, the recipient rate of persons aged 65 to 74 increased only slightly.

Denmark's most recent data of the mid 2000s showed that the recipient rate strongly increased. However, the occupational schemes were still far away from comprehensive recipient rates; the outcomes of the quasi-mandatory collective agreements need to mature further to depict a clear shift towards a higher importance of occupational pensions. During the 1990s, shortly after the implementation of negotiated pension plans, the total recipient rate was rather low (ca. 21 per cent). This number increased in the following 10 years on average by approximately 40 per cent. But still, on the individual level, only 30 per cent of the elderly population were receiving private pensions. On the household level this accumulated to almost 50 per cent.

Table 2: Share of private pension income in the public-private pension income mix by socio-demographic characteristics (65+)

		United Kingdom			Finland			Denmark		
		mid90s	around 00	mid00s	mid90s	around 00*	mid00s*	mid90s	around 00	mid00s
Household level	total	25.2	26.4	30.5	63.5	64.3	69.6	16.1	17.8	19.6
	among private pension recipients	37.0	37.6	40.3	64.8	66.7	71.3	41.9	41.7	40.7
gender	men	28.1	28.8	33.0	69.1	71.7	75.9	16.5	18.5	20.2
	women	22.9	24.4	28.2	59.5	58.6	64.4	15.8	17.2	19.1
age-group	65-74	28.0	29.0	33.2	70.4	71.2	75.8	18.0	19.1	20.5
	75-84	21.6	23.6	28.1	55.8	57.6	63.3	14.8	17.3	19.7
	85+	17.0	18.8	23.3	38.5	40.1	49.9	9.2	12.1	14.2
household	1	19.0	21.0	23.4	60.1	52.8	56.8	12.4	14.3	15.5
	2	29.4	30.0	34.4	68.8	72.1	77.0	18.5	20.1	21.9
	>2	19.0	20.4	22.9	50.8	52.7	56.7	12.4	12.9	16.5
income decile	1st(lowest)	6.0	8.4	8.1	33.1	31.6	41.2	5.2	6.0	6.9
	2nd	4.9	5.2	8.9	37.6	39.6	46.7	1.6	1.2	1.4
	3rd	8.9	11.6	12.4	41.9	50.4	53.8	0.8	0.9	1.1
	4th	13.1	13.2	18.9	49.7	57.8	59.6	0.8	0.9	2.2
	5th	18.7	16.9	23.8	63.6	64.3	72.1	1.2	2.3	4.0
	6th	21.3	23.9	26.7	66.6	70.8	79.4	6.2	9.6	14.6
	7th	26.6	28.2	34.4	79.5	73.0	81.4	15.6	15.7	18.6
	8th	36.0	36.7	42.3	82.8	80.7	84.3	24.7	29.1	32.0
	9th	47.7	51.1	55.1	87.0	82.1	86.1	42.4	45.6	47.1
	10th(highest)	68.3	68.1	73.1	92.6	92.8	90.9	62.2	66.5	67.7

Notes: Share calculated on the gross income amounts.

*LIS coding for the public and private pensions was changed in Finland in wave 5, on the household level employment-related pensions were considered private pensions, this information was not available on the individual level, values for 2000 and mid 2000s were calculated on the household level.

Source: own calculations based on Luxembourg Income Study (LIS) Database.

The developments in the United Kingdom and Denmark were generated by diverging shifts in the old-age income mixes. First, there could be a similar development observed across the oldest group of the elderly. In Demark particularly the coverage of the elderly aged 75 or more increased due to the increasing inclusion to voluntary plans. For this age-group the reforms in the beginning of the 1990s had almost no effect; most of them were already claiming pension benefits when the new legislation became effective. Therefore the strong increases in these age groups exemplify an increasing self selection into private schemes over time. This situation could be observed similarly in the United Kingdom.

The situation was quite different for the younger group of the elderly. The increased recipient rate for the younger group of the Danish elderly can be related to the mandatory inclusion to occupational pensions. Recipient rates increased by nearly 40 per cent, although the importance for the income was still rather low. This differentiates the Danish development quite strongly from the British situation, where recipient rate patterns remained rather stable for the more recent generations of retirees.

In terms of the income share of private pensions in the total pension income mix, the same ranking between the countries could be observed (see Table 2): In the mid 2000s, the highest importance in the public-private mix created the Finnish schemes (ca. 70 per cent), followed by the British (ca. 30 per cent), and the Danish (ca. 20 per cent). Alternatively, the income share can be calculated for the private pension income recipients only; this view refers to the idea how important are the private pensions for those who are receiving them.

For private pension recipients it could be observed that these incomes were similarly important in the income mix for British and Danish pensioners (ca. 40 per cent). Therefore in both countries private pensions were strongly complementing the income for those who receive them.

Similarly to recipient rate patterns, the private income share of pensioners aged 75 or older increased substantially in all three countries. This increase could be observed even in Finland, where recipient rates were already stable over time. This indicates that the abolishment of Finnish basic pensions limited the role of public pensions. Additionally, the younger birth cohorts had longer contribution period to the various mandatory occupational schemes that had been introduced only in the 1960s and 1970s. Thus the older cohorts entered the working phase already before the introduction of the mandatory occupational schemes. However, the cut of the public basic pension seems to have affected particularly two-person households, where the private pension share increased from approximately 69 to 77 per cent; due to their combined higher pension income they were less likely to be eligible to the pension-income tested targeted pension. The British data show that private pensions still increased in importance in the public-private pension mix, particularly across men, although recipient rates even slightly declined.

The findings support that being in a two person household strongly increased the private income share; most of these households might be couples. The higher share of elderly women among single person households decreased the importance of private pensions. Larger households that mostly relate to multigenerational households showed in general lower importance of private pensions, as in these households the incomes of other household members below age 65 become more relevant.

IV.4. Inequalities in benefit levels

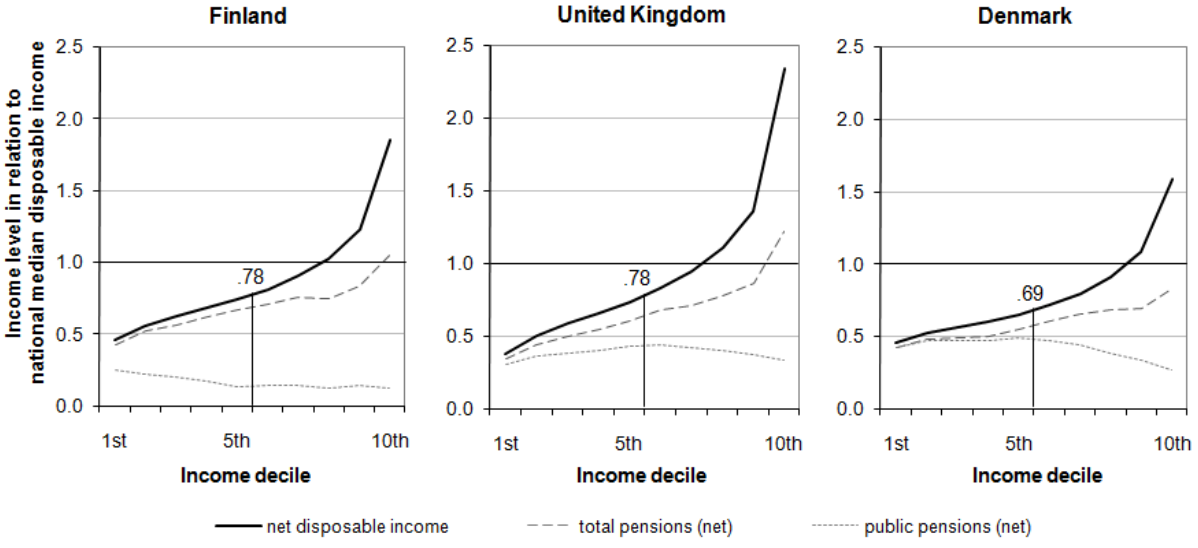
As documented in the historical overview of the three pension systems, this cross-national comparison shows a broad institutional variation in terms of minimum pension policies. The British system ties entitlement to the basic pension to a minimum period of labour-market inclusion, whereas the Danish and Finnish basic and targeted schemes are based on residency and income tests that are unlinked from employment. Whereas the Danish scheme upheld a combination of basic amount and targeted supplement, the recent reformation in Finland in 1996 transformed the old universal minimum pension scheme to a purely targeted minimum pension. OECD estimations mirror that Danish low-income earners might profit from a strong increase in the minimum claims since the 1970s. The level of income-tested pension can amount to approximately double the amount of the basic national basic pension, guaranteeing an income of 36 (18 + 18) per cent of Danish average earnings (OECD 2009b 158-60). The Danish system provides much higher minimum pensions than in the United Kingdom (28 (14 + 14)) and Finland (18).

Figure 1 depicts the disposable income of the elderly in relation to national median disposable income across the whole society split by income deciles. Individuals are distributed to each decile with respect to their total net disposable income.[7] The first income decile refers the individuals living in the households with the lowest disposable income. Two additional curves are plotted for the same decile: total pension income (net) and public pension income (net). Thus for each decile the distance between the y axis and the public pension curve reflects the importance of public pension, the distance between public pensions and total pensions signifies the importance of private pensions, and the distance between total pensions and disposable income clarifies the role of other income sources such as work and capital income.

The shape of the curves demonstrates that allocation of the individuals occurred *via* two effects: a higher share of private pensions, but also a higher share of other income sources in the income mix. In comparison to the Nordic countries the British income distribution looks much more unequal at the upper end of the income distribution.

In all three countries public pensions are relatively equally distributed across the income deciles. This is in line with the assumed distributional consequences of a public Beveridge type minimum pension policy. In all countries, these schemes mainly provide the first tier, preventing poverty. With regard to generosity of minimum pension benefits, we find the following country order: the low-income group in Denmark was better off than in Finland, whereas British retirees were worst off. The diverging characteristics of the public pension curves document the contrasting redistribution logic in each country. The highest public pensions were paid on average in the sixth income decile in the United Kingdom, in the fifth income decile in Denmark, while in Finland the highest benefits were paid to the first income decile. This highlights that the Finnish system more strongly concentrates on vertical

Figure 1: Income distribution of net disposable income, total pensions, and public pensions (65+, mid 00s)



Source: own calculations based on Luxembourg Income Study (LIS) Database.

[7] In order to be able to show net pension income levels, the gross pension incomes were transformed to net values.

redistribution, whereas in Denmark and the United Kingdom public schemes provide also an essential part of income for the middle-income group: in the United Kingdom primarily *via* SERPS benefits, in Denmark *via* income-tested supplements of the national pension and ATP-benefits.

In Finland private pensions are by far the most important income source, as reflected by the distance between the public and total pension income lines. Even in the lowest income deciles basic pension income is complemented with occupational pensions by 40 percent. The long maturing process of the occupational schemes generated a high relevance for the entire elderly population. The evaluation over the three points in time (see Table 2) signifies that the importance of public pensions decreased primarily for the low-income group as an effect of shifting to entirely targeted pension benefits since 1996. Private pensions were the most important income source for the middle-income group – on average 70 per cent came from second and third-pillar schemes. The relative importance of private pensions was lower again in the high-income group. In turn labour and capital income increased in importance. However, as can be seen in Figure 1, in absolute terms also higher private pensions were paid, reflecting that the high-income group had either rather high private pensions, or rather high other income, or a mix of both.

In the United Kingdom the share of private pensions was below 10 per cent for the lowest income decile. Increasing with income more and more persons may have substituted the SERPS benefits with favourable *contracting out* to private pensions, this effect gets stronger the longer persons decided to contract out of the SERPS. Voluntary occupational pensions were widely spread across the society even across low-income group, however particularly in the upper half of the elderly population, private pensions were more relevant. Previous studies showed that the SERPS lead to a segmented occupational provision along gender and occupational lines (Papadakis and Taylor-Gooby 1987: 119-130), particularly leaving part-time workers in the SERPS (Ginn and Arber 2000). As these risk groups consequently had low SERPS benefits and hardly any private pensions, they barely escape poverty (less than 50 per cent of median disposable income, reflected by the 0.5 line in Figure 1). The high-income group had stronger incentives to contract out, as pension replacement by basic pensions and SERPS can be considered too low in order to maintain previous living standards. Therefore, a notable increase in the private pension income share could be observed already in the low and middle-income group. From the distribution of public benefits we can conclude that from the seventh decile to the highest decile the effect of *contracting out* of SERPS outmatched the increase in SERPS benefits. As more and more people in the high-income group were likely to have contracted out permanently, SERPS benefits only marginally contributed to the average disposable income of the high-income group. On the other hand due to the higher contributions to the occupational and personal plans, the income share received by private pensions strongly increased by income. Due to the strong labour market inequality in the United Kingdom, high inequalities are partly transferred to the elderly through higher private pension promises (DB schemes) and higher capital accumulation (DC schemes). In terms of disposable income, the British high-income group are much better off than the

middle-income group, but also than the Danish and Finnish high-income group. Again this is only partly an effect of higher pensions, but even more other income sources are adding up to the overall inequality across the elderly population. But also the private pension share in the pension income mix increased strongly from the seventh (40 per cent) to the highest income decile (73 per cent).

The Danish figures demonstrate that the population below the median was almost exclusively receiving public pensions. Consequently, the lines of public and total pensions almost match each other. However, this group profited from the generous basic amount and the income-tested supplement that lifted their income above 50 per cent of Danish median income earnings, thus poverty could by and large prevented. Also the slope of disposable income only slightly increased until the seventh income decile, illustrating that there existed a lack of provision for the middle-income group. Pension income levels of the middle and high-income group are by far the lowest in this three country comparison. As income levels are still primarily influenced by the past institutions that kept occupational pensions highly unregulated, we might conclude that the Danish voluntary private schemes failed to provide adequate replacement. Two effects can be linked to this situation. First, the low-income group could expect relatively high targeted pensions, which may have hindered the development of private second-tier schemes. Second, the higher private pensions were, the more cut were public benefits. This is reflected by the decreasing income level of public pensions for the high-income group. Consequently, the income-tested public pensions decreased inequality of pension benefits partly. Private pensions were much more relevant in the public-private pension mix in the high-income group. From the seventh (32 per cent) to the highest income decile (68 per cent) the income share of private pensions more than doubles. Thus the high-income group seems very likely to have been included in traditional voluntary occupational plans over a longer period of time.

Lastly, I will now evaluate the disposable household income levels received by the median elderly person. The median elderly person aged 65 or above (see Table 3) was worst off in Denmark (69 per cent of equivalised disposable household of the total population) due to the historical lack of provision. The median elderly person was better off in the United Kingdom (78 per cent) mainly through other income sources besides pension income. Similarly well off was the median elderly person in Finland (78 per cent), mostly due to the highly regulated occupational schemes. These statistics were rather stable in Denmark and the United Kingdom. The Finnish number dropped quite strongly between the observations from 1995 to 2000 from 84 to 79 per cent. This can be linked again to the general abolishment of basic pensions.

IV.5. Inequalities among the elderly in relation to the whole society

The previous evaluation of income showed that particularly the British system generated high inequalities through the income level on the upper end. However, this finding does not support that the high-income group also received a high replacement rate. The high income values in relation to the median need to be considered as a by-product of high labour market

inequalities. In contrast, income inequalities of the elderly tended to be lower in the Nordic countries due to more equal labour market income distributions. I will put the income of the elderly in relation to the income of the total population in order to receive a better understanding about the relative income levels of the income groups.

In the following, I will analyse inequalities of the total population and the 65 and above population simultaneously.[8] For each population the mean equivalised income level for each income decile was calculated. The division of each decile for the 65 and over population by the respective decile for the total population curve leads to a relative income level of each income decile group. I will depict two curves in Figure 2: The first curve (Figure 2a) shows equivalised net disposable income of the elderly in relation to equivalised net disposable income by the total population. The second curve (Figure 2b) illustrates net total pension income of the elderly in relation to equivalised net disposable income by the total population; this procedure proxies the idea of income replacement and reproduced market income inequalities along the income distribution.

If income inequality is similarly reproduced for all income groups, we would expect a stable income level over all income groups. However, this measurement technique has some limitations. First, the sorting in the income groups occurs very differently across the elderly population than it does in the pre-retirement group, as the household structures are very different in both groups. Second, also other income sources besides earnings respectively pensions could be quite different. Still, this technique might clarify the generic cross-national differences in the income distribution of the elderly that originated from country-specific pension systems.

Two additional refinements in addition to the data preparation for Figure 1 have been made. First, a standard technique has been applied to top code the incomes of the highest one per cent percentile to the value of the 99th percentile to limit measurement bias of mean income in the highest income decile. For Figure 2b only households whose pension income share was at least 60 per cent were kept. This procedure allows a more precise measurement of inequality caused by the pension system, and reduces the bias by employment income.

There are three notable circumstances that need further attention. First, earnings-related insurance schemes typically aim at replacing only a certain percentage of previous earnings; thus the ratio is expected to be below one. Second, minimum pension regulations particularly detach the low-income group from this scenario; due to minimum pension the low-income group may eventually show ratios above one. Otherwise the low-income group would fall below their already poor income level. These income levels could be higher than their former disposable income level, when minimum pensions are rather generous. Third, several persons aged 65 and above received a high share of earnings or other income, either personally or through intra-household redistribution. As shown in Figure 1, these persons ended up mostly in the high income deciles; therefore higher ratios might be also likely for the high-income group; Figure 2b tried to separate out this effect.

[8] A similar technique has been applied by the OECD before (OECD 2001).

Figure 2: Income level of the elderly in relation to total population (mid 2000s)

Source: own calculations based on Luxembourg Income Study (LIS) Database.

The ratios in Figure 2 show various interesting results. First, a clear positive effect of the minimum pension schemes for the low-income group could be observed in all three countries. The elderly in the first income decile were as well off as those in the first decile of the total population. In the United Kingdom they were even slightly better off (Figure 2a). This effect vanished when analysing the pension income (Figure 2b). However, the income level was comparatively low for the working-age population and the elderly population. Although the British elderly were not more affected by poverty than the total British population, they were still affected most by poverty in this cross-national comparison.

In Denmark relative income levels for the elderly declined fast from the low-income group to the median; the ratios declined more moderate in the United Kingdom and decrease rather slow in Finland. This fits quite well to the findings before. In Denmark, minimum pensions were by far the most important income source for the elderly persons below median income. Minimum benefits were only marginally complemented by the earnings-related ATP benefits or any forms of private pensions. As a result, income groups below the median received similar pensions (Figure 1). Figure 2b supports that inequality among the total population was much higher than among pensioners. Pensioners below and around the median seem to have lacked to save adequately for their old age; their income level dropped down below 55 per cent.

This situation was less pronounced in the United Kingdom, but similarly inadequate. The low to middle-income group provided rather less for their retirement, as a result of low SERPS contributions, and low obligations for contributions to complementary private pensions.

The legislation in Finland created a different scenario. A small group of pensioners fared less well compared to both other countries. This may be linked to the abolished basic pension entitlement. In contrast to Denmark and the United Kingdom, almost all elderly received an important share of their income from mandatory occupational schemes. These benefits were

in general strongly linked to the previous earnings history. Thus the Finnish elderly population received more individualised pensions that aligned the income distribution of the elderly more closely to labour market inequality.

In the upper income deciles the findings also differ quite strongly. The Finnish income levels remained rather stable also for the high-income group due to the employment linkage. The mandated occupational schemes seem to reproduce income inequality of the labour market also for the high-income group, as these schemes did not foresee contribution ceilings.

In the British case basic pensions diminished in importance for replacing income for the middle to high-income group. It seems that the middle to high-income earners did not adjust their savings behaviour in order to receive similar high income levels like the low-income group. As a result the income levels dropped further in the high-income group. However, as shown in Figure 1, their income level was still rather high compared to median earnings of the total population.

In the Danish scenario it can be concluded that if a person received private pension income, this pension was rather important for the household's income mix. This signifies the still high relevance of fringe benefits in the form of occupational pension schemes. Therefore the curve showed slightly higher values on the upper end.

IV.6. Conclusion: Different paths to private pensions – different societal inequalities?

This three country case study brought further insights in the distribution of pension income among the elderly population in three advanced European societies: Finland, Denmark, and the United Kingdom. The three countries implemented their second-tier pension schemes very differently. Finnish tripartism early on introduced occupational schemes in the 1960s. In Denmark similar solutions regulated by binding collective agreements were only introduced in the 1990s. Thus the Danish elderly currently received pension income mostly from historically voluntary occupational schemes. Income-tested supplements to the basic pensions yield to a close connection between public and private benefits. The British second-tier scheme was only partly mandatory on a low level; it also partly excluded the low and high-income group. The *contracting out* of the SERPS was particularly attractive for the middle and high-income groups.

Consequently, occupational pensions were an important income source even for the low-income group in Finland, whereas British and particularly the Danish low-income group were receiving primarily public pensions. The breaking down in income deciles made it possible to observe the pension income level of each group in relation to the population's median equivalised disposable income. By applying this standard technique, income levels can be compared cross-nationally. In a second step the income distribution of the elderly can be compared also to the total population's income inequality. The different paths that have developed in second-tier provision led to substantial differences in income inequalities among the elderly across the three countries.

Finnish second-tier schemes reached by far the highest importance in this comparison. The maturing of mandatory contributory schemes since the 1960s allowed the state to substitute public pension partially with occupational pensions. First, high importance of occupational pension benefits was reached, and then as a consequence public basic pensions were abolished so that the remaining income-tested scheme is now targeted to the poor only. Finnish median pensioners were much better off due to their inclusion to mandated contributory schemes.

The Danish middle-income group showed rather low income levels. This situation occurred as a by-product of the former voluntary second-tier benefits and the rather generous basic pension plus targeted supplements. As this Danish public scheme guaranteed relatively high pensions, private pensions were crowded out for the middle-income group. As a consequence the middle-income group of the elderly received rather inadequate pensions in comparison to the respective total population's income decile. Collective agreements will enhance a comprehensive coverage with occupational pensions and a stronger importance of occupational pensions in the income mix in the future.

British pensions yielded a quite different redistribution. Income inequality among the elderly population was essentially reduced in comparison to the total population. However, this result was primarily caused by the insufficiencies of the pension system to attract voluntary savings behaviour. The low-income group had a high risk of poverty in general. The middle-to-high income group received rather low pension income due to low public pensions and selective coverage with private schemes. Thus vertical and horizontal redistribution worked insufficiently.

V. *Bismarck vs. Beveridge: pension income inequality developments in Germany, Sweden, Denmark, and the United Kingdom*

V.1. Introduction[9]

Social security of the elderly is a major concern of the welfare state. In post-industrialist societies, a major juncture of pension system design took place in the 1950s (Ebbinghaus and Gronwald 2011; Hinrichs 2000). These reforms affect income inequalities in various ways. Particularly earnings-related schemes developed over a long time period to provide full benefits; workers who started their employment career in the 1950s have retired by majority only in the 1990s. Thus, the oldest retirees in the current societies have not been fully affected by pension reform outcomes. On the other hand, the retired population is only affected by reforms that have a direct effect on pension income levels, such as adjustments to consumer prices or minimum income regulation.

Analyses of reform processes in each nation state help clarify which interactions exist between specific schemes of public and private actors and how they have developed over time (see, for example, edited volumes by Arza and Kohli 2008a; Ebbinghaus 2011a; Immergut et al. 2007). However, important questions have remained insufficiently answered. These questions include: Do nation-specific paths provide adequacy of benefits for current pensioners? Does the shift towards a stronger role of private pension schemes exacerbate inequalities?

The division of power between the government, social partners, and firms can be decisive for income inequalities among the elderly. Specific regulations of second-pillar schemes structure the public-private mix of provision. In turn these varying approaches to pension regulation affect the financial well-being of the aged, as different types of pension schemes induce manifold redistributive effects. Particularly private pension income is less studied and its effect on income inequalities among the elderly is less clear.

In this chapter I will analyse inequalities in pension income and its on-going transformation among the elderly, taking into account its institutional reform path. I will analyse the interplay of public pensions and private pension components in four advanced European welfare states: Denmark, Germany, Sweden, and the United Kingdom. These nation states show a broad variation in their complementary design of public and private pension regulation and welfare state ideology.

The Danish and the British systems are proponents of the Beveridge path of pension provision, primarily preventing poverty within the public scheme. In both countries, supplementary provision had been designed in a liberal fashion primarily based on voluntarism. Only in the 1990s collective agreements became the Danish way of mandatory inclusion to private schemes. The strong, but decentralized social partners neglected to take action on a industry-wide level, as they were expecting the government to take action in a universal approach (Green-Pedersen 2007). This delineates the Danish situation from the Swedish one.

[9] Chapter V is a further development of Neugschwender (2015), LIS Working Paper No. 627.

The Swedish actors pursued a mixed strategy based on tripartism. Besides minimum pensions, the Swedish state also regulates contributions to earnings-related public schemes. In addition, occupational pensions have become an important component of the savings structure since the 1960s and 1970s, where various universal industry-wide collective agreements were decided.

In Germany, the public social insurance system was broadly extended in the late 1950s, securing also the living standard up to a certain income ceiling. Occupational schemes were only marginally important for income security, concentrated on specific occupational groups.

The structure of this chapter is the following. First, an introductory section describes the main institutional arrangements in each of the country-specific pension systems. Secondly, and based on this framework, I will analyse nation-specific profiles of public-private regulation. This will include an empirical evaluation of private pension recipient rates and private pension income shares using the Luxembourg Income Study (LIS) Database. In doing so, it will include evaluations by income deciles that describe inequalities of income. I will use relative income levels, which measure overall adequacy of pension income in relation to society's income standards. In addition to inequality profiles, I will use common inequality indicators like poverty rates and Gini coefficients. The repeated cross-sections cover the development that has occurred between 2000 and mid 2000s.

V.2. Historical pension system development

This section will focus on the major nation-specific policies which were implemented to provide social security to the elderly, and which mostly affected the current pension income of the currently retired population.

Germany is frequently referred to the ideal-typical case of a social insurance system. German Reich's chancellor Bismarck introduced this scheme in 1889. In the beginning, rather selective public first-pillar schemes for high-qualified employees were step-by-step extended to a broader group of employees. Major extensions of the public scheme (GRV) took place in 1957. A general replacement rate of 70 per cent of previous earnings was envisaged (Schmähl 1997). The GRV scheme is based on the principle of equivalence, where benefits should closely match paid contributions. Occupational pensions diminished in importance during the maturation of the public pension scheme, but never eroded completely due to two peculiarities (Schmähl 1994; Schmähl 1997): First, self-employed persons were not compulsorily included. Second, contributions involved an upper limit, so that high-income earners needed to provide outside the state scheme if they expected to maintain a high replacement of their earnings. Various reform initiatives in the 2000s will lead to a slow decrease in public pension income levels, while on the other hand; occupational and personal pension provision has been favoured by the state. State allowances or favourable tax deductions make private pensions more attractive for all income groups (Ebbinghaus et al. 2011; Hinrichs 2005; Schmähl 2004). Researchers in the field are concerned that old-age poverty will rise, as the restructuring of the scheme kept private pensions on a voluntary

basis. Therefore, temporarily employed or low-qualified persons might frequently stay uncovered by private pension savings (Hauser 2008; Hinrichs 2008; Neugschwender 2008). Since the German system provides only minimum benefits in the form of extended social assistance claims for the elderly, this scenario is non-negligible under current regulation.

The Swedish combination of public minimum benefits and public earnings-related pensions (ATP) appears to be most similar to the German system in this cross-country comparison. But still, essential differences exist. First of all, the Swedish system is characterized as an encompassing system based on universal inclusion (Korpi and Palme 1998). However, the former system is going through a major transformation since the reformation during the 1990s (Kangas et al. 2010; Lindquist and Wadensjö 2011): Initially, the Swedish system implemented generous first-tier universal basic pension and now it has been replaced by an income-tested guaranteed minimum pension on a lower level. Therefore, the new system might reduce benefits particularly to those with low inclusion to the labour market. In favour of occupational pensions, the guaranteed pension is not tested against earnings and occupational pension income. Also the former earnings-related component of the public scheme (ATP) was replaced by a new scheme. ATP faced several problems since its introduction in 1960. It was not financially sustainable, and the defined benefits were expected to turn into a flat-rate pension for the majority of male providers (Green-Pedersen and Lindbom 2006). Thus the earnings-related ATP is currently being transformed to a notional defined contribution scheme that is based on a pay-as-you-go basis, containing an income ceiling (OECD 2013a). The scheme is topped up by a funded *premium pension* (Engström and Westerberg 2003; Palmer 2008). However, in contrast to Germany and also in the United Kingdom and for a long time in Denmark, occupational pensions were early on set up to complement public pensions. At the same time when ATP was implemented, social partners negotiated collective agreements, first for white-collar workers and the public sector (1960), and then later for blue-collar workers in the private sector (1973) (Lindquist and Wadensjö 2011). Given the limited public scheme benefits, they should be particularly relevant for the high-income group (Green-Pedersen and Lindbom 2006). Although occupational pension schemes covered the whole workforce on a mandatory basis for a long period, the role of private pensions for the income package was still minor in the mid 1990s (Behrendt 2000). The major reason is the low level for mandatory contributions of approximately two per cent of earnings (Palmer 2008).

Danish and Swedish pension policies were rather similar before the critical juncture around 1950. In the following years, the social actor's regulatory approach developed in rather different paths (Ebbinghaus and Gronwald 2011; Green-Pedersen and Lindbom 2006; Kangas et al. 2010). In Sweden, social partners and the state introduced an earnings-related component of the first pillar (ATP) and collective agreements made occupational pensions quasi-mandatory for the public and private sector since the 1960-70s. On the contrary, the Danish government primarily increased the minimum pension level, and introduced an earnings-related second-tier scheme based on working hours (ATP). Thereafter, since 1964, the public minimum pension involves two parts: a basic amount (people's pension) and an

income-tested amount that is pension payments twice the basic amount. The ATP complements only marginally contribute to the income package of the elderly (Andersen 2011; Green-Pedersen 2007). The rather generous minimum pension regulation secured income replacement for low-income earners quite well, but left a high gap for middle and high-income groups (Kangas et al. 2010). Private pensions, on the other hand, were kept mostly unregulated until the 1990s. Take-up-rates of voluntary private pension plans remained fairly low with exceptions of public and white-collar employees (von Nordheim Nielsen 1996). Social partners aimed at better protection. In contrast to other Nordic countries tripartite negotiations fizzled out, as both the state and social partners demanded the opposite actor to take action (Green-Pedersen 2007). However, scarce benefits for better paid blue-collar workers in the metal industry became a major concern of the respective unions (Green-Pedersen and Lindbom 2006). As a result, in the late 1980s and early 1990s policies shifted extensively towards self-administered social partner agreements. More and more sector-based binding regulations were decided, following the initiatives in the public and metal sector. Current coverage among the Danish workforce is now equally high as in Sweden, exceeding 90 per cent (OECD 2009b). The future public-private mix will clearly shift towards a stronger role of private elements. As a consequence of compulsory enrolment to private plans, the public income-tested minimum pension will decline in importance in the future. Kangas et al. (2010) argue that these developments lead to an essential convergence of Nordic pension regimes again, where earnings-related private second-tier pensions will maintain a part of previous earnings. As these pensions are more strongly linked to earnings, inequalities may shift towards previous labour market inequalities and rebalance the public-private mix.

Building on the liberal tradition, the British system seems to pay less attention to state regulation in general. In comparison to Continental European and Nordic countries, the British state left social welfare issues more to the private area (Esping-Andersen 1990). Indeed, first-tier basic pensions introduced in 1948, concentrated mostly on vertical redistribution. Since reformation in 1975, public benefits were backed up with contributions to the State Earnings Related Pensions Scheme (SERPS). Through the SERPS, public and occupational pension components were directly linked together and should provide the second tier. The regulation allowed a *contracting out* of the SERPS if a person already had favourable occupational pensions, and since 1986 also personal pensions allowed a *contracting out*. This solution was also backed up by stately tax deductions. This meant that persons who were obligated to contribution payments had either to contribute to the SERPS or private schemes. At the same time, this can be described as the crux of the system – the public schemes leave low-income earners and workers with interrupted careers inadequately protected. Persons below the lower earnings limit were excluded from the SERPS, and the same group frequently had also no private pensions (Schulze and Moran 2007). British private pension protection remained mainly dependent on individual employer-employee negotiations. Consequently, not all employers offered occupational schemes for their employees. Moreover, due to taking back a part of the initial extension through the 1986 reforms, both public schemes together provide only meagre pension income benefits

(Schulze and Moran 2007; Taylor-Gooby 2005). Since 2003, a Guaranteed Minimum Pension provides another social first-tier benefit for those poorly protected by other pension income (Blake 2003; Taylor-Gooby 2005). Similarly, targeted at the poorest income groups, over the next 50 years, SERPS will gradually be modified to the State Second Pension (S2P), transforming the second-tier public component to a second flat-rate (Bridgen and Meyer 2011; Disney and Emmerson 2005). Effects yielded by this reform are still marginally observable in the income mix of current retirees.

V.3. Labour market attachment and pension system inclusion

The institutionalist perspective revealed various properties of each country's old-age security systems. Besides these differences in pension system regulation there are also labour market and gender role differences when comparing the financial situation of the elderly in a cross-national perspective.

The *male-breadwinner model* describes gender differences in labour market participation (Esping-Andersen 2002; Lewis 1992; Lewis 2001; Taylor-Gooby 2001). This traditional model assumes a male as the permanent full-time earner in a typical household situation, whereas the female spouse is mainly engaged in the household responsibilities such as caring for the children, elderly, and disabled household members. The *male-breadwinner model* assumes that the head of the household's social security is sufficient enough for the entire family. Thus, the system is designed to provide more security to the household head and less security to the spouses. During retirement female spouses may receive minimum pension benefits and profit from intra-household redistribution or take on the pension of a deceased partner.

In Germany and in the United Kingdom, women were largely excluded from the labour market over the last decades. Thus they may be more dependent on derived benefits or redistribution within the family. In Germany the GRV scheme also redistributes derived benefits to risk groups, whereas redistribution is rather less present in the British public schemes. Thus it is likely that many women end up with rather low basic pension benefits complemented by rather low SERPS respective private pension benefits. It is more difficult to expect clear patterns for individual pension benefits in Germany due to the various redistribution mechanisms in the public scheme. However, in terms of own individual benefits, spouses may not be eligible to personal social assistance benefits since these are calculated on the household's income.

Women in the United Kingdom and the two Nordic countries receive personal basic pension benefits. Additional income from second-tier schemes can lift old-age income above minimum benefits. However as women's earnings were rather low for the current group of women, a high share may end up with income close to the minimum amount. As the Nordic countries also provide less survivor pensions, elderly single households are at high risk of poverty because they lack the essential share of benefits from their deceased spouses.

Occupational schemes have developed in quite different directions. Thus inclusion to second-pillar schemes might vary strongly in relation to sector of employment and occupa-

tional status. In general, the Nordic countries and Germany are undergoing a transformation towards a stronger role of occupational and private pension plans. In the United Kingdom occupational pensions have always been an important component of old-age provision. Most recent reforms mainly aimed to strengthen vertical public redistribution to the poor.

In Denmark, more and more groups will retire with additional occupational benefits from the collectively agreed schemes from the 1990s. In contrast income-tested benefits of the targeted scheme will decrease in importance. Although employees contributed various years to collective schemes, a certain group of the elderly is no longer affected by this regulation. Age cohorts born 1930 or earlier either have already retired before the regulation became effective, or have retired shortly after its implementation. The working hours based scheme ATP is less important for the income mix and not directly linked to the earnings-level.

In Sweden and Germany public schemes have been cut, so that future retirees are in need to mix their provision more than before. In Sweden, complementary schemes in the occupational sphere have been already highly regulated since the 1960s. The current retirees are broadly covered by additional income from these schemes. However, contributions were fixed on a rather low level around two per cent of earnings, limiting a broad importance of occupational pensions.

In Germany, only some occupational groups were protected by mandated schemes. Social partners did not focus to strengthen occupational pension for all employees, as the earnings-related GRV scheme provided reasonably high replacement rates. This protection made additional income sources mostly obsolete. However, as a result of the major cuts during the 1990s reforms, the replacement rate will decrease in future. Therefore, German future retirees are neither universally protected by minimum pension entitlements nor by highly regulated complementary pensions besides the earnings-related public pension. In this scheme, retirees are subject to market forces and thereby must seek resources outside the public scheme to have secure retirement income. As not all individuals will contract additional private pension plans, the decreased generosity of GRV benefits may lead to inadequate saving profiles.

The British case seems to be even more selective. Poverty and inequality has ever been high due to poor benefits for the low-income group and selective benefits for the high-income group. Several groups stayed excluded from additional voluntary private schemes, and only circa half of the working-age population contributed to such schemes. Furthermore, the public schemes envisaged no meaningful replacement rate like in Germany. Instead, British government directly linked public and private second-tier benefits to each other. Persons had to stay either in SERPS or could *contract out* if they already had *approved personal plans* in the private area. Thus persons accumulated years contracted out of SERPS, years in the SERPS, and years excluded from the SERPS. Many British retirees may have neglected the importance to save adequately for their retirement phase. Previous analyses seem to confirm that strong inequalities were determining the savings profiles, and strong inequalities consequently shape the British elderly population (Disney and Whitehouse 2001; Ebbinghaus and Neugschwender 2011; Ginn and Arber 1999).

V.4. Inequalities in recipient rates and private income shares

The following descriptive statistics show inequalities and current developments among the elderly in nation-specific perspective. Socio-demographic and socio-economic distinctions are accounted for to evaluate and interpret these inequalities. All analyses are based on the Luxembourg Income Study (LIS) Database. The data provider LIS prepared income data from national income surveys to gain cross-national comparability. The following datasets were used: Denmark (2000, 2004), Germany (2000, 2004), Sweden (2000, 2005), the United Kingdom (1999, 2004).

In this study the elderly are defined as the population aged 65 or above. However, all statistics are based on the respective household's net income position.[10] It is assumed that all income is redistributed equally to all household members, a standard technique applied in income inequality and poverty research (Jenkins and van Kerm 2009; Salverda et al. 2009).

Figure 1 shows the income mix of pensioners by income deciles. The lowest income decile (first) describes the situation of the elderly's poorest 10 per cent. Income is subdivided in 'public pensions', 'private pensions', 'earnings', and 'other income'. [11] The results demonstrate that in all countries public income was by far the most important income source; circa 80 per cent of income was provided by the state, in Denmark even more than 90 per cent. Also in the second to sixth income deciles public transfers remained the major income source over market related income. However, all four figures indicate that market related income from earnings or private pensions tended to raise the income position of these households, so that they were likely to end up in the upper half of the population. In the highest income deciles these two income sources together were most important for the income position, replacing public transfers' importance.

In line with the mixed British savings structure, occupational and personal pensions were particularly important in the United Kingdom. Private pensions contributed on average circa 40 per cent to the income mix, followed by almost 30 per cent in Denmark, 20 per cent in Sweden, and only 8 per cent in Germany (see Table 1). Importance of private pensions increased in all countries. Recipient rates are highest in Sweden due to the long tradition of mandated occupational pensions. Between the two points in time coverage still increased from 85 to 90 per cent (see Table 1). Similar increases in private pension recipient patterns were also visible in the other countries. Whereas around 2005 three out of four elderly in the United Kingdom received benefits from private pensions in the household, only around half of the Danish and one quarter of German households were covered. This signifies again that various older birth cohorts have no longer been affected by the more recent reforms.

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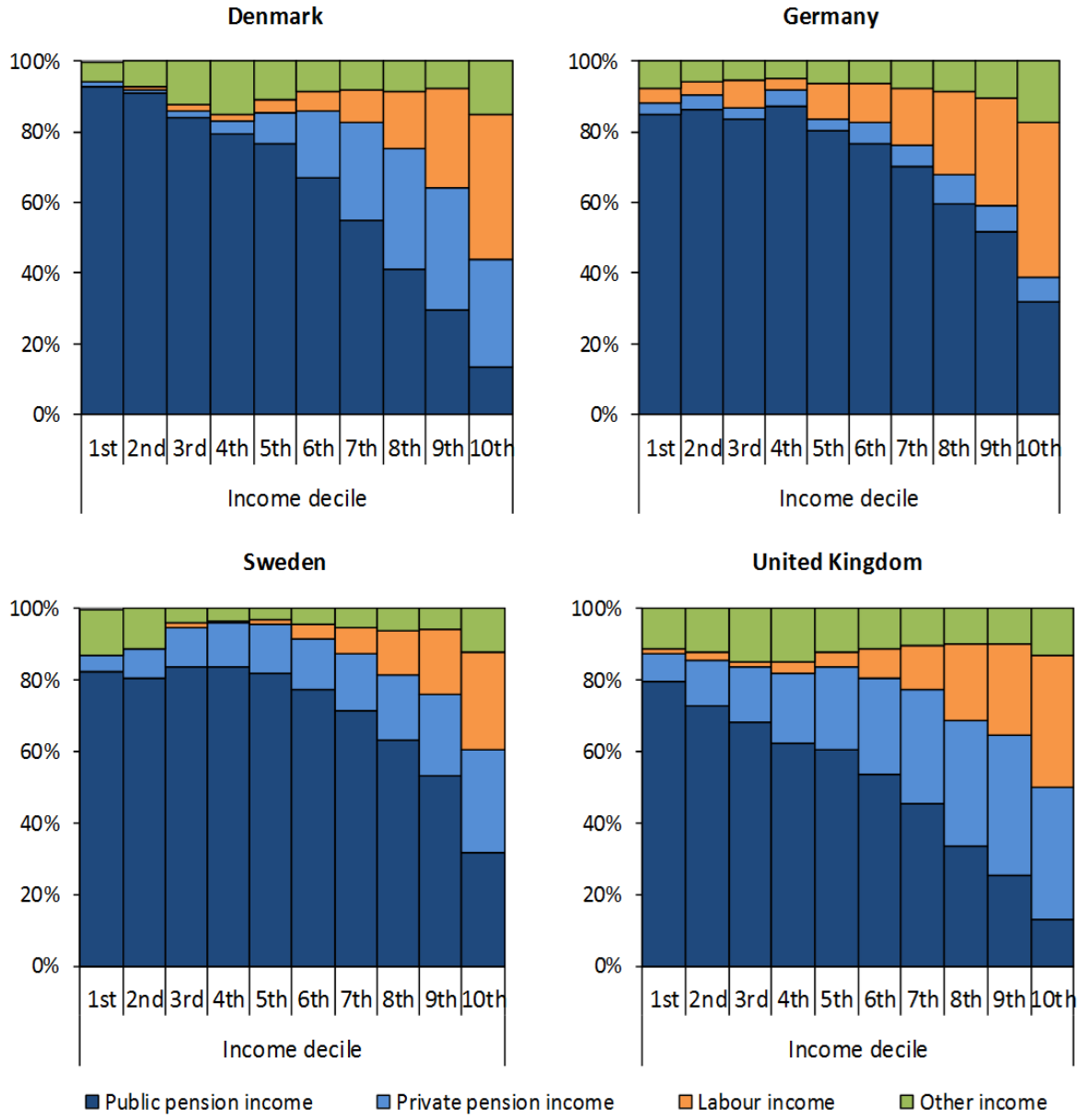
[10] All evaluated LIS datasets involve gross and net (disposable) household income. Disposable income is derived by subtraction of payroll and income taxes from gross income. Specific income sources were only available in gross amounts. Therefore, in order to evaluate living standards based on actual disposable income, by breaking it down to income sources, a simple netting down procedure has been applied, deducting the observed average tax rate by each income decile.

[11] The category other income involves, e. g. health insurance.

Figure 1: Income mix of the elderly population (65+)



Source: own calculations based on Luxembourg Income Study (LIS) Database.

Figure 2 evaluates private pension recipient rate and income share patterns by gender. All figures exemplify the increasing importance of private pensions in the public-private mix. Between the two points in time coverage and income share increased in general. Gender differences were diminishing in Germany and Sweden, were rather stable in the United Kingdom, and were slightly increasing in Denmark. However, Danish discrepancy was already on a very low level in 2000. Furthermore, Danish coverage was strongly on the rise due to the broad introduction of collective schemes in the 1990s. Indicated by the data, male pensioners may have benefited more from this institutional change, as the inequalities between genders slightly increased again. British inequalities remained fairly pronounced and stable over time; the distance between women and men's coverage slightly decreased. In Germany women increasingly received additional benefits due to two developments. First, younger birth cohorts were personally better protected, as reflected by increasing coverage

Table 1: Recipient rate of private pensions and income share of private pensions in the public-private mix by socio-demographic and socio-economic characteristics (65+)

a) Recipient rates of private pensions

			gender		age		household-size		income group		
		all	men	women	65-74	75+	1	2	low	middle	high
Denmark	around '00	0.43	0.44	0.42	0.46	0.39	0.33	0.48	0.08	0.46	0.74
	around '05	0.49	0.50	0.47	0.51	0.44	0.36	0.55	0.13	0.54	0.78
Germany	around '00	0.20	0.23	0.18	0.22	0.17	0.15	0.23	0.09	0.24	0.27
	around '05	0.26	0.26	0.25	0.29	0.22	0.19	0.30	0.17	0.26	0.35
Sweden	around '00	0.85	0.89	0.81	0.90	0.79	0.71	0.91	0.63	0.94	0.97
	around '05	0.90	0.93	0.88	0.95	0.85	0.80	0.95	0.76	0.97	0.98
United	around '00	0.70	0.75	0.66	0.73	0.66	0.57	0.77	0.53	0.73	0.84
Kingdom	around '05	0.75	0.79	0.71	0.77	0.72	0.61	0.81	0.59	0.78	0.86

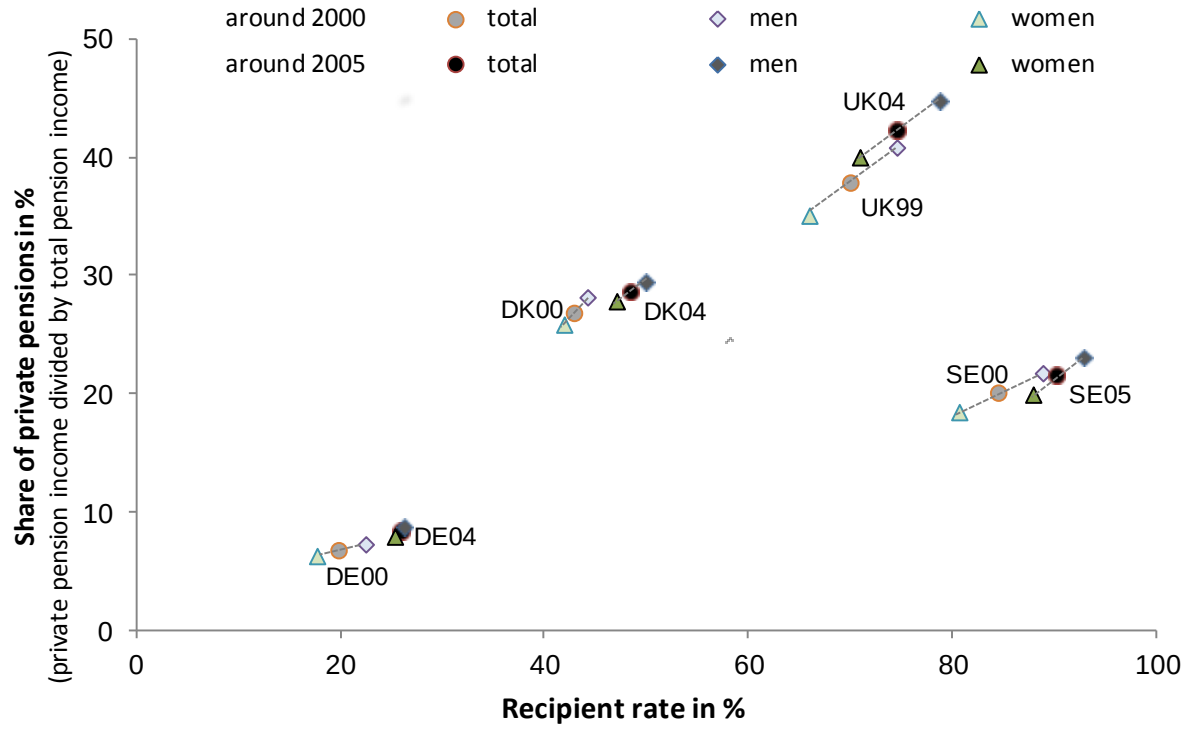
Source: own calculations based on Luxembourg Income Study (LIS) Database.

b) Share of private pension income in the public-private mix

			gender		age		household-size		income group		
		all	men	women	65-74	75+	1	2	low	middle	high
Denmark	around '00	26.8	28.0	25.7	28.3	24.7	22.1	29.4	1.4	15.7	51.4
	around '05	28.6	29.4	27.8	29.4	27.4	23.9	30.8	2.5	17.9	53.0
Germany	around '00	6.7	7.3	6.2	7.3	5.7	5.1	7.5	2.3	4.6	10.5
	around '05	8.3	8.8	7.9	9.1	6.9	5.9	9.1	3.5	4.7	13.4
Sweden	around '00	20.0	21.6	18.4	23.3	15.6	15.5	21.5	8.6	13.7	30.4
	around '05	21.5	23.0	20.0	25.2	16.7	18.3	22.4	9.7	15.2	32.6
United	around '00	37.9	40.7	35.0	40.8	32.9	31.2	41.1	13.5	28.5	55.9
Kingdom	around '05	42.3	44.6	40.0	44.8	38.7	33.9	45.6	18.0	33.1	59.6

Source: own calculations based on Luxembourg Income Study (LIS) Database.

Figure 2: Recipient rate of private pensions and income share by gender

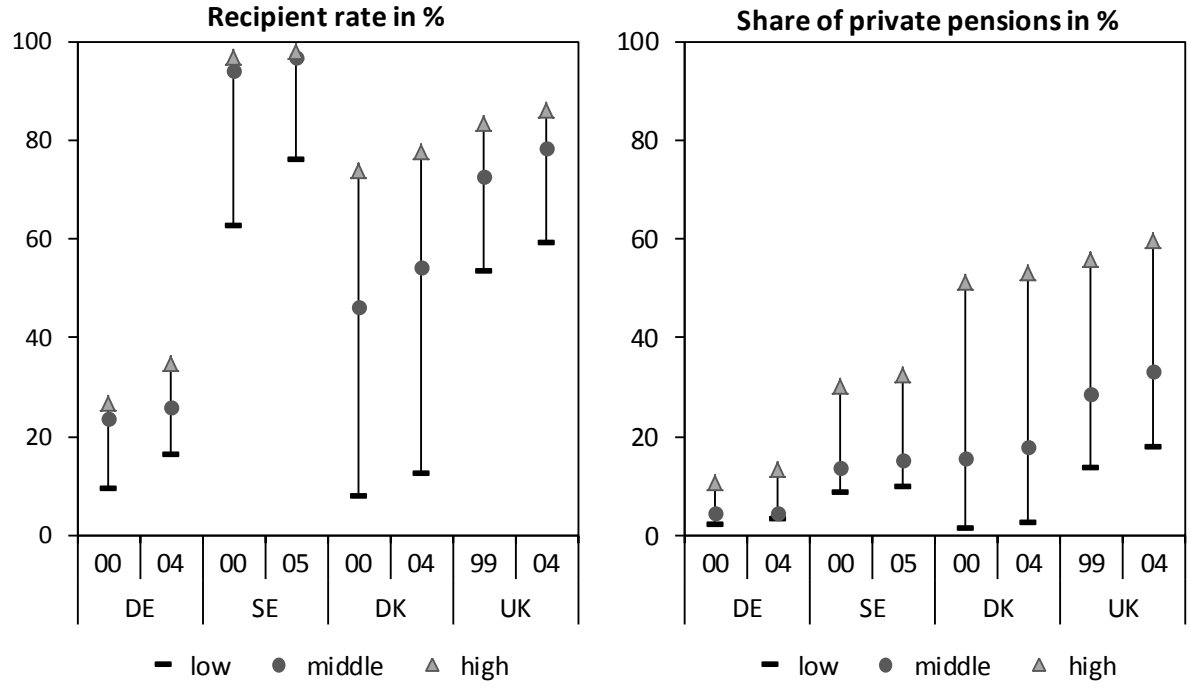


Source: own calculations based on Luxembourg Income Study (LIS) Database.

among single households and the elderly aged 75 and above; these groups by majority replicate living arrangements of single women households at the same time. Second, as men's recipient rate also increased, elderly women benefit indirectly through intra-household redistribution of private pension income. Nevertheless, recipient rate discrepancy with regard to age and household size was still the largest in Germany (see Table 1), indicating a strong increase in recipient rates among younger birth cohorts. Gender inequalities were also markedly pronounced in Sweden. However, Swedish women seem to catch up with men's coverage. On the other hand private pensions' income share of women remained far below those of men.

A distinction in low, middle and high-income groups reveals strong variation across the nation state's income mixes (Figure 3). Whereas the Swedish recipient rate of private pensions was by far the highest in all three groups, their importance was rather low for the income mix in general. This relates to the social insurance system structure of public pensions, which led to a high relevance of public pension provision. In addition, only low mandatory contributions to occupational schemes were set up in the collective schemes, keeping the accumulated benefits rather low for the majority of providers. Low-income pensioners particularly showed an increase in recipient rate, which also reflects an increasingly strong importance for the income mix; however, still on a low level of approximately 10 per cent. Since coverage was rather selective in Germany, relevance of private pensions is rather negligible as an income source for all income groups' pension income mix. Neither recipient rate nor relevance for the income mix does strongly diverge across income groups. However the low relevance should not obscure that private pensions strongly increased for the low and high-income group between 2000 and 2005.

Figure 3: Private pension recipient rate and income share by income group (65+)



Source: own calculations based on Luxembourg Income Study (LIS) Database.

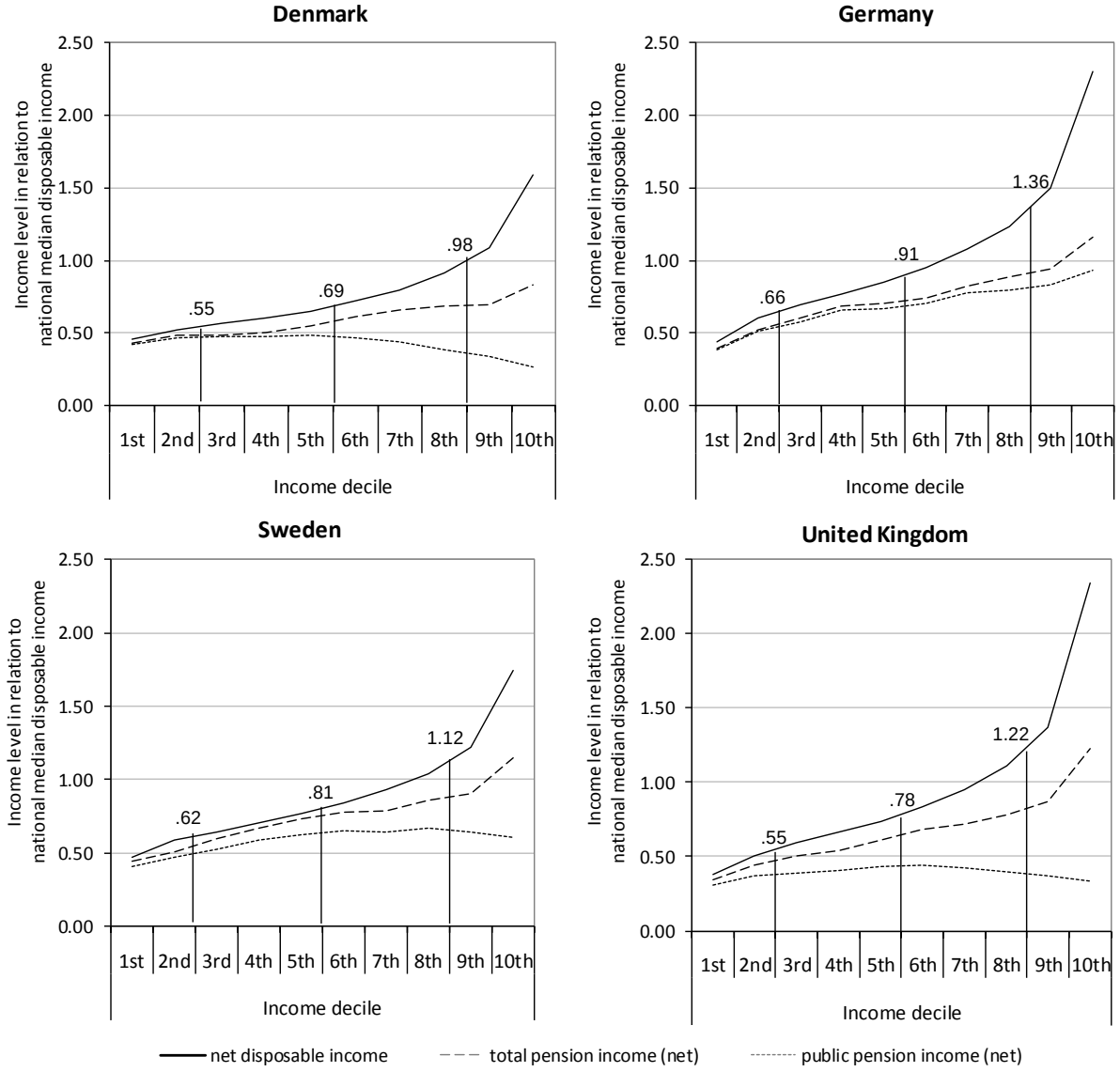
Furthermore, private pensions were contributing round about 22 per cent for beneficiaries of supplementary private pensions (Ebbinghaus and Neugschwender 2011: 415). Pension income in the United Kingdom was more mixed and selective across income groups. On the one hand, the low and middle-income groups also received an essential share of pensions from private sources, as many have partially contracted out of SERPS. On the other hand, coverage remained selective even for the high-income group. Nonetheless, private pensions contributed more than 60 per cent to pension income. Private pensions in Denmark were very unequally spread, coverage and income share increase strongly with income. This can be linked back to voluntarism of private pension regulation and other institutional features. Since public minimum pensions are cut, when there is other pension income, public pension benefits decrease strongly in importance for high-income pensioners. Therefore we can identify a clear substitution of income-tested public pensions in favour of higher income for private pension recipients. Universal basic pensions and the working hour based scheme ATP maintained a minimum relevance among high-income groups. However, importance of private pensions was almost as high as in the United Kingdom, where coverage was still slightly higher. The case of Danish private pensions shows that supplementary plans have mainly worked very selectively as fringe benefits.

V.5. Adequacy of income and developments

Figure 4 depicts a relative income level by each income decile in relation to national median disposable income across the entire society; the respective points for each decile were connected to a line. The graphs refer to the situation in the mid-2000s. In addition, disposable income is subdivided in three income sources: public pensions, private pensions, and other income such as work and capital income. The distance between the x-axis and public pensions illustrates the importance of public pensions, the distance between public pensions and total pensions shows the importance of private pensions, and the distance between total pensions and disposable income demonstrates the importance of other income sources (see Figure 1). To exemplify these findings, a British elderly who receives an income at the twentieth percentile (P20) had an income that was approximately equal to 55 per cent of the national median income of the entire British society. The major income source for such a pensioner was on average public pensions, equal to 40 per cent of national median income. On top, similar persons also received 5 per cent of median income each from private pensions and other income sources. According to the conventional definition of at-risk-of poverty (disposable income is lower than 60 per cent of median income) the elderly faced a risk of poverty that exceeded 20 per cent.

The figures indicate that the relative income level at the P20 value was similarly low in Denmark and the United Kingdom (.55), it was a bit higher in Sweden (.62), and it was highest in Germany (.66). However, the slopes of the curves for the lowest income groups (first and second income deciles) reveal a broad variation. In both Nordic countries the slope was low, reflecting the beneficial situation of lowest income groups that were almost equally well protected through minimum benefits, with exception of some migrants that faced some

Figure 4: Income distribution of net disposable income, total pensions, and public pensions (65+, mid 00s)



Source: own calculations based on Luxembourg Income Study (LIS) Database.

cuts due to missing years of residence. On average, the first income decile in Sweden and Denmark received an income just below the 50 per cent of median income line. Likewise income poverty was around 7 per cent in Sweden and 9 per cent in Denmark. German income standard was a bit lower for the poorest elderly. As discussed before, pensioners did not receive minimum pensions and may also not claim social assistance, leading to the situation that the elderly in the first decile had very low income. The poverty gap was higher for Germany than in the Nordic countries. The picture was similar for the United Kingdom; elderly in the first and second decile were protected on a lower level as compared to the Nordic countries. This relates to cuts in the basic pension due to missing years of employment and meagre second-tier benefits; poverty was clearly the highest in the UK in this comparison.

Median elderly's relative income level revealed a different pattern in terms of generosity. In Denmark the median elderly person received only slightly more income than the low-income group. As shown before in Figure 3, only a small share of persons received additional private

pension income. However, public benefits maintained only a low income level of only 69 per cent of median income of the total society. This indicates a strong private pension provision gap in Denmark in the past (cf. also Chapter IV). The mixed income package in the United Kingdom related to 78 per cent. Slightly higher was the relative income level for Sweden (.81), where earnings-related pensions could better maintain the previous income standard. The ideal-typical case of social insurance in Germany provided the highest income standard (.91). However, in contrast to Sweden, also other income sources made an important contribution to elderly households in Germany. On average the Swedish pension system was still the most generous for those elderly in the lower part of the income distribution.

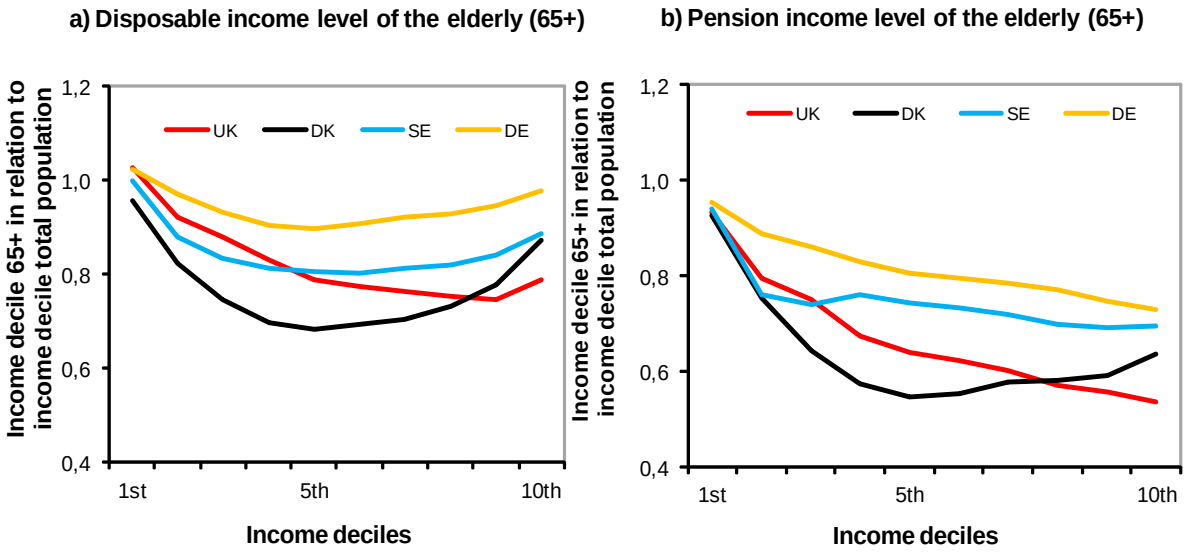
The German elderly were best off at the P80 value, followed by the British, Swedish, and lastly Danish retirees. Above this income level the income curves drift apart due the increasing importance of all income sources. With regard to pension income, the German public scheme provides by far the highest benefits. However, public pensions were only topped up slightly by selective private pensions to a level of ca. 85 per cent of median income. Swedish private pensions lifted up moderate public pension incomes to a similar high level of 80-85 per cent. Since the previous public pension scheme involved a rather low income ceiling, the middle-to-high income group (fifth to seventh decile) was less secured. Very beneficial private schemes existed only for the highest income group. In the United Kingdom and Denmark, public pensions diminished in terms of benefits and relevance for the income mix. Due to the basic pension component in both countries, income maintenance is only reached by additional private income sources. Both countries' income mixes were characterised by a historical development of primarily voluntary occupational and personal schemes. The mixture of *contracting out* and SERPS provision led to a rather low income standard for the majority of British elderly, only securing a small proportion in the highest income decile well. Particularly low was the income security in Denmark, where even the elderly at the P80 value (.98) was slightly less well off than the society's median income. However, there needs to be one point highlighted. Wage dispersion was much higher in Germany and the United Kingdom than in the Nordic countries. Thus income standards of the elderly do not necessarily reflect a low replacement; these indicators are more related to wage dispersion, particularly at the upper end.

In order to get a better insight, if the income inequalities among the elderly found in Figure 4 need to be understood as a result of high labour market inequalities or pension system design, I will analyse in the following the income distributions of the total population and the 65 and above population simultaneously.[12] Both the total population and the 65+ population have been divided each in ten deciles. The division of each decile's equivalised net disposable income for the 65+ population by the respective decile for the total population curve leads to a relative income level of each income decile group.

Figure 5a shows equivalised net disposable income of the elderly in relation to equivalised net disposable income by the total population. A second line (Figure 5b) demonstrates net

[12] A similar technique has been applied by the OECD before (OECD 2001); see also more detailed explanations in Chapter IV.5.

Figure 5: Income level of the elderly in relation to total population (mid 2000s)



Source: own calculations based on Luxembourg Income Study (LIS) Database.

total pension income of the elderly in relation to equivalised net disposable income by the total population (only households whose pension income share was at least 60 per cent were kept); this procedure aims to reflect income replacement and the level of reproduced market income inequalities for each decile; hence, if income inequality is similarly reproduced for all income groups, one would expect a stable income level over all income groups. This technique is certainly only an approximation, as it does not compare actual individual replacement rates; however, it may still clarify the generic cross-national differences in the income distribution of the elderly that may have its origin in regular pension payments from national pension systems.

The calculated ratios in Figure 5 clarify the importance of minimum pensions for the low-income group. Elderly persons in the first income decile were reaching on average a similar income level as those in the first decile of the total population. In Germany and the United Kingdom the elderly´s income even slightly exceeded the incomes as compared to the total society (Figure 5a). With respect to pension income only (Figure 5b) these ratios remained slightly below 1, but on a similar high level in all four countries.

Denmark particularly sticks out in this comparison. Danish relative income levels for the elderly declined comparatively fast form the low-income group to the median; as shown in Figure 4, due to the nearly absent mandated contributory second-tier schemes, income groups below the median received rather similar pensions (Figure 4). Figure 5b demonstrates that inequality among the total population was much higher than among pensioners. Pensioners below and around the median seem to have lacked to save adequately for their old age; their income level dropped down below 55 per cent. However, for the high income group, the ratio increases again, which signifies that occupational systems are quite important for the ones who have them.

Also in the United Kingdom the low to middle-income group among the pensions was less secured as compared to the total society and also compared to the much higher ratios in Germany and Sweden. This finding can be linked to the rather low contributions to SERPS and/or the low obligations to contribute to complementary occupational or personal pension plans. Also in the high income groups the ratios continues to drop, which signifies that the pension system failed to replace previous income levels; it is noteworthy to mention that the British income groups still received comparatively high pensions as compared to the median in line with pension income levels observed in Germany.

In contrast to the Beveridge systems, the more public contribution-based pension systems seem to fare much better with respect to income replacement for the low-to-middle income groups. In both countries, Sweden and Germany, pension income seems in general more in line with inequality of earnings, which can be identified from more stable income ratios throughout all income deciles. Also the existence of contribution ceilings in these two countries does not change this picture as compared to Finland (see Chapter IV.5); most persons in the upper income deciles hold occupational or private pensions, which complement to the public schemes.

Table 2 evaluates inequality indicators and measures income standards in relation to society's median income. A special focus is placed on the relative income standards of each pension income source and total disposable household income. The relative developments are shown as percentage change over the two points in time. Thus an increase by approximately 4 per cent in British disposable income documents an average increase from 92 to 96 per cent of national median income. Correspondingly, the decrease from 71 to 69 per cent in the case of German public pension income relates to a decrease of 3 per cent.

There occurred two main developments. On one hand, income standards of the elderly increased relatively compared to the society's total median disposable income. On the other hand, public pension income slightly decreased, with exception of Denmark.

British elderly showed the strongest increase in disposable income (4 per cent). Particularly private pension income strongly increased (22 per cent) which consequently affected the income standard. Private pensions have become more important also for the low and middle-income groups. This was caused by two opposing effects. In principle, the reformation of public pensions aimed at topping up the poorest pension income groups, thus raising the public pension income and share. This effect however is outreached by a stronger role of private pension income and higher security among the younger cohorts. As a result public pensions even declined in relevance. Still poverty was decreased.

The on-going transformations of Swedish and German public systems reveal comparatively strong effects. Cuts in generosity affected the middle and high-income groups in Germany and the high-income group in Sweden. In contrast to the United Kingdom, private pension development only partially made up for relatively lower income. In Germany, the increased spread of private pensions resulted in a benefit mostly towards the high-income group, whereas the middle-income group was slightly less well secured. Hence, an increased gap

Table 2: Development of income and inequality measures (65+)

	Denmark		Germany		Sweden		United Kingdom		DK	DE	SE	UK
	2000	2004	2000	2004	2000	2005	1999	2004	trend between the two points in time in %			
Poverty in % (65+)												
below 40% of median	0.9	1.2	3.2	2.1	2.0	1.3	6.5	5.0	33%	-35%	-34%	-24%
below 50% of median	13.3	9.4	8.0	7.0	6.9	5.6	15.4	14.2	-29%	-12%	-18%	-8%
below 60% of median	38.1	33.0	14.8	13.6	18.7	17.3	29.4	25.7	-13%	-8%	-7%	-13%
Poverty gap at 60 % (65+)												
	14.4	13.8	22.4	20.1	16.1	14.1	21.7	21.5	-4%	-10%	-12%	-1%
Gini coefficient												
	0.214	0.213	0.258	0.266	0.218	0.211	0.288	0.294	0%	3%	-3%	2%
Disposable income level in relation to society's median income (65+)												
all	0.78	0.80	1.04	1.07	0.90	0.91	0.92	0.96	3%	3%	1%	4%
low income	0.51	0.52	0.59	0.60	0.57	0.58	0.49	0.51	3%	2%	2%	3%
medium income	0.67	0.69	0.91	0.91	0.80	0.81	0.77	0.79	3%	0%	1%	3%
high income	1.16	1.20	1.61	1.67	1.32	1.33	1.49	1.56	3%	4%	1%	5%
Net pension income level in relation to society's median income (65+)												
all	0.57	0.59	0.76	0.75	0.74	0.74	0.64	0.67	3%	-2%	0%	6%
low income	0.46	0.47	0.53	0.53	0.50	0.53	0.43	0.44	2%	0%	5%	2%
medium income	0.56	0.58	0.77	0.74	0.74	0.74	0.61	0.64	4%	-4%	1%	5%
high income	0.70	0.73	0.99	0.98	0.97	0.95	0.87	0.93	3%	0%	-3%	7%
Net public pension income level in relation to society's median income (65+)												
all	0.42	0.42	0.71	0.69	0.59	0.58	0.39	0.39	1%	-3%	-2%	-2%
low income	0.45	0.46	0.52	0.51	0.46	0.48	0.37	0.36	1%	-1%	4%	-3%
medium income	0.47	0.47	0.73	0.70	0.64	0.63	0.43	0.43	1%	-4%	-1%	-1%
high income	0.34	0.34	0.88	0.85	0.68	0.64	0.38	0.37	0%	-4%	-6%	-2%
Net private pension income level in relation to society's median income (65+)												
all	0.15	0.17	0.05	0.06	0.15	0.16	0.24	0.28	10%	22%	8%	18%

Source: own calculations based on Luxembourg Income Study (LIS) Database.

between the elderly middle and high-income group could be observed, which in turn resulted in a boost in the Gini coefficient. The other way around was the situation in Sweden; here all income groups profited from still maturing private pension benefits. However, the high-income group stayed less secured with pension income due the stronger decrease in public pension standards. This development was linked to a lower Gini coefficient for the elderly.

Also Danish relative income standards have increased between the two points in time, mainly generated by the increases in private pension income. Whereas public pensions for all income groups have closely developed in line with median income (around 1 per cent), private pensions increased strongly in importance (around 10 per cent). Particularly the middle-income group benefitted from the private pension development. This increased inequality between the low and middle-income group, but also decreased income inequality between the middle and high-income group, as additional occupational benefits no longer only act as selective fringe benefits. As a consequence the Gini coefficient remained nearly unchanged, as these two effects cancelled each other out.

V.6. Conclusion: Different paths to private pensions – different inequality developments?

Pension systems in advanced societies have developed quite differently since their first implementation. Reforms of these systems take a long period of time to show their full impact on the insured and their financial outcomes during retirement. This chapter pursued a twofold strategy. First, the analysis of reform processes made clear in how far inequalities may originate from country-specific institutional arrangements. Essentially occupational schemes that are at the same time earnings-related, may have favoured specific occupational groups one-sidedly. However, collective agreements could also provide a broad universal coverage with occupational pensions like in the Nordic countries. Second, empirical analyses evaluated current inequalities among retirees in a cross-national perspective and demonstrated adequacy levels and on-going transformations of the public-private mix.

The analyses showed that private pensions strongly affected income inequality of pension income in all countries under study, increasing primarily the income position of high-income pensioners. In addition, the structure of public pension benefits had a more general impact on inequality and adequacy of pensions, particularly for the low-income group.

Poverty statistics demonstrated that all countries left specific groups of retirees insufficiently covered. Basic minimum pension schemes in Sweden and Denmark provided rather generous provision for the poorest income group. In contrast, British minimum security was set up on a much lower income standard, which led to the highest poverty risk in this comparison. Germany's mixture of social assistance and GRV benefits generated a high inequality among the low-income group.

However, the German benefits from the public pension scheme provided the highest benefit level for the middle and high-income group. The development between the two cross-sections showed that the middle-income group lost a part of their beneficial security. Cuts in the public scheme were not yet balanced out by an increase in private pensions. Since coverage was still rather selective, inequalities might increase further in the near future.

Especially Danish old-age income was characterized by strong selectivity of private pension benefits. The reformed provision scenario needs additional time to mature further. Current developments support that the provision gap of the middle-income group was already partly closed.

The Swedish system was much more advanced in terms of private pension benefits. Recipient rates were close to being universal; however these schemes by majority only slightly increased the income level. The replacement of the old public scheme led to further decreases in the income level of the high-income elderly. In the future, the earnings-related pensions will ensure the importance of the public pension income component, but also generate some inequalities through the selective coverage with individual pensions with financial institutes.

British retirees found themselves in the most advanced public-private mix, but also in a very diversified and problematic savings structure. Individuals were mostly free to decide on their provision above a certain minimum provision. The regulatory approach of basic pensions, the SERPS and partial *contracting out* to private pensions did not effectively reduce poverty. Income standards of the elderly for the high-income group seemed relatively high compared to median income of the society, however taking into account the much higher inequality of the labour market, the elderly high-income group received comparatively low pensions. However, the public-private mix was still growing, so that in the near future a further rebalancing can be expected. It is likely that inequality remains high due to voluntary provision, securing only a selective group of future retirees well.

VI. A cohort study: pension income inequality in six European countries

VI.1. Introduction[13]

A cross-national study of cohorts over a certain period of time might shed light on general income inequality developments. By evaluating cohorts comparatively across countries we can examine the following questions: Can there be shifts in the public-private mix observed? Are the on-going developments increasing or decreasing inequalities? In how far are differences in pension system regulation also transferred to differences in the pension income distribution?

Therefore, this study's main aim is to analyse the income mix, old-age income levels, and inequality patterns. First, this study will analyse the public and private pension benefits independent from each other and second in combination with each other. This proceeding will clarify in how far the on-going increase in importance of private pension income affects the outcomes of total pension income. An analysis of developments by a cross-sectional design is difficult, due to the strong age-related effects as discussed in Chapter III.3. The applied cohort design in this chapter solves these problems, particularly as it decreases the age effect. This chapter analyses the income mix and income distribution of birth cohorts of the retired population of six countries: Sweden, Finland, and Denmark, Germany, Italy, and the United Kingdom.

The remainder is as follows. In a first step, I will present an overview in how far the institutional settings of the selected countries differed in the past, and in how far country-specific hypotheses can be made in addition to general hypotheses on inequality developments. The following section focuses on the data selection and the common data preparation for the later analyses. In order to answer the research questions, three main blocks of changes over time will be evaluated, each applying the cohort design:

- recipient rates of private pensions and importance in the pension income mix,
- absolute old-age income,
- and inequality measures.

First, the development of coverage with private pension income and income share of private pensions in the income mix is presented. These evaluations clarify which countries already strongly rely on a private and/or occupational pension component. The analyses of private pension income share are shown by income quintiles. Secondly, the generosity of pensions is analysed; the income distribution is split in deciles. Finally, the study focuses on the inequality measures Gini coefficient and poverty rate. The poverty analyses include a breakdown of single pensioner women versus coupled pensioners.

[13] Chapter VI is a further development of Neugschwender (2014), LIS Working Paper No. 618.

VI.2. Institutional overview and hypotheses

Cross-national pension research frequently breaks down the analysis in pillars and tiers in order to clarify the main differences between institutional arrangements of pension systems (Goodin and Rein 2001; OECD 2007; World Bank 1994). In Chapter II.4 these approaches were linked to income groups and their protection with respective plans. In this chapter, the focus is placed on alternative providers of pension schemes (employer provided schemes and personal pensions by financial institutes), the historical development of the interplay between alternative providers, and the on-going shift in the income distribution.

In general, public and private social security can be regulated in a variety of ways. It is particularly important to analyse the interplay of such social systems in order to better understand the outcomes of inequality. Public social security primarily focuses on protection against social risks and redistribution, whereas private social security arrangements may supplement, but in some cases entirely substitute public social security programs. Bargaining and regulating collective agreements are important for the obligation to additionally contribute to complementary pension plans. In mandated pension schemes coverage and take-up might be much larger as in schemes where occupational and private pensions remained mostly unregulated.

In a study of 25 OECD countries, Goudswaard and Caminada (2010) found that a higher share of public spending for social security slightly decreased the income inequality among households. Public pension spending as a percentage of GDP was the most relevant factor in explaining levels of inequality; the higher this ratio, the lower the Gini coefficient. In contrast to this, private pension spending as a percentage of GDP had the opposite effect; the higher the ratio, the higher the Gini coefficient.

Korpi and Palme (1998) showed that it is not only universal public schemes, but also targeting to certain groups that drive redistributive outcomes of social protection schemes. The authors argued that universal benefits lead to more equality in incomes, whereas targeting towards the poor may lead to more inequality in terms of contributions, and that high-income earners will benefit more. Furthermore, Korpi and Palme (1998) stress the importance of universal social security systems to decrease inequality; such as in the Nordic countries which are largely universal with goals for both poverty reduction and income maintenance.

Korpi and Palme's (1998) argument is particularly relevant for pension systems. It exemplifies that in countries where old-age protection was mostly introduced to protect the low-income group against poverty in old age, various supplementary schemes developed, which altogether provided the income maintenance (Ebbinghaus and Neugschwender 2011). It is also necessary to distinguish between voluntary and mandatory occupational and private pension schemes. When there are alternative schemes to choose, it depends strongly on the income group which schemes which group prefers. Low-income earners might prefer the public redistribution, whereas high-income earners prefer the personal contribution-based schemes, since these plans will provide them higher returns on their investment (Conde-Ruiz and Profeta 2007). This scenario is particularly relevant for the UK where the insured can *contract out* from the public second-tier scheme to the private one.

One can expect that complementary occupational and private pensions generally increase inequalities as they contain less redistributive elements than public pensions and particularly favour the middle and high-income group (cf. Rein and Behrendt 2004). However, van Vliet et al. (2012) did not find clear evidence for such a generalised theoretical approach. However, also the OECD is concerned that the on-going 'trends towards working longer and more reliance on private pensions may increase inequality among retirees' (OECD 2013a: 13). Thus, this argument needs to be further elaborated and specified; the authors acknowledge that the theoretical framework needs to take into account the variety of institutional approaches to regulation of complementary pension schemes by the state and/or employers.

At the same time, inequality analyses of current pensioner's income need also to be linked to the on-going inequality developments. Burtless (2006) emphasised that the current shifts in the income mix are particularly relevant for the low-income group, which is gradually better secured by supplementary occupational pension plans; however, private pensions have an influence on the whole income distribution, and hence no effect on inequality among the elderly.

A cross-sectional perspective at any certain point in time does not account for the historical relevance of the introduction of complementary pension schemes. Most of the mandated collective agreements in the Nordic countries and partly in Germany were introduced later than the main public schemes, particularly late in Denmark (only in the 1990s). Therefore, current inequalities among pensioners only partly reflect the complementary occupational and private pensions in the income distribution

As pension systems redistribute financial resources over time they reflect a deferred use of financial resources, referred to as *horizontal* redistribution (Esping-Andersen and Myles 2009; Palme 2006). Thus pensions reproduce income inequalities of the labour market through equivalence of contributions and benefits. Countries with high market inequalities are expected to generate high levels of inequality among pensioners; income maintenance is effectively achieved by previous high-income earners. Particularly the selective protection against income maintenance of high-income earners might drive the inequality increasing effect of private pensions. Therefore, encompassing pension systems, as described by Korpi and Palme (1998) might play a major role in limiting inequality among the elderly. These systems could reduce the additional need of protection for the high-income group, since these occupational groups already profit from a mandated market-oriented second tier of pension provision. This scenario fits most closely to the Finnish pension system.

On the other hand, minimum pensions aim to redistribute income across the elderly on the *vertical* dimension, among pensioner groups. Thus, since the main focus is poverty prevention, such policies can only provide income maintenance for the middle-income group, when the level of the minimum pension is very generous. In this case, it is very important to understand the interplay with complementary pensions.

A complementary scheme on voluntary basis might have a lower take-up rate. This is particularly likely when the individuals have low incentives to contribute to additional

personal plans. This is the case when minimum pensions provide rather good replacement of income in the future, but also when the minimum pension is income tested against other pension income. The latter scenario considerably reduces the incentives to contribute to private pensions.

As shown in Chapters IV and V both arguments applied to the Danish case where income maintenance for the middle-income group was strongly underdeveloped until the introduction of collective agreements. Until the 1990s, Danish employees were free to participate in occupational plans offered by their employers, and hence rather selective. In the early 1990s, collective agreements made participation quasi mandatory for the broad majority of employees (Andersen 2011). Since then, Denmark showed recently a strongly developing private pension component in the income mix.

In contrast, the British basic pension was linked to previous insurance year and provided a rather low level of protection. In addition, mandated contributions to the public, or occupational, or personal plans were kept on a rather low level which left a broad scope for additional complementary schemes to develop. However, the key problems remained: the SERPS provided low benefits, and particularly low-income earners hardly *contracted out* of the SERPS (Schulze and Moran 2007, Blake 2003).

Also in Germany the private component was mostly kept on a voluntary basis. In contrast to Denmark and the United Kingdom, the public scheme offered income maintenance for the long-time insured up to a certain ceiling; additional complementary schemes covered only a few occupational groups. Recent German reforms in the early 2000s aimed at strengthening tax incentives and subsidies for private pension plans (particularly the *Riester* pension (Anderson and Meyer 2003, Ebbinghaus et al. 2011, Neugschwender 2008). Future developments may lead to a cut in the income maintenance level and will balance the pension income mix differently.

Pension incomes are likely to reveal two main developments when comparing the older to the younger cohorts, which blur the empirical findings:

- First, the older cohorts started and ended their employment career earlier than the younger ones. Particularly in the after war period the economic situation boomed which is linked to a strong increase in living standards, and wages in particular. Thus the wages of younger birth cohorts were on average higher, which is likely to lead to higher pension benefits as well, as they had higher income and contributions to old-age income systems. This is very much relevant for the birth cohorts that are evaluated. Whereas the oldest birth cohorts entered the labour market age already during the Second World War, the younger cohorts did start their employment career only in the after war years. This situation can be linked to more stable employment patterns, better inclusion to earnings-related pension schemes, and subsequently higher pension income.

- A second complication is that old-age income is generally expected to be higher the longer the coverage within more beneficial public pension scheme institutions. Public pension schemes were broadly extended during the mid-1950s; this may be more beneficial for the younger cohorts, whereas the older cohorts contributed less over their entire working career. In addition, the expansion of occupational schemes, which took place even later than the public pension scheme expansion, might be even more selective for the oldest cohorts.

Therefore, I expect to find a strong increase in amounts among the younger cohorts in general, both in public and private pension income. In addition, I expect to find a stable increase of public pensions for middle-to high-income earners, due to the beneficial employment situation and the gradual maturing of public pension schemes. The middle and high-income groups receive a combined income package of universal minimum pensions and various earnings-related second-tier schemes. Consequently, for the better-off retirees the contribution years and the country-specific regulation might make a difference. In contrast to the middle and high-income groups, the low-income group is dependent on minimum pensions and/or social assistance, independent of their previous employment history. Depending on generosity and benefit regulation over time, this might indicate a change in welfare state activity to prevent at-risk and extreme poverty among the aged.

On the other hand, I expect to find a more mixed structure for private pensions, particularly driven by the degree of mandated occupational schemes. In countries where occupational pensions were in general regulated on a mandatory basis, only a few more contribution years to occupational pensions might result in substantially higher pensions. However, this process is very slowly taking place, over a period of ten years, the effects of matured obligated occupational pensions can be best observed in terms of coverage and income share, but the observed inequality development may remain marginal across cohorts.

If there are no mandated occupational pensions, one can expect that there is only a small group of pensioners that were covered with occupational schemes, mainly as fringe benefits for the highly skilled or state employees. This scenario applies mostly to the Italian system and for most occupational groups in Germany, where public pensions were introduced as income maintenance schemes on rather high level.

However, there is also an alternative scenario that applies to the United Kingdom and Denmark until the early 1990s. In both countries public pensions mainly provided the first tier aiming to prevent poverty, whereas the income maintenance was limited. In order to maintain the standard of living, employees were offered occupational pension plans by individual employers or the private financial sector. Similarly, when occupational earnings-related schemes successively covered more and more employees and employment years, retirees with such a more diversified pension income mix were likely to be on the upper end of the income distribution, receiving higher total pensions in comparison to the oldest cohorts. This most likely would result in an increase in inequality caused by selective increases among the upper end of the income distribution through *maturing* voluntary occupational pension schemes, but not so much through the nature of occupational pension

schemes per se. Thus the increase of inequality can be temporary and reflect an increasing awareness to additionally provide for old age through individual pension plans. The latter could be shown also quite strongly through the private market in Sweden, where more and more persons were only expecting rather low public pension benefits due to the low ceilings, and therefore did take up more private plans since the 1980s (Lindquist and Wadensjö 2011).

There are certain circumstances that counterbalance the beneficial situation for private pension recipients: First of all, public pensions can be cut respectively if sufficient other (pension) income is received, e.g. through income tests. This scenario is less relevant for public social insurance systems, whereas it is very much common in the pension systems in the Nordic countries. Secondly, the period between the 1980s and until the early 2000s is characterised by a strong trend of decreasing effective age of retirement (OECD 2015: 162-163). Whereas many public schemes even favoured the early exit without deductions, in occupational and private schemes this early exit trend might relate to shorter contribution periods and therefore limit the relevance of private pensions in the old-age income mix. These two circumstances partially restrain the clear inequality increasing effect from the maturing occupational schemes.

VI.3. Operationalisation

For the following analyses datasets from the Luxembourg Income Study (LIS) Database were used. LIS provides a standardised database from national survey/register data. Six countries were selected for the analyses: Denmark, Finland, Germany, Italy, Sweden, and the United Kingdom. Various datasets, containing for each country at least three points in time, were pooled: Denmark (1992, 1995, 2000, 2004), Finland (1995, 2000, 2004, 2007, 2010), Germany (1994, 2000, 2004, 2007, 2010), Italy (1995, 1998, 2000, 2004, 2008, 2010), Sweden (1995, 2000, 2005), and the United Kingdom (1994, 1999, 2004, 2007, 2010).

This study applies a cohort and longitudinal design using cross-sectional input data. 77251 elderly were observed at 3-5 points in time for each of the six countries. These data were pooled in one data file reflecting the individual birth cohort. In the following subsections, I will discuss some of the main data restrictions and solutions, pointing to its implications for the interpretation of the data.

The different cross-sectional datasets were treated as quasi cohorts, which mean pensioners that were observed at one point in time are very likely to have constant pension benefits since retirement, which are adjusted in line with consumer prices. Therefore, pension outcomes for pensioners for the same birth year from different survey years should reflect similar pension benefits and distribution. Thus, pooling the income data for pensioners was less problematic. By doing so, I implicitly assumed a full indexation of pensions in line with consumer prices, which is plausible for advanced pension systems.

Sample selection

The sample selection for the analyses contained various data preparation steps. The previous chapters signalled that personal labour market income blurred the pension income distribution; both labour market and and/or private pension income were important income sources on the upper end of the income distribution. Therefore, in this study, a clearer focus on analysing the inactive and already retired population is taken. Since the main interest in this study was the measurement of inequality of pensions, persons and households with a strong connection to the labour market were excluded systematically.

The analyses include only persons who were defined to be the head of the household, and their respective spouse. Acknowledging that multiple generation households are also an important social group to study, they were excluded due to reasons of limited comparability of all countries under study. For the exception of Italy, all countries had rather low percentage of multiple generation households; thus the results did represent the situation of the broad majority of retirees. In general, the measurement of pension income inequality in multi-generational households would require a quite different operationalisation.

By keeping heads and spouses only, employment income of other household members already influences the income situation of the elderly less. In a next step, both head and spouse of the pensioner couple should not be 'mainly employed' or, in case where the main activity was not available, they should not be 'currently employed' (this applied for the older datasets prior than Wave V of the Luxembourg Income Study (LIS) Database). In Italy the information was taken from the usual activity during the income reference period. Thus also the influence of a working spouse is drastically reduced; otherwise the pension income of the couple shows an incomplete picture before actual retirement, and respectively labour income of the working spouse might lift the household up in the income distribution.

Moreover, in order to exclude pensioner households who may receive only partial retirement pensions before reaching the actual retirement age, both partners had to be at least 66 years of age at the time of interview. The sample was also restricted to household members with at least one partner that was not older than 75 years in order to exclude the elderly that retired a long time ago. Unfortunately, the same threshold of 75 years cannot be applied in Sweden and Denmark. For these two countries, in those two countries a threshold of 80 years was applied in order to keep additional observations for the cohorts from different waves.

Finally, the main income source of the household should not come from employment income (i.e. dependent work and self-employed income together do not add up to more than 50 per cent of the total gross household income). This condition is set up complementary to the previous ones; it can very well be that persons who retired during the income reference period self-assessed themselves as being 'not mainly employed', however the income situation still refers to the labour market earnings of the previous income reference year of the survey.

These sample selection procedures may bias the general income distribution of the elderly by not reflecting the relevance of partial or delayed retirement nor accounting for the

importance of multi-generational households. To account for some of these particular households, work income was implicitly allowed as a secondary income source besides pension income. However, by setting up all these criteria, the influence of early and delayed retirement was minimised; the remaining sample of pensioner households were likely to receive the full amount of retirement pensions, which allowed a more precise measurement of pension outcomes and pension income (re-) distribution.

Figure 1 shows which observation points and cohorts were used for the analyses. For representativeness, two birth cohort years were combined to one observation point, as otherwise the number of observations would be very low for some of the analyses by deciles. For example, the birth-cohorts 1921 and 1922 were pooled together to one cohort; each of these two-year cohorts contained respectively pooled observations from the country-years. The birth cohort 1921-22 in Denmark contained observations from the dataset DK92, where these persons were approximately 70 to 71 years old, additional observations from the dataset DK95 where the persons were 73 to 74 years old, and also observations from the dataset DK00 where the persons were 78 to 79 (see Figure 1).

As discussed previously, two cohort designs were operationalised based on different age ranges. In Sweden and Denmark, persons with at least one partner being in the age range 66 to 80 were included, whereas in the other four countries at least one partner had to be in the age range 66 to 75. As a consequence the Danish and Swedish results were problematic since not all cohorts contained observation from a similar age range. The oldest cohorts could not possibly contain persons who were aged below 70 in Denmark and 73 in Sweden; the youngest cohorts could not contain persons older than 71 in Denmark and 72 in Sweden. Since the socio-demographic characteristics differ particularly with age, age-related effects could not be fully eliminated in these cohort designs. Thus, the results for the cohorts in Denmark and Sweden were partly driven by increased importance of pensions and less single households among the younger cohorts. For the other four countries persons aged between 66 and 75 and their respective partners were equally represented. In this scenario, it was possible to measure inequality developments for cohorts unlinked from the major influencing factor age.

In total, the pooled files contained 77251 observations, see Figure 2 for details. In each of the countries the sample restrictions reduced the observations for persons aged 66 and older by 25 to 30 per cent.

The unit of analysis is the household. This decision is based on data limitations; individual level data on pensions that allowed a separate evaluation of public and private pensions were not available for the earlier datasets. But also it is common practice to evaluate inequality measures such as the Gini coefficient and poverty rates at the household level.

Comparability of the pooled observations within countries was achieved by price-adjusted income amounts, expressing income standards of the year 2000 for Denmark, Finland, Germany, Italy, and Sweden. As the British data were collected in two periods 1999 and 2000, incomes were adjusted to the mean of the two years 1999 and 2000. In order to receive comparability across countries income amounts are shown in purchasing power parities

Figure 1: Sample design: birth cohorts and country years from the Luxembourg Income Study (LIS) Database

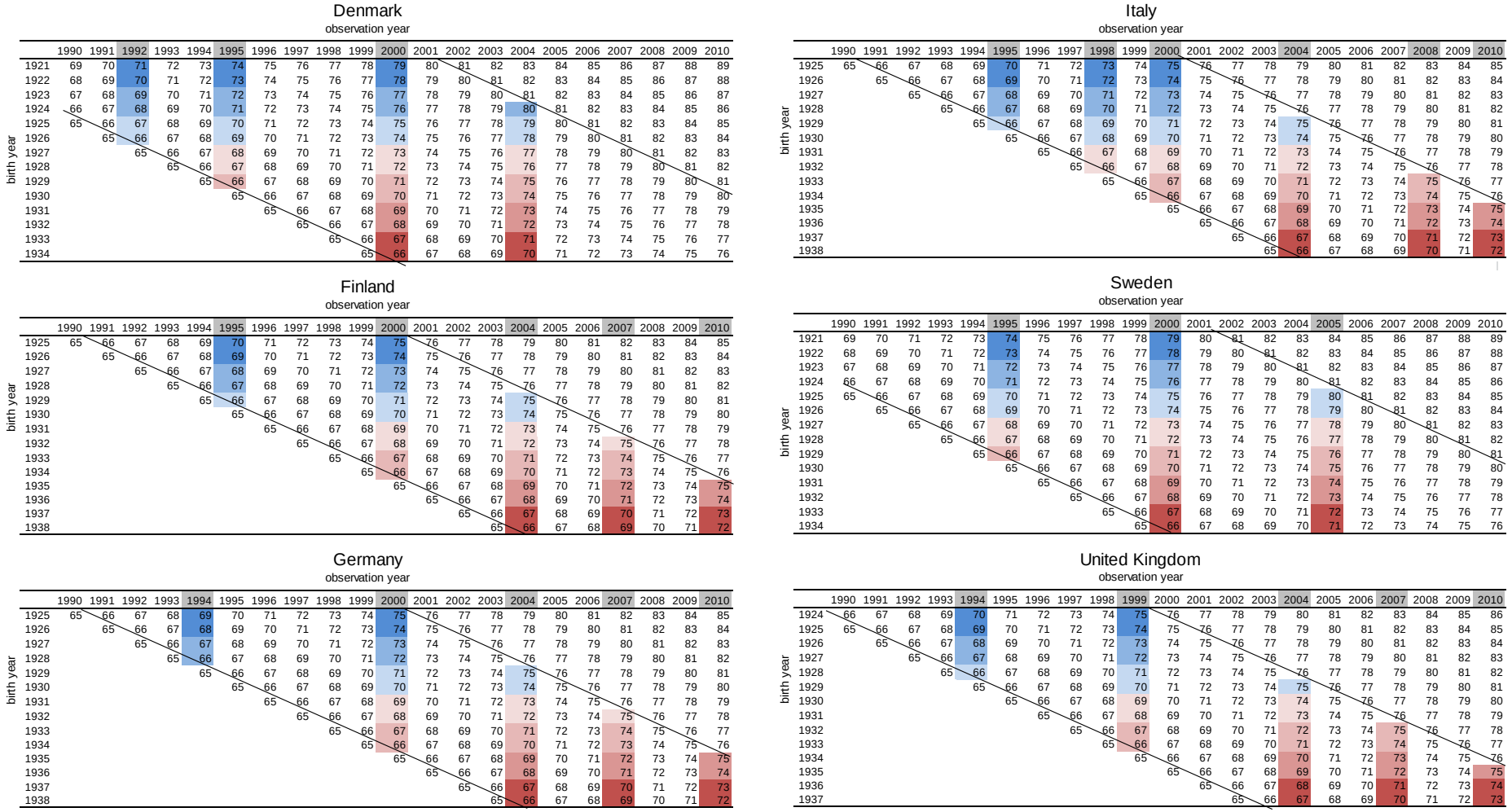


Table 1: Number of observations by country, country years, and birth cohort years (Luxembourg Income Study (LIS) Database)

	Denmark				**Finland**					**Germany**				
Total sample		35210				4410					6980			
of which	DK92	DK95	DK00	DK04	FI95	FI00	FI04	FI07	FI10	DE94	DE00	DE04	DE07	DE10
	858	9218	13834	11300	487	972	1341	1001	609	287	1668	2069	1620	1336
Total observations for each cohort														
1921-22		4727												
1923-24		5660												
1925-26		6260					443					519		
1927-28		5932					489					623		
1929-30		4867					657					853		
1931-32		4050					631					865		
1933-34		3714					723					1225		
1935-36							714					1368		
1937-38							753					1527		
of which	DK92	DK95	DK00	DK04	FI95	FI00	FI04	FI07	FI10	DE94	DE00	DE04	DE07	DE10
1921-22	339	2258	1840	290										
1923-24	298	2296	2074	992										
1925-26	221	2003	2178	1858	202	186	41	11	3	145	306	41	18	9
1927-28	0	1884	2127	1921	192	193	71	26	7	142	361	86	24	10
1929-30	0	777	2025	2065	93	210	255	74	25	0	376	362	69	46
1931-32	0	0	1957	2093	0	197	220	166	48	0	301	302	198	64
1933-34	0	0	1633	2081	0	186	246	218	73	0	324	410	371	120
1935-36					0	0	249	243	222	0	0	445	443	480
1937-38					0	0	259	263	231	0	0	423	497	607

	Italy						**Sweden**			**United Kingdom**				
Total sample			7322					8297				15032		
of which	IT95	IT98	IT00	IT04	IT08	IT10	SE95	SE00	SE05	UK94	UK99	UK04	UK07	UK10
	717	922	1378	1874	1402	1029	1903	3348	3046	1963	3933	4444	2945	1747
Total observations for each cohort*														
1921-22								1246						
1923-24								1357						
1925-26			929					1555				1746		
1927-28			972					1417				1871		
1929-30			1151					1202				1836		
1931-32			954					780				2061		
1933-34			1055					740				2592		
1935-36			1125									2288		
1937-38			1136									2638		
*of which**	IT95	IT98	IT00	IT04	IT08	IT10	SE95	SE00	SE05	UK94	UK99	UK04	UK07	UK10
1921-22							513	640	93					
1923-24							471	698	188					
1925-26	304	247	287	61	22	8	416	568	571	891	786	69	0	0
1927-28	274	248	287	105	45	13	359	445	613	774	853	147	97	0
1929-30	139	241	307	362	61	41	144	415	643	298	830	609	99	0
1931-32	0	186	268	333	100	67	0	307	473	0	796	920	184	161
1933-34	0	0	229	348	362	116	0	275	465	0	668	921	838	165
1935-36	0	0	0	343	406	376				0	0	881	881	526
1937-38	0	0	0	322	406	408				0	0	897	846	895

*for the United Kingdom the numbers refer to the birth cohorts minus one year, e. g. 1925-26 refers to 1924-25.

(ppp), which means that the amounts in national currencies were divided by an adjustment factor to receive a standardised currency unit, which then reflected the International dollar (I$) at current prices in 2000. Furthermore, all income sources were equivalised in order to compare the income situation of households of different composition, reflecting *economies of scale* that occur when persons share the same dwelling and resources. The common approach of LIS was applied, i.e. all income sources were divided by the square root of household members.

VI.4. Recipient rates and public-private mix by cohorts

This section evaluates the development of coverage with private pension income and income share of private pensions in the income mix. The following questions will be addressed: Which groups of the elderly are already strongly covered? Is private pension income an important source of income? For this section the income distribution of the pensioner sample was divided in income quintiles using the equivalised household's gross total income. Thus, the first 20 per cent of persons living in households with the lowest equivalised gross total household income ended up in the first income quintile.

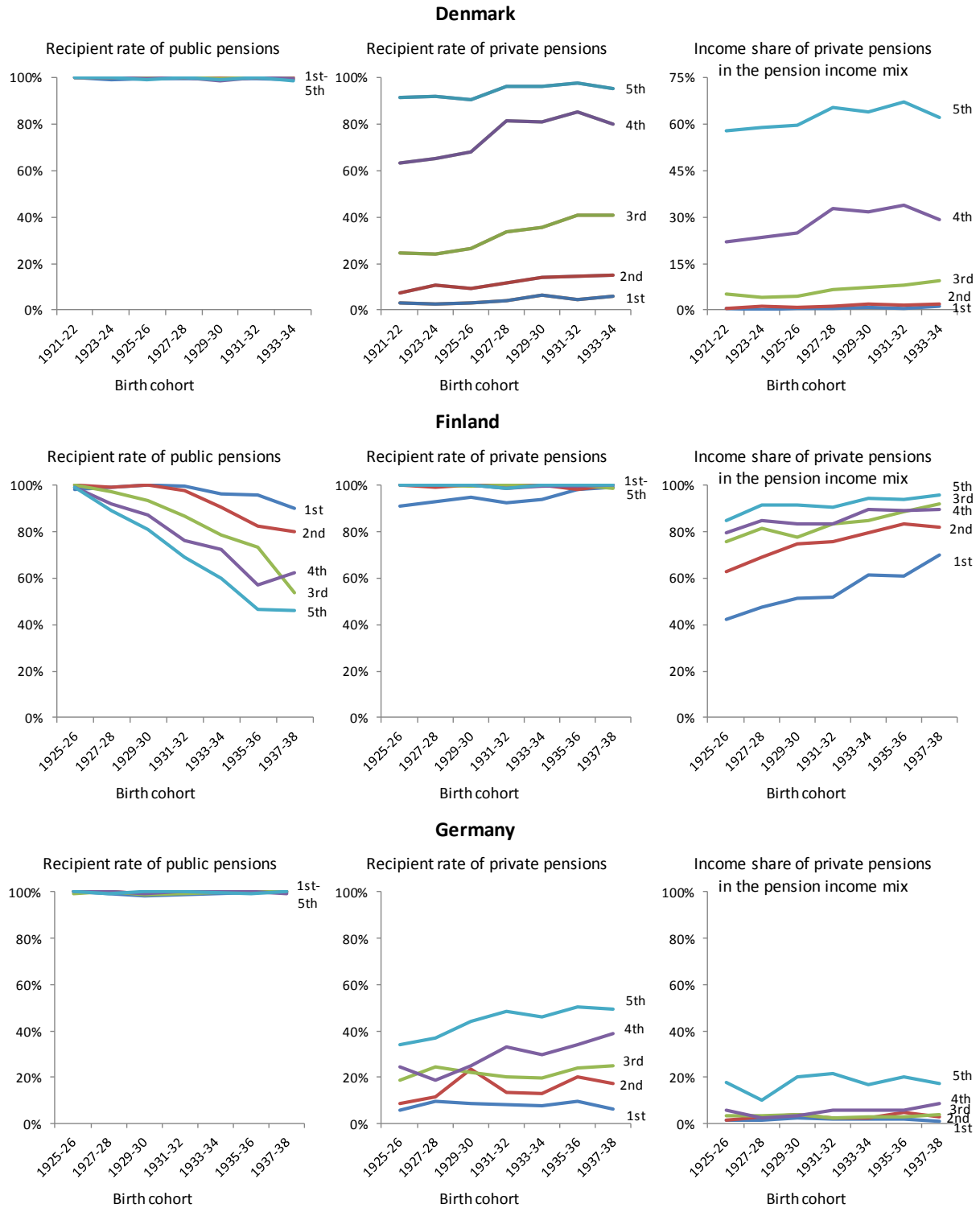
Figure 2 evaluates the recipient rate of public and private pensions, and income shares in the pension income mix by income quintiles and by cohorts. Hence, for each of the income quintiles percentage shares for each of the cohorts and quintiles are calculated. The pension income shares were calculated on gross-income amounts, except in Italy they are based on net-income amounts.

Figure 3 links the findings of the recipient rate of private pensions and the income share of private pension in the income mix from Figure 2 by showing the average over all quintiles by cohorts. All statistics are representative on the individual level; however they were calculated on equivalised household level coverage and amounts. Therefore, an individual is considered to receive pensions as soon as single person in the household receives pensions.

A general finding is the extensively high recipient rate of public pension income, most cohort/quintile observations exceeded recipient rates of 98 or 99 per cent. This could be expected with the restrictive sample selection minimizing the role of employment income; this illustrates that nearly all observation units are pensioner households. Moreover additional analyses on the individual level revealed that the vast majority of individuals did receive public or private pension income.[14] This also supports the high recipient rate of public pensions among the lowest income quintile.

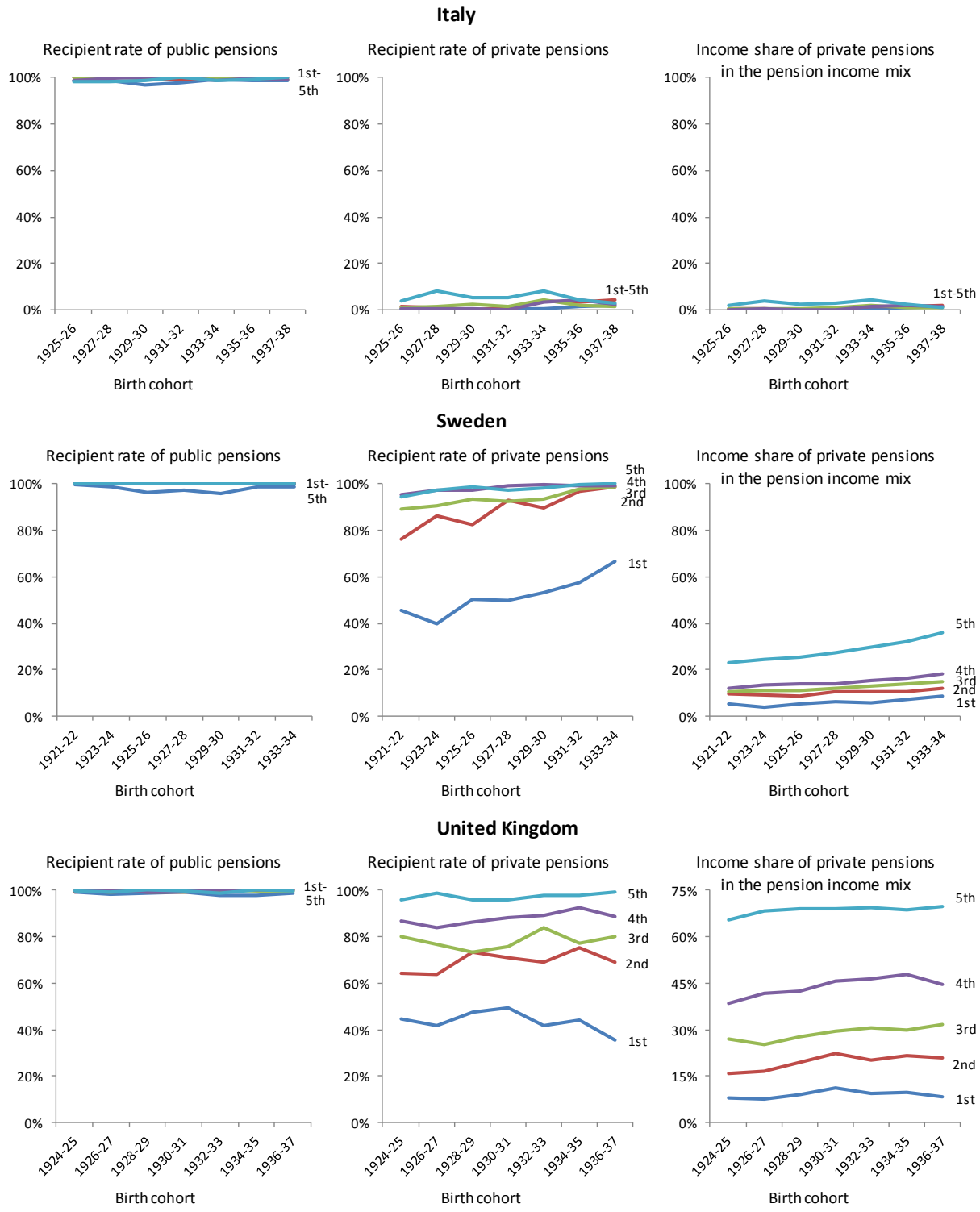
[14] The individual data are not shown here, as they do not allow the split in public vs. private pension income sources. In general it could be doubtful that personal level analyses can be meaningful, as e.g. couple households may receive a combined benefit from public pensions, which thus is reported only once as the total amount. The latter is likely to happen when the pension system pays supplementary benefits to dependents. Thus personal level data analyses are also not undertaken due to reliability concerns of the data itself.

Figure 2: Recipient rates of public/private pension income and income share of private pension income in the pension income mix by cohort and income quintile



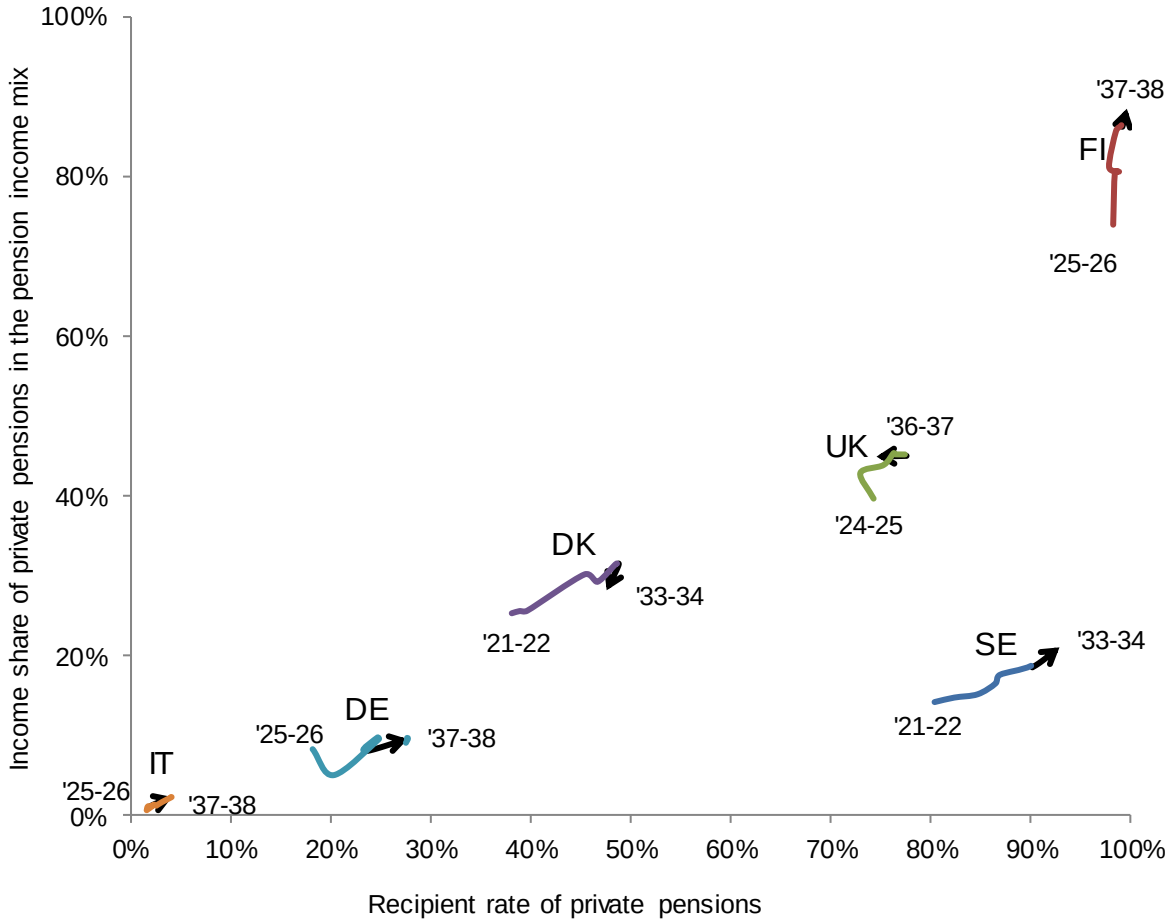
Source: own calculations based on Luxembourg Income Study (LIS) Database.

Figure 2 (continued): Recipient rates of public/private pension income and income share of private pension income in the pension income mix by cohort and income quintile



Source: own calculations based on Luxembourg Income Study (LIS) Database.

Figure 3: Recipient rate of private pension income and income share of private pensions by cohort



Source: own calculations based on Luxembourg Income Study (LIS) Database.

The Finnish case is the exception that provided less comprehensive public pension coverage. In 1996, Finland abolished the universal basic pension scheme, everyone was not necessarily eligible to receive these public benefits as a social right; and since 1996 the national pension benefits were tested against other pension income. This institutional change has boosted the importance of private pensions in the pension income mix to more than 90 per cent over all cohorts for the most recent birth cohorts. For the middle- to high-income groups, the earnings-related occupational schemes successively substituted the public minimum pension. Even in the lowest income quintile for the most recent birth cohort 1937-38 private pensions have become the main source of income. This scenario clearly lifts out the Finnish case from comprehensive public pensions, as it still used to be the case at the time of Korpi and Palme's (1998) analysis; however it remained an encompassing system, due to the almost universal coverage by occupational plans. In 2011, the Finnish government also introduced a guaranteed minimum pension that is tested only against other pension income (Barr 2012).

In addition to overall high coverage with public pensions, Finland and Sweden had particular high recipient rates with private pensions. This finding is not surprising; both countries introduced complementary occupational schemes already in the 1960s on a mandatory basis for most employees. The break down in income quintiles further reveals

that those who did not receive private pensions were likely to end up in the lowest income quintile. The share of households who do not receive any private pensions was a bit higher in Sweden than in Finland (20 per cent for the oldest cohorts, see Figure 3); however, the development over time showed a strong increase of the recipient rate in the first quintile for Sweden. The other income quintiles already reached coverage of nearly 100 per cent for the youngest cohort 1933-34. In Finland the development over cohorts demonstrates a continuation of comprehensive coverage, whereas in Sweden a higher share of the population was covered than before, so that now approximately 90 per cent of pensioner households received second-pillar supplements in addition to public pension income. This is a combined effect of increased coverage with occupational and personal pension plans (Lindquist and Wadensjö 2011).

In the United Kingdom and Denmark the distribution of private pension income was much more unequal and concentrated among the high-income groups. This is in line with the expectations of selective coverage with complementary occupational pensions that were left mostly unregulated. Both countries show a strong increase of recipient rates over the lowest quintile to the highest income quintile.

The recipient rate in Denmark was especially selective; receiving occupational pensions was strongly linked to a higher position in the income distribution, whereas, the low-income groups hardly received any private pensions. The development over time confirms a better inclusion of many pensioners due to the increasing importance of obligatory occupational pensions since the 1990s. The recipient rate rose in the third and fourth income quintile. However the observed cohorts do not yet depict comprehensive inclusion, which relates to the fact that not all employees who were close to retirement age when the regulation was implemented received annuity payments. Instead, these employees with less contribution years may have received lump sum payments. Lump sum payments became less relevant for the more recent cohorts; however, they were the common way for low accumulated entitlements in occupational pension accounts (Andersen and Skjodt 2007). Therefore, these figures are partly biased by the decreasing importance of lump sum pensions over time.

The British sample signals a more balanced interplay of public and private pensions, reflecting the *contracting out* scenario. Since *contracting out* from the public scheme was mostly a substitute of contributions from public to private schemes, private pension recipients were not necessarily better off than non-private pension recipients. In line with this expectation, more than 40 per cent of the pensioners in the lowest income quintile (for birth cohort 1924/25) received partly private pension income; thus their total pension income was not so different in comparison to those who stayed entirely in the public second-tier scheme. The United Kingdom showed a rather stable recipient rate pattern across time for the cohorts, which can be also linked to the *contracting out* structure. Many individuals were either not willing, or up to 1986 (when also the possibility of *contracting out* to personal pension plans was introduced) had no option to contract out of the public pension, since the supply of those plans remained an employer's choice (Blake 2003, Dilnot et al. 1994). Overall, *contracting out* was attractive for those who believed in higher returns of the capital market.

In Germany and Italy, private pensions were far less important for the broad majority of pensioners. Since both countries had extended their *pay as you go* public pension schemes in order to provide income maintenance to middle- and high-income earners, there was no major need to develop additional complementary schemes (Ebbinghaus and Gronwald 2011). However, the German system contained some regulated supplementary occupational pensions. Coverage with occupational pensions was not so much linked to income, but rather linked to occupation and core membership to a profession (Ebbinghaus et al. 2011). As a result, even in the highest income quintile for the most recent birth cohorts only every second German elderly couple received private pension income. In Italy, private pensions reached almost no importance in the income mix; this can partly be explained by the high-income ceiling (Barr 2012, OECD 2013a), and thus take-up rates of additional private pension plans were low.

In terms of income share of private pension income in the pension income mix, Sweden showed a rather low importance of supplementary private pensions. The breakdown in income quintiles reveals that even high-income earners did receive mostly public pension income; the income share in the highest income quintile was twice as high as in the fourth income quintile, but public pension income was clearly the more important pension income source with approximately 70 per cent for the most recent birth cohort. However, the share of private pension income strongly increased from 23 per cent (for birth cohorts 1921-22) to 36 per cent (for birth cohorts 1933-34), which was the strongest increase among all income quintiles. This development might indicate that Swedish retirees started taking up selectively additional retirement plans, which lifted their incomes much higher that they find themselves in the highest income quintile after retirement. In fact, since the income ceiling was particularly low in Sweden, during the 1980s many insured expected to receive rather similar benefits (Kangas et al. 2010); it became evident that if better income earners were interested in maintaining a certain living standard they had to save or invest in additional personal retirement accounts.

While the importance of public pensions was decreasing in Finland, the income share of occupational and personal pensions was increasing. With nearly 89 per cent (for the birth cohorts 1937-38) in comparison to 74 per cent (for the birth cohorts 1925-26) second and third-pillar pensions have become by far the most relevant pension income source. The relative increases over time were strongest for the low-income pensioners, however even for high-income group the balance shifted towards a stronger role of private pensions. It is unclear from this analysis, if the cut in public benefits and the increase in occupational pensions hindered the financial wellbeing of Finnish retirees. For example, if the benefits from the matured occupational pensions exceeded the cuts in the public pensions, then Finnish pensioners would be better off.

Similar to the recipient rate, the income share of private pensions was slightly higher in the United Kingdom than in Denmark, which was mostly driven by a stronger role of private pensions among the low-income pensioners in the United Kingdom. Whereas up to the third income quintile most Danish pensioners did receive only public pension income (more than

90 per cent), British retirees had a more balanced income package. In both countries, the importance of private pensions in the pension income mixes increased strongly from the lowest to the highest income quintile. However, private pension income was the main source of pension income only for the highest income quintiles, whereas in all other quintiles public pensions remained more important than private pensions.

Both countries' patterns are in line with the expectations. In Denmark historically coverage with private pensions was extremely low for the broad majority of the population, since pensioners could expect rather generous public pensions. Employees in higher positions were covered, and also received high occupational pensions on top of the public pension. However, the same group did no longer receive the income-tested supplements to the basic pensions. The latter might strongly shift the income share towards private pensions among the high-income group, but may also limit inequality. The relevance of private pensions increased among the middle-income pensioner group, which indicates that the shape of the replacement rate curve slightly might return back to the typical shape as in the other countries, providing an increasing replacement rate for the middle-income group (see Chapters IV and V).

In the United Kingdom, private pensions played a minor role for the low-income group, reflecting that the low-income group only *contracted out* a few years from the public second tier, and then switched back to the public pillar. Consequently, they did not accumulate high benefits. In the mixed British system of voluntary and mandatory contributions two scenarios were more likely to occur. First, a general *contracting out* to occupational pensions and thus lower entitlements to the SERPS can be assumed. Second, high-income earners were more willing to pay additional contributions besides their mandatory contribution rate. Both factors favoured a strong shift towards private pension accumulation among the upper end of the income distribution of the elderly. In the United Kingdom the income share went up on average from 40 to 45 per cent; in Denmark the income share increased from 25-29 per cent.

In Germany the amounts from private pension plans can be identified as being only low supplements to the public pensions. Private pension income accounted for only 9 per cent for the most recent cohort. Even in the highest income quintile only about one fifth of the total pension income came from private pension income sources. The public-private pension mix hardly changed over time.

Since in Italy only a low percentage of persons received private pension income, those pensions were negligible for the income mix. The pension income distribution was almost exclusively shaped by the public pension income. For all quintiles private pension income was below two per cent; specific plans for some high-income earners (TRF) were covering only very few persons so that it cannot be expected that survey data provide reliable estimates for public and private pension income for birth cohorts.

VI.5. Pension income developments by cohorts

In the following section, I will focus on the evaluation of the level of the elderly's income. Are the younger birth cohorts better off than the older ones? Which pension income source increased for which income group? To answer these questions, the sample's income distribution was divided into income deciles using the household total gross income. Analogous to the previous section, the first 10 per cent of persons living in households with the lowest equivalised total gross household income ended up in the first income decile. For each of the deciles, an average amounts from five income sources was calculated: public pension income, private pension income, capital income, employment income, and other income (including other social security income besides pensions and private transfers from, i.e. other households or non-governmental institutions). The latter three incomes were aggregated to other income, since in the developed countries the elderly in the lower income deciles almost exclusively received pension income.

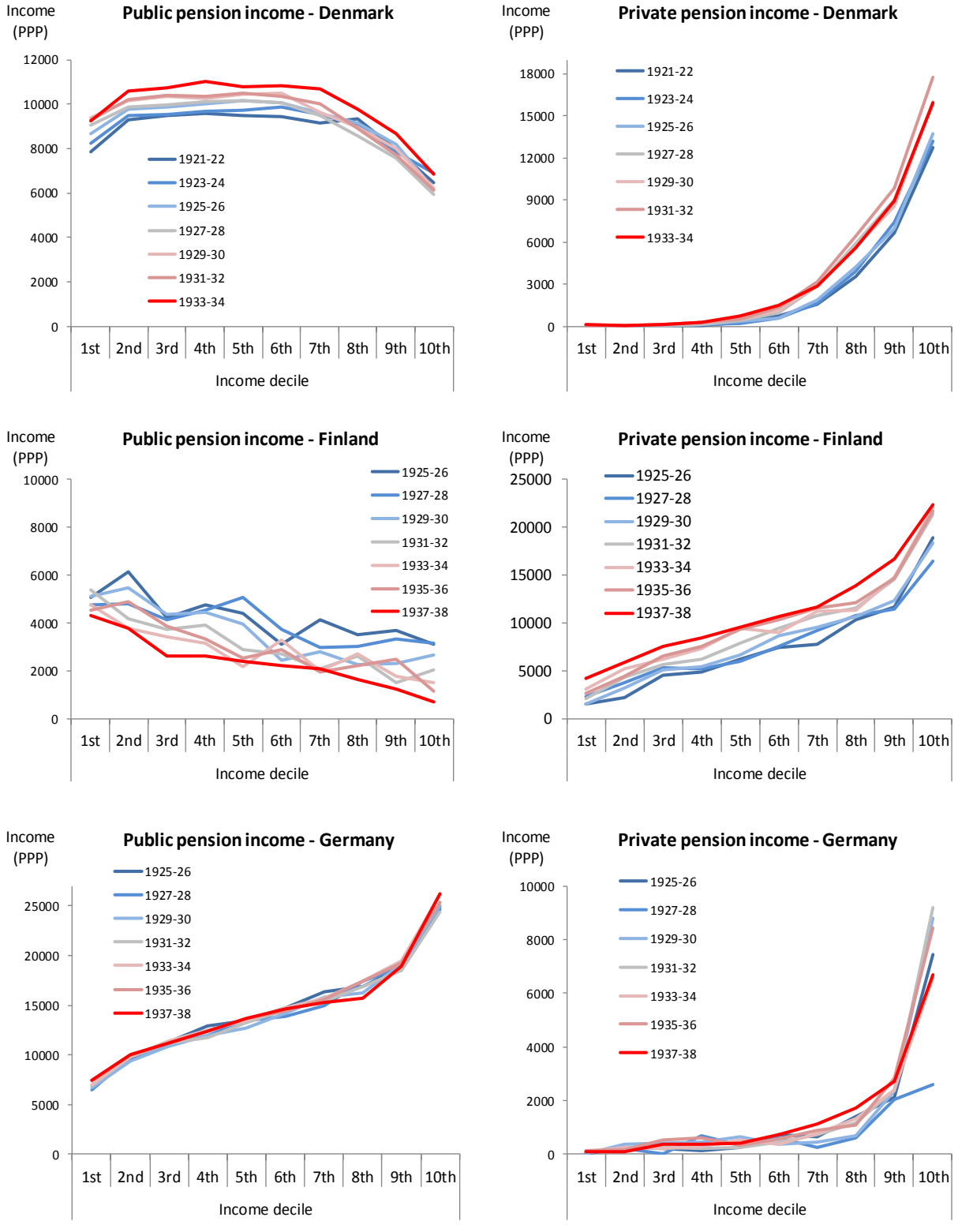
Since the datasets from the Luxembourg Income Study (LIS) Database report typically incomes gross of social security contributions and income taxes, individual income sources were recalculated applying a generic tax rate for each income decile, in order to split the disposable income in distinct income sources. As the taxed income of other household members has a direct effect on the household tax rate, I did not re-create a percentage for the individual household. This allowed for a better adjustment for taxation of pension income than the tax rate for the household; the latter would bias the taxation on pensions.[15]

As a consequence of this netting-down procedure, all amounts can be interpreted as price and ppp-adjusted equivalised net values; allowing for income levels for each income decile to be compared cross-nationally and over time.

The results in Figure 4 show the absolute income development for net public and private pension income separately by income decile and birth cohort. Figure 5 presents the complete income distribution based on the average net incomes for the income deciles; the observations for the cohorts were reduced to two birth cohort observations, ten years apart. Hence, for each of the countries, the income distribution of one specific older birth cohort is compared with the income distribution for the ten years younger birth cohort. Since the data availability restricted the operationalisation, the depicted birth cohort years differ slightly across the countries.

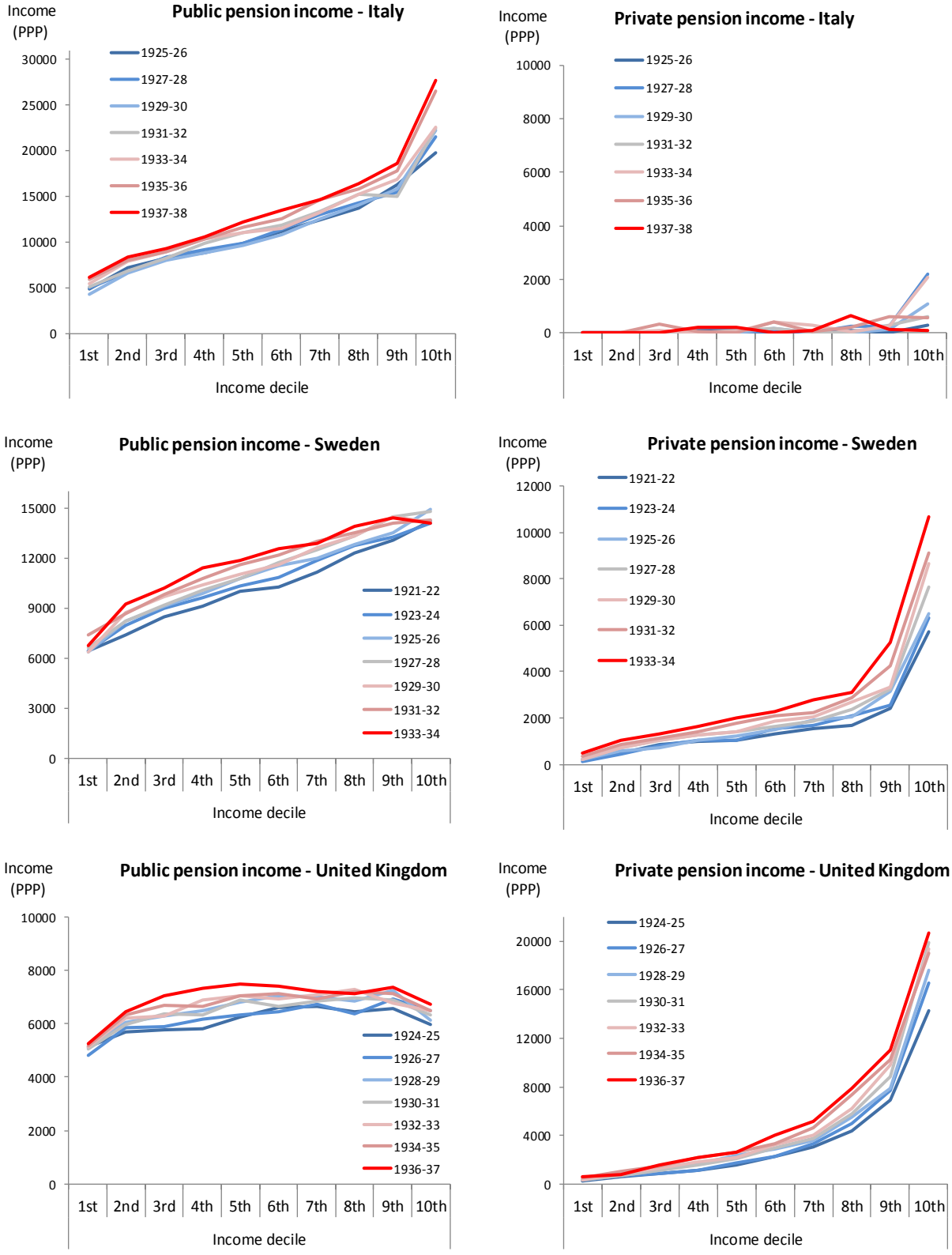
[15] I acknowledge that there exists institutional variation in the tax system, which is not covered in this setting. In this setting I assume that a household which had to pay rather high taxes in the first income decile had to pay this amount most likely less on the pension income, but rather on other income in the household. In the higher income deciles it is hard to tell whether the tax is applied on each pension income separately, or whether a private pension is taxed at all, or the tax is calculated by the total income. The study of taxation systems is not part of this analysis, but could be improved by country-specific netting down procedures; for further interest, Table 1 in the Appendix reports the average taxation over all cohorts by income deciles.

Figure 4: Development of public and private pension income by cohort and income decile



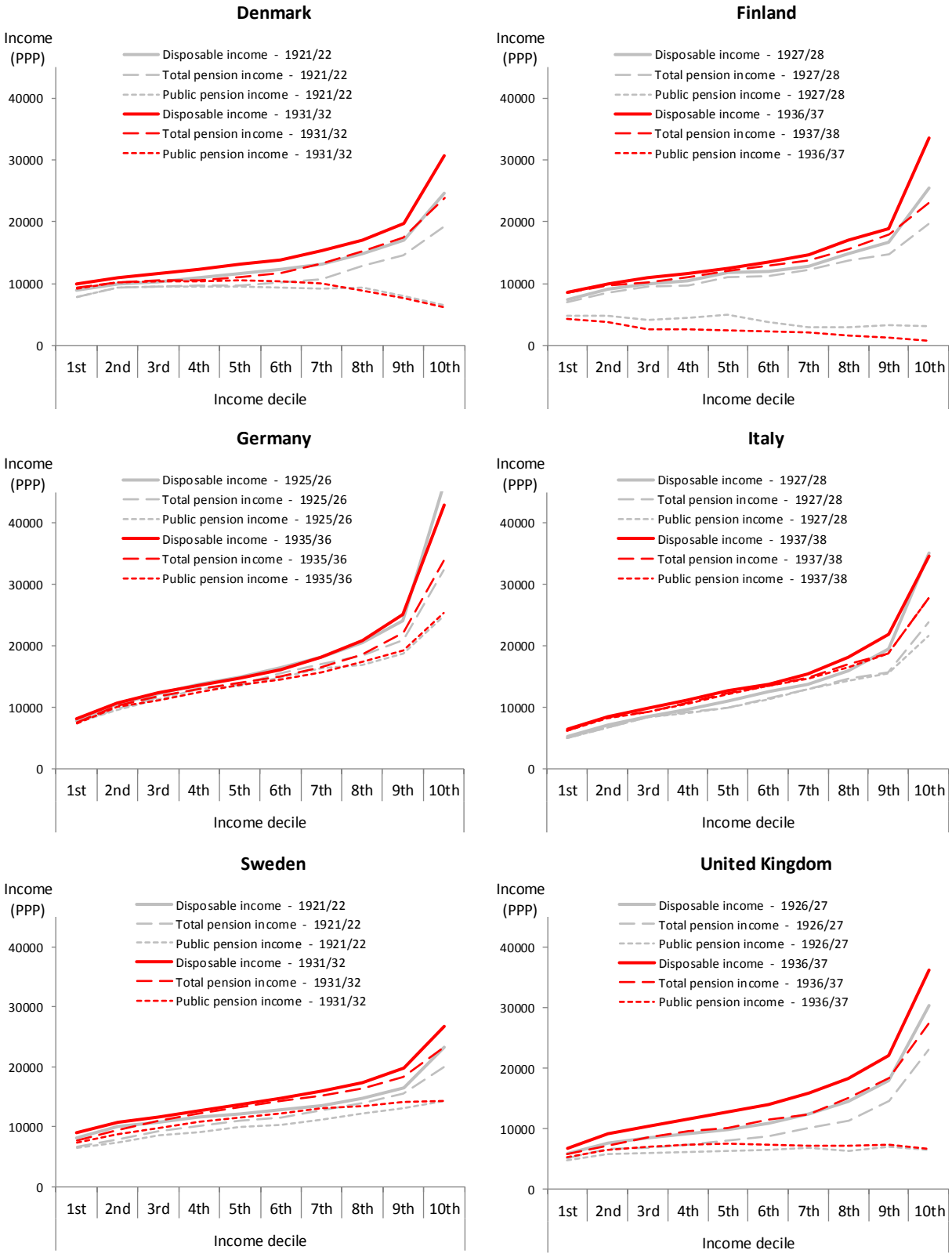
Source: own calculations based on Luxembourg Income Study (LIS) Database.

Figure 4 (continued): Development of public and private pension income by cohort and income decile



Source: own calculations based on Luxembourg Income Study (LIS) Database.

Figure 5: Development of income mix by income decile (10 year period)



Source: own calculations based on Luxembourg Income Study (LIS) Database.

Both Figures 4 and 5 implicitly also document the income share of the previous Figure 3. Thus for example the average income of the fifth income decile in Sweden of public pensions (ca. I$s 10.000) and private pensions (ca. I$s 1.050) add up on average to I$s 11.050 at constant 2000 prices, which means that on average in the fifth income decile approximately 10.5 per cent of the public-private pension income mix were received from private pension income.

Table 2 sums up the findings of the graphs, comparing the average incomes of the deciles. Two deciles were collapsed to one quintile, as the numbers were quite sensitive due to low case numbers in each decile by cohorts; thus the quintiles delivered more stable estimates and allowed better interpretation of the findings. Four percentage rates were calculated to show the increase/decrease in: public pension income, private pension income, total pension income, and total disposable income.In general, these findings support that the income of the elderly on average rather increased than decreased for each income source and income decile over time. There are two exceptions to this development. In Germany the income distribution hardly changed in terms of shape and income amounts. The only notable change is the slightly more important share of private pension income in the seventh and eighth income decile (Figure 4), which can be linked to broader coverage with supplementary pensions before retirement for the younger cohorts.

The other exception is again the Finnish public pension income, which drastically declined in importance as an income source. The declining relevance of public pension income was similarly relevant for all income groups (Figure 4); high-income pensioners, who were receiving already other pension income, were no longer provided access to the full basic pension income. Finnish public pensions are less relevant for the highest income quintile (-70 per cent; Table 2), suggesting that eligibility to basic pensions declines with income and across the cohorts.

However, the Finnish occupational and personal pension income re-balanced the pension income. Figure 4 shows that all income groups profited from the more extensive protection with the various occupational pensions. The latter development exceeded the decline of public benefits so that the overall effect is positive, and all income deciles of younger Finnish pensioners of cohort 1935-36 were better off than the ones from cohort 1925-26 (Figure 5).

In Denmark, Sweden, and the United Kingdom the younger birth cohort was also better off than the older birth cohort. In contrast to Germany and Finland, there was a combined effect of increasing importance of public pensions and private pensions. In all three countries there was a clear shift from public to private pension income. These developments affected the income distributions in a different way in each of the countries.

In Denmark, strong increases in terms of average amounts were concentrated among the high-income group. Private pension income increased by 77 per cent in the third quintile, and almost doubled in the fourth quintile (88 per cent; Table 2). This could be expected, since the younger birth cohorts were provided with 10 more years of mandatory supplementary occupational pensions preceding their retirement. At the same time, voluntary coverage with

Table 2: Average increase/decrease by income source (10 year period)**

	Income quintile	Disposable Income	Total Pension	Public Pension	Private Pension
Denmark					
	1st	10	14	14	- *
	2nd	13	10	9	200
	3rd	12	14	10	77
	4th	15	21	2	88
	5th	20	22	-4	44
Finland					
	1st	13	17	-15	69
	2nd	11	11	-40	53
	3rd	9	11	-47	50
	4th	15	13	-38	28
	5th	22	20	-70	41
Germany					
	1st	3	3	2	490
	2nd	0	0	-3	216
	3rd	-2	0	0	1
	4th	0	-1	-1	6
	5th	-2	5	2	23
Italy					
	1st	19	24	24	- *
	2nd	16	15	14	- *
	3rd	13	21	21	- *
	4th	13	15	14	- *
	5th	5	18	24	- *
Sweden					
	1st	8	18	16	58
	2nd	9	19	17	34
	3rd	14	22	17	63
	4th	18	19	13	57
	5th	18	18	4	68
United Kingdom					
	1st	18	12	10	56
	2nd	24	28	19	82
	3rd	29	28	16	64
	4th	27	28	10	58
	5th	21	22	5	34

* unreliable estimate, as recipient rate is below 5 per cent.

** due to data availability and operationalisation, the estimates do refer to slightly different birth cohorts: Denmark: 1921/22 and 1931/32, Finland: 1925/26 and 1935/36, Germany: 1925/26 and 1935/36, Italy 1925/26 and 1935/36, Sweden 1921/22 and 1931/32, United Kingdom 1924/25 and 1934/35.

Source: own calculations based on Luxembourg Income Study (LIS) Database.

occupational pensions favoured particularly high-income earners. Since the supplements to basic public pensions were significantly cut in case of other income, it is not surprising that public pensions in the highest quintile decreased in importance as a result of increasing occupational pensions. Occupational pensions successfully substituted a part of public pensions. However, the overall development showed a clear increase in inequality caused by the rising relevance of occupational pensions. In the fourth quintile, the public pension cuts were outbalanced by increases in occupational pension income. The distance of median-income pensioner and high-income group as well as the distance between low-income group and median-income pensioner became larger, indicating that the income distribution became more convex, and inequality figures for the Gini might have increased.

In the United Kingdom the average amounts of private pensions increased much more than the public amounts. In contrast to the income-tested pensions in the Nordic countries, the higher pension incomes from occupational schemes were not relevant for eligibility to public pensions. In this institutional setting the second to forth income quintile especially benefitted, where pension income rose by 28 per cent within the 10-year period (Table 2). Although private pensions became more relevant for the first quintile and this income group was now much better off in terms of absolute income, this group showed the lowest increase over the ten years, signalling that there was a high share at the bottom that did not benefit as much from the positive development from the increasing pensions. Again, as particularly the distance to the median pensioner gets larger, inequality might be increasing.

In line with the previous findings for Sweden, the evaluations seem to support that additional private plans for high-income earners became more relevant. Over the ten years period, private pension income increased by 68 per cent for the highest income quintile (Table 2); this is the strongest relative increase for private pensions in the highest income quintile in this cross-country comparison. On the other hand, Swedish public pension income remained nearly unchanged, which supports that the income ceiling limits the relevance of public pensions. Overall, total pensions mostly increased for the median pensioner; thus the distance between the high-income group and median pensioner slightly decreased. On the other hand, since the lower income quintiles did not benefit as much as the median pensioner, the distance between low-income pensioners and the median pensioner increased.

The shape of the Italian income distribution was almost exclusively shaped by the various public pension schemes. Public pension income amounts increased for the younger cohorts in all deciles. Private pension income did not reveal a clear pattern, if at all any pattern. Figure 4 suggests that the few persons that receive private pension income, these pensions are on average very high and may lift up recipients in the highest income quintile. This pattern is can be linked to lump sums from the compulsory severance pay scheme (Tfr) (Jessoula 2011).

In the following the income package of birth cohorts 1931/32 (1930/31 for the United Kingdom) will be compared, to assess the living standard of this cohort in a cross-national perspective. Tables 3.1 and 3.2 contain four columns for each country, which are calculated for each decile. In Table 3.1 the first column shows the gross equivalised pension income, price and ppp-adjusted for the year 2000; the second column is a ratio of gross equivalised pension income of the pensioner sample by median gross equivalised total household income of the whole population in the year 2000. The lower this ratio, the less generous the pension income compared to the median living standard of the society. Table 3.2 assesses the effect of taxation on pension income. For each statistic there is a ranking from 1 indicating the highest level to 6 indicating the lowest level in this country comparison.

The gross figures (Table 3.1) show that the combined pension income before taxes was lowest in Italy for the first income decile (I$ 5.846); hence the reported rank is sixth (lowest) in this country comparison. Slightly higher was the level of pensions in the first decile for the

Table 3.1: Pension income and pension income to median ratio - gross values

Income decile	Denmark		Finland		Germany		Italy***		Sweden		United Kingdom	
	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)
1st	11806 (1)	0.40 (1)	7615 (3)	0.35 (3)	7430 (4)	0.31 (5)	5846 (6)	0.32 (4)	8990 (2)	0.38 (2)	5979 (5)	0.29 (6)
2nd	13146 (1)	0.44 (3)	9260 (4)	0.43 (5)	10721 (3)	0.45 (2)	7891 (6)	0.43 (4)	12110 (2)	0.51 (1)	7250 (6)	0.35 (6)
3rd	13434 (2)	0.45 (5)	10417 (4)	0.48 (4)	12355 (3)	0.52 (3)	9623 (5)	0.53 (2)	14393 (1)	0.61 (1)	8115 (6)	0.40 (6)
4th	13605 (2)	0.46 (5)	11554 (4)	0.53 (4)	12836 (3)	0.54 (3)	11324 (5)	0.62 (2)	16166 (1)	0.68 (1)	8599 (6)	0.42 (6)
5th	14137 (3)	0.48 (5)	13074 (4)	0.60 (4)	14637 (2)	0.62 (3)	12840 (5)	0.70 (2)	17864 (1)	0.76 (1)	9860 (6)	0.48 (6)
6th	15332 (3)	0.52 (5)	14881 (4)	0.68 (3)	15996 (2)	0.68 (4)	14212 (5)	0.78 (2)	19214 (1)	0.81 (1)	10509 (6)	0.51 (6)
7th	17685 (2)	0.60 (5)	16497 (4)	0.76 (3)	17319 (3)	0.73 (4)	16095 (5)	0.88 (1)	20494 (1)	0.87 (2)	11704 (6)	0.57 (6)
8th	21154 (2)	0.71 (5)	18587 (4)	0.86 (3)	19505 (3)	0.82 (4)	18339 (5)	1.00 (1)	22179 (1)	0.94 (2)	14323 (6)	0.70 (6)
9th	24652 (2)	0.83 (6)	22115 (4)	1.02 (3)	22633 (3)	0.96 (4)	18911 (5)	1.03 (2)	25260 (1)	1.07 (1)	18126 (6)	0.89 (5)
10th	37142 (2)	1.25 (6)	34668 (3)	1.60 (3)	38948 (1)	1.65 (1)	29346 (6)	1.60 (2)	33987 (4)	1.44 (5)	31770 (5)	1.55 (4)
Median of gross equivalised total household income	*29619*		*21733*		*23668*		*18302*		*23616*		*20468*	

* pension income is calculated as the average gross pension income for the respective income decile of the pensioner sample; amounts are weighted, price and PPP adjusted, and equivalised by the square root of household members.

**this number is a ratio of gross pension income by decile of the pensionser sample divided each by median gross household income of the total population; amounts refer to the year 2000 and are equivalised by the square root of household members.

***since the Italian dataset for 2000 is net only, but simulated taxes and contributions were provided for the datasets 2004/2008/2010 incomes were grossed up for 2000 by using the average taxation by decile of the more recent years.

Source: own calculations based on Luxembourg Income Study Database.

Table 3.2: Pension income and pension income to median ratio - net values

Income decile	Denmark		Finland		Germany		Italy		Sweden		United Kingdom	
	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)	Pension income* (rank)	Pension income/ median** (rank)
1st	9308 (1)	0.46 (2)	7448 (3)	0.46 (3)	7004 (4)	0.39 (4)	5115 (6)	0.36 (5)	7720 (2)	0.46 (1)	5361 (5)	0.32 (6)
2nd	10258 (1)	0.51 (4)	8541 (4)	0.52 (3)	9992 (2)	0.56 (2)	6792 (5)	0.48 (5)	9490 (3)	0.56 (1)	6673 (6)	0.40 (6)
3rd	10513 (3)	0.52 (5)	9442 (4)	0.58 (4)	11445 (1)	0.64 (2)	8333 (5)	0.58 (3)	10943 (2)	0.65 (1)	7495 (6)	0.45 (6)
4th	10626 (3)	0.52 (5)	10081 (4)	0.62 (4)	11941 (2)	0.67 (3)	9872 (5)	0.69 (2)	12161 (1)	0.72 (1)	7874 (6)	0.47 (6)
5th	10999 (4)	0.54 (6)	10788 (5)	0.66 (4)	13538 (1)	0.76 (3)	11094 (3)	0.78 (2)	13312 (2)	0.79 (1)	9019 (6)	0.54 (5)
6th	11707 (5)	0.58 (6)	12122 (3)	0.74 (4)	14924 (1)	0.84 (3)	12045 (4)	0.84 (2)	14273 (2)	0.85 (1)	9586 (6)	0.58 (5)
7th	13196 (4)	0.65 (5)	12856 (5)	0.79 (4)	16114 (1)	0.90 (3)	13396 (3)	0.94 (1)	15231 (2)	0.90 (2)	10556 (6)	0.64 (6)
8th	15316 (3)	0.75 (6)	14172 (5)	0.87 (4)	18064 (1)	1.01 (2)	15231 (4)	1.07 (1)	16334 (2)	0.97 (3)	12717 (6)	0.77 (5)
9th	17539 (3)	0.86 (6)	16024 (4)	0.98 (4)	20933 (1)	1.17 (1)	15225 (6)	1.07 (3)	18299 (2)	1.09 (2)	15671 (5)	0.94 (5)
10th	23898 (3)	1.18 (6)	23387 (4)	1.44 (4)	33574 (1)	1.88 (1)	23047 (6)	1.61 (2)	23358 (5)	1.39 (5)	26161 (2)	1.58 (3)
Median of net equivalised disposable household income	*20309*		*16283*		*17831*		*14277*		*16841*		*16594*	

* pension income is calculated as the average net pension income for the respective income decile of the pensioner sample; amounts are weighted, price and PPP adjusted, and equivalised by the square root of household members.

**this number is a ratio of net pension income by decile of the pensionser sample divided each by median net disposable household income of the total population; amounts refer to the year 2000 and are equivalised by the square root of household members.

United Kingdom (I$ 5.979). German pensioners in the first income decile received a comparatively higher income (I$ 7.430), but the low level of the pension income to median ratio (0.31) signals that the living standard of the first decile was not secured well by pension income; gross pension income in the first income decile accounts only to 31 per cent of the median equivalised gross household income received in the German society. These numbers were similarly low in Italy (0.32) and lowest in the United Kingdom (0.29). This signifies that in these countries there was no effective minimum pension regulation introduced as compared to the Nordic countries. Compared to the low incomes and ratios in the United Kingdom, Germany, and Italy, the minimum and basic pension schemes of the Nordic countries provided higher income levels and ratios. Pension income in the first decile was most generous in Denmark, followed by Sweden, and Finland.

For the following deciles different scenarios apply. There was a steep increase of public pension income in Germany and Italy, reflecting the relevance of the previous earnings history. Germany's gross pension income to median ratio was second highest in the second decile. Germany switched the rank with Finland also in the second and following deciles. Notably high were also the increases in the second and third income decile in Sweden, which can be linked to the nature of the previous relevance of the ATP scheme for current pension income, which also replaced a certain portion of the previous earnings on top of the minimum pension. The Swedish pension transfers were most generous in terms of income and pension income to median ratio. In Finland the combination of income-tested minimum pensions and earnings-related occupational pensions limited the increase of pension income for the second and following deciles. In Denmark pension income was high for the lowest income quintile, but for the second quintile Denmark switched ranks with Sweden, and for the third quintile also German pensions exceeded on average Danish ones. This signifies once again that Danish public pensions barely provided additional transfers besides the rather high flat-rate amounts of the two minimum pension components. However, only the first decile profited from the generous level of the minimum pension; already in the second quintile Denmark ranked only third in the pension income to median ratio, and dropped down to fifth rank in the third decile.

Also in the upper half of the income distribution Swedish pensions remained up to the ninth decile the highest in ppp-adjusted and equivalised amounts. Compared to the median living standard, they switched rank only with Italy in the seventh and eighth income decile. Therefore, in both countries the living standard provided by pensions is rather high in international perspective. However, the Italian living standard lacked behind the Swedish one, ranking only fifth from the third up to the ninth decile in this comparison. Both countries show a restricted importance of pension in the highest income decile. In Italy this can be partly explained by the non-existent need of additional private pensions, since public pensions hardly contained income ceilings and thus high pensions were already provided by the public scheme. In Sweden, on the contrary, rather low ceilings restricted the public pensions and therefore additional private pensions were necessary to receive high

replacement rates from previous earnings. In addition to this, Swedish wage dispersion was comparatively low, which at the same time resulted in a comparatively low pension income to median ratio on the upper end of the income distribution.

On the contrary, since British wage dispersion was much higher; pension income was much higher in the highest income deciles in the United Kingdom. However, as shown in Chapter V, income levels and pension income to median ratios were surprisingly low at the upper end of the income distribution, given the high wage dispersion; this can be explained by the selective coverage with voluntary private pensions.

Similarly the Danish pension system generated only rather low pension income to median ratios due to the low importance of compulsory supplementary pensions from employer provided schemes; the lowest rank for the two highest deciles can be additionally explained by the low wage dispersion. However, Danish pension income was also comparatively high for the highest income decile, which could be expected by selective coverage with private pensions, which favoured high-income earners.

German and Finnish pension income for the seventh to ninth were rather similar in terms of gross pension income and pension income to median ratio. German pension income ranked third and its ratio fourth, whereas Finnish pensions ranked fourth and its ratio third. In the highest income decile German pension income was the highest in this comparison combined with the highest pension income to median ratio. Similarly to Denmark, this can be explained by the favourable coverage with additional pension schemes for high-income earners. On the contrary, Finnish pension income was provided almost entirely by the employer provided schemes with no income ceilings; hence hardly any additional coverage with other private schemes (Barr 2012).

The perspective of net pension incomes reveals a slightly different country ranking, due to the higher taxation in the Nordic countries. As a consequence, Swedish net pension income for the second decile, not only lacked behind Danish pensions, but also German pensions. However, Sweden ranked highest for the net pension income to median ratio for the whole lower half of the income distribution, which can be explained by the in general high level of taxation also for the working population.

But also within the Nordic countries the effect caused by taxation differed, the particular high taxation in Denmark dropped the pension income down to the fifth rank in the sixth decile, compared to the gross figures now exceeded by the Finnish and Italian net pension income; the net pension income to median ratio was lowest in Denmark, even lower than in the United Kingdom. The cross-country comparison in net terms signals even more the low protection of the middle-income group in Denmark.

Since German pension income was hardly taxed, Germany ranked better in net values compared to gross values. In the net comparison German net pension income was highest for the upper half of the pensioner sample, whereas in gross terms German gross pension income had been mostly exceeded by the Swedish one (except the highest decile) and the Danish one (except the sixth and highest decile). At the same, the low taxation of pension

income led too much higher net pension income to median ratios as compared to gross pension income to median ratios. Already the eighth income decile of German pensioners received on average pensions equal to the equivalised median net disposable household income; in gross values pensioners in the same decile received pensions which only related to 82 per cent of the equivalised gross median household income. Notably high was also the change in rank for net pension income in the United Kingdom for the highest income decile, which in net terms strongly exceeded the Nordic countries.

VI.6. Inequality and poverty development

This section will address the following questions: How did inequality of pension income develop? Is there a general development towards a lower risk of poverty for the younger birth cohorts? These questions will be addressed by evaluating two main indicators used in inequality and poverty research: Gini coefficients and poverty rates.

The Gini coefficient is a measurement of inequality of the income distribution. The more unequal income is distributed, the higher its value. Table 3 reports Gini coefficients for the specific birth cohorts of the adjusted sample and a Gini coefficient for the core working age group (25 to 59) to put the figures in perspective with the inequality among the working aged group. In all countries inequality of net disposable income was lower among the elderly than among the working aged group. However, differences were substantially large in Sweden and the United Kingdom, slightly less pronounced in Denmark and Finland, and rather low in Finland and Germany. Inequality was particularly low in Denmark and Sweden, followed by Finland and Germany in the middle, and United Kingdom and Italy with the highest level of inequality.

Regarding inequality development, Sweden showed a strong increase in terms of Gini development, which again might be mostly linked to additional take up of individual pensions for the younger cohorts. Also the numbers for Denmark seem to slightly increase, the more the income mix is generated by additional pension benefits from the mandated occupational schemes. In Italy, inequality decreased by seven per cent during the ten year period.

In this study, poverty rates are defined as percentage share of persons earning below a certain threshold of total population's median net equivalised disposable household income. Poverty rates are shown for three thresholds: 40, 50, and 60 per cent of the median; the 40 per cent criterion reflects extreme poverty, 50 per cent poverty, and 60 per cent at-risk-of-poverty. Figure 6 documents the respective poverty rates for each cohort among pensioner couples and among single women. Since all income amounts are expressed in 2000s values, the median of net equivalised disposable household income is calculated from the respective dataset in 2000 (except 1999 in the United Kingdom). In a second step the respective poverty lines were created by multiplying this median income by 0.4, 0.5, and 0.6, which were then used to estimate the percentage shares of each cohort of the pensioner population who were living in household with net equivalised disposable household income below these thresholds.

Table 3: Gini development (10 year period)

Gini coefficient for age group 25 to 59 in 2000*

Denmark	Finland	Germany	Italy	Sweden	United Kingdom
0.206	0.244	0.259	0.328	0.245	0.342

Gini coefficient for birth cohorts - average over 5 birth cohort years**

Birth cohort	Denmark	Finland	Germany	Italy	Sweden	United Kingdom
1923	0.176				0.159	
1924	0.176				0.160	
1925	0.177				0.164	
1926	0.181				0.172	0.270
1927	0.180	0.229	0.244	0.304	0.174	0.273
1928	0.180	0.227	0.259	0.297	0.177	0.278
1929	0.185	0.230	0.254	0.296	0.179	0.278
1930	0.186	0.219	0.256	0.291	0.180	0.278
1931	0.179	0.219	0.266	0.283	0.181	0.276
1932	0.178	0.220	0.265	0.285	0.189	0.277
1933		0.220	0.252	0.279		0.277
1934		0.222	0.250	0.279		0.277
1935		0.220	0.253	0.280		0.275
1936		0.216	0.243	0.281		

Increase/decrease of Gini coefficient (10 year period)

Denmark (1923-32)	Finland (1927-36)	Germany (1927-36)	Italy (1927-36)	Sweden (1923-32)	United Kingdom (1926-35)
+1.2%	-5.7%	-0.4%	-7.4%	+18.6%	+1.7%

* Gini coefficient was calculated on individual level based on equivalised net disposable household income.

** Gini coefficient was calculated on individual level based on equivalised net disposable household income; figures refer to the adjusted pensioner sample in each country; for each birth-cohort a five year average over five birth cohort years was calculated; thus e.g. birth cohort 1923 refers to the birth-cohorts 1921-1925.

Source: own calculations based on Luxembourg Income Study (LIS) Database.

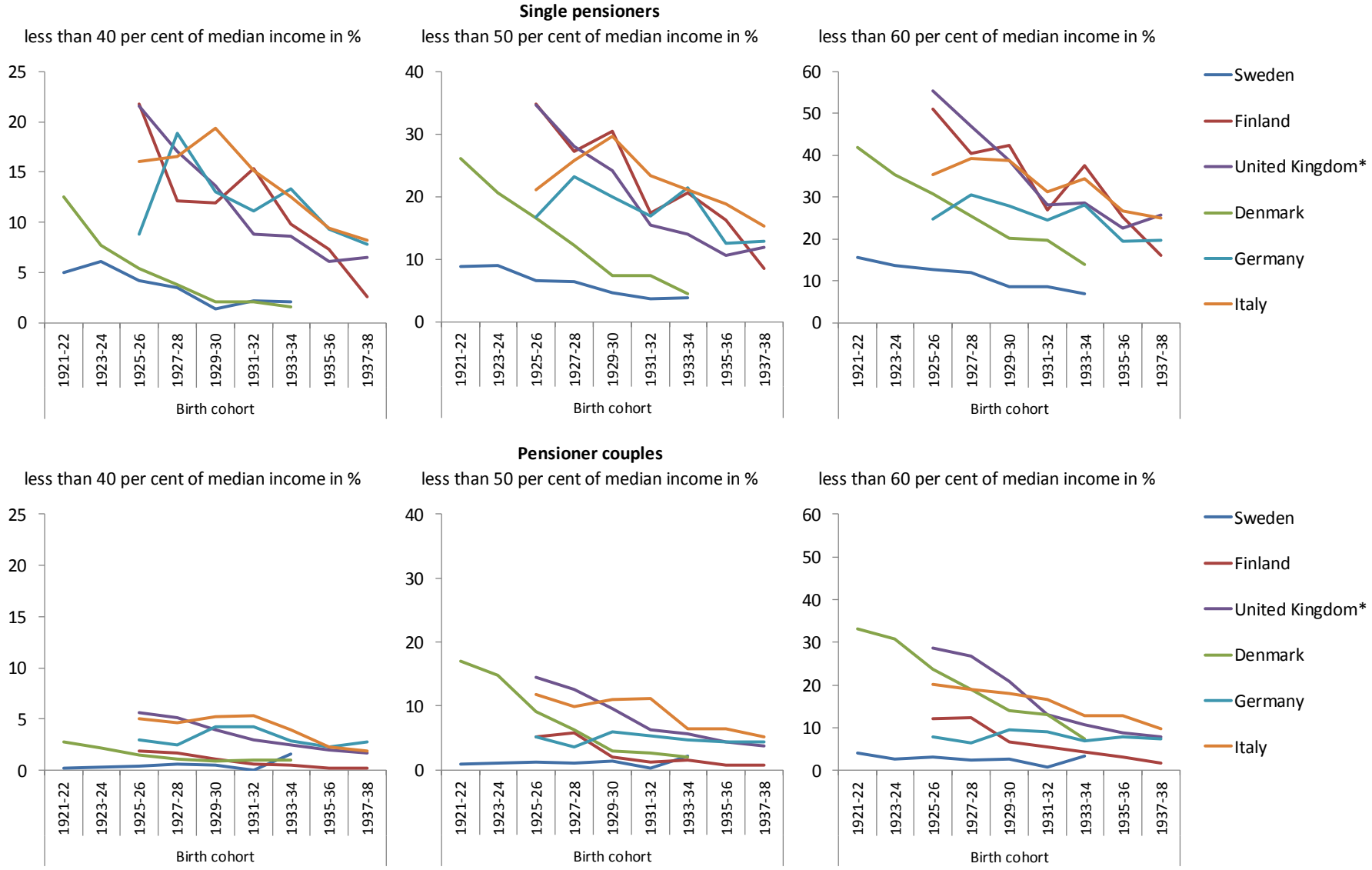
A common finding for all countries in this study is the general decrease of poverty rates (Table 6). Thus the living standard of pensioners has increased more than the living standard of each nation state's median living standard. This could be expected, since the younger birth cohorts observed in this study were mostly in a situation with growing pension entitlements for later birth cohorts due to higher contributions during their careers.

For couple pensioners for the birth cohorts 1925-26, the United Kingdom had the highest poverty rate (14.5 per cent) for the less than 50 per cent of median threshold. This could be expected given the low pension income as compared to the median living standard in the total British society. Second highest was the poverty rate in Italy (11.8), followed by Denmark (9.2), Finland (5.2), Germany (5.2), and Sweden (1.2).

In the following younger birth cohorts, poverty rates for couple pensioners can be grouped in two clusters, one being the Nordic countries with almost no poverty for couples, and the other cluster being Italy, the United Kingdom and Germany, where poverty rates remained at a level between five to seven per cent. The pattern was very similar for the 40 per cent threshold.

The comparison of the 60 per cent at-risk-of-poverty threshold revealed two specific country cases. Denmark's poverty rate switched rank with Germany, signalling the rather low protection with minimum pensions compared to the living standard in Denmark. In

Figure 6: Poverty rates by single pensioners and pensioner couples by cohort



* for UK the figures refer to birth-cohorts minus 1 year, e.g. 1924-1925 for 1925-26.

Source: own calculations based on Luxembourg Income Study Database.

Germany the oldest cohorts were better protected against risk-of-poverty than in Denmark and Finland, exemplifying the high relevance of rather generous wage replacement from the pay-as-you-go benefits. However, among this comparison Germany was the only country where poverty rates stagnated at the same level for the younger birth cohorts. Thus for the youngest birth cohorts German couples were at a higher risk of poverty than in Finland and similar risk than in Denmark. The decreasing poverty rate in Finland supports that the partial substitution of public pensions by occupational pension had no negative effect on the outcomes of the low-income pensioners.

In general pensioner couples were better off than single women. For all three thresholds the poverty rates substantially decreased for the younger birth cohorts. For the birth cohorts 1933-34 Sweden and Denmark were at a comparatively low level below 10 per cent, whereas in all other countries poverty rates were between 15 and 25 per cent. Notably high were also the poverty rates for Finnish single women (above 20 per cent), which can be explained by the non-existent protection of survivors above the age of 65. Similarly to the couple's statistics for the at-risk-of-poverty rate, the Danish curve moves slightly stronger upwards compared to the other countries. Also German women in pensionable age remained the most stable at-risk group in this comparison. Whereas for the oldest cohorts every second Finnish and British woman was at risk of poverty and only every fourth in Germany, for the youngest cohorts the rates dropped to 25.7 per cent in the United Kingdom and 16.1 per cent in Finland, and thus the German rate (19.6 per cent) exceeded the Finnish one for the youngest cohort.

VI.7. Conclusion

This comparative cross-national study focused on a comparison of six countries with broad institutional variation of pension systems. The main aim of this chapter was to study the impact of these institutional differences on current pension outcomes and developments across cohorts. Summing up the findings reflected quite different income mixes and inequality developments.

Three countries (Denmark, Germany, and the United Kingdom) showed a rather high inequality at the upper end of the income distribution, which was mostly driven by the selective coverage with supplementary occupational or personal individual pensions. Across the whole income distribution in the United Kingdom pensioners were secured with a rather low pension income compared to the median equivalised disposable household income; consequently, this drastically reduced the inequality among the elderly in comparison to the total population. The Danish pension system provided mainly minimum pensions, and hardly mandated income maintenance policies, whereas the German public earnings-related scheme contained contribution ceilings. Both schemes made additional protection for the better off employees necessary in order to replace previous earnings on a reasonable income level. The Danish reformation of the pension system towards mandatory occupational pensions during the 90s did not lead towards increased inequality yet, but substantially lifted up the income distribution for the third and fourth income quintile.

Also the Swedish system changed quite strongly its nature. The oldest birth cohorts were mostly protected by rather equalizing pensions due the low contribution ceiling. In contrast to this the younger cohorts aimed more at replacing their living standard by additional personal pension plans. This development resulted in a strongly inequality increasing effect. In Finland and Italy the income distribution did show a more balanced increasing pension income level for all income groups, representing a more similar replacement rate for occupational groups.

The main limitation of this comparison is the restricted period of time for the cohort design. Thus the developments of inequality were strongly characterised by the specific regulation that affected the protection in a very specific way. Also the oldest cohorts entered their working age in times of the Second World War. Future research with a more extended cohort design and more recent cohorts might put the findings better in perspective. This study also cannot capture the effect of early-retirement regulation and nature of derived benefits which particularly shape the inequality of women's pension income.

Appendix (Chapter VI)

Income Decile	Denmark	Finland	Germany	Sweden	United Kingdom
1st	16.9%	3.5%	6.5%	11.1%	10.5%
2nd	21.5%	7.4%	7.2%	19.3%	8.2%
3rd	22.1%	10.6%	7.1%	22.1%	7.8%
4th	22.1%	13.4%	7.4%	23.2%	8.0%
5th	22.4%	15.3%	7.3%	24.5%	8.6%
6th	23.5%	18.5%	7.3%	25.5%	8.9%
7th	25.9%	20.1%	7.3%	26.2%	9.6%
8th	28.3%	22.0%	7.2%	26.7%	11.5%
9th	30.0%	24.5%	7.7%	27.8%	13.5%
10th	36.9%	31.4%	13.4%	31.6%	18.0%

Table 1: Estimated average tax rate* by income decile

* the estimated average tax rate is calculated for each decile as a percentage of household gross income by household disposable income for the respective income decile.

Source: own calculations based on Luxembourg Income Study (LIS) Database.

VII. Conclusion and outlook

Nowadays, societies face various challenges to enable stable financial resources during working life and old age. First of all, labour markets are changing; women are more and more included in employment. Single parent families have become more frequent, and thus reconciliation of work and family life should become more relevant on the political agenda. But also qualification needs change in post-industrialist societies; labour markets have become more flexible.

As a result, many working careers show interruptions due to care periods and unemployment during times of economic crises. Social security systems in general and pension systems in particular need to be capable to address these on-going societal transformations. Many women remained a major social risk group, as they require both reconciliation of work and family life, and adequate pension benefits in old age. In pension systems that increasingly balance their public pension schemes with complementary occupational and personal pension schemes, it becomes particularly important that such non-public pension schemes also provide adequate redistributive elements.

Reflections on the comprehensive framework for studying pension systems and outcomes

This monograph started with a comprehensive perspective that explains variation in old-age income security and its different outcomes within and between countries: *pension system characteristics*, *labour market attachment*, and *living arrangements*.

With respect to *pension system characteristics,* this comprehensive framework incorporated the concept of pension pillars that elaborated a distinction in the involved actors in regulation of pension systems: the state, employers, and financial institutes. The concept of income tiers clarified the functions (goals) of pension income: *poverty prevention* and *income maintenance*. In the following, these two policy goals were formalised with two indicators: *pension adequacy* and *income replacement*. *Pension adequacy* refers to the idea that income of the elderly should meet a certain income standard. *Income replacement* can be measured by a *replacement ratio* that results in a percentage of the average life-time earnings.

Additionally, the typology of Bismarckian vs. Beveridgean pension systems was introduced. Along the Bismarckian path developed public social insurance systems that primarily aimed at maintaining living standards. In most advanced Bismarckian systems, the development of important complementary private second-tier pension schemes was *crowded out*, as the mandatory social insurance system already provided the first and second tier of income. Beveridgean systems guaranteed an absolute minimum level of public benefits to provide *poverty prevention*; such first-tier benefits could be either universally paid to the elderly based on age and residency, or targeted to the income poor elderly. Due to this restricted public approach, in advanced Beveridge type systems various alternative public, occupational and personal schemes were *crowded in*, thus various multi-pillar systems emerged. This monograph focused on analysing the variation of second-tier pension schemes and their impact on pension outcomes.

Second-tier schemes showed a broad worldwide cross-national variation depending on the state of development. Particularly in Latin American countries, large informal sectors had consistently diminished the development of public mandatory earnings-related systems. Therefore, this group of countries and later on various Eastern European countries fundamentally departed from the Western European approach, and introduced frequently mandatory individual savings plans; these reforms have been also promoted by the World Bank's (1994) study *Averting the Old Age Crisis.* In contrast to this, most Western European countries upheld in their second-tier schemes a strong link between employment and contributions to public (first pillar) or occupational (second pillar) pensions. The United Kingdom and the United States continued providing a combination of limited public mandatory earnings-related schemes and almost equally important voluntary occupational and personal pension plans.

Next to the analysis of variation in pension system arrangements, the argument on *labour market attachment* stressed the importance of continuous contributions to pension systems to facilitate individuals' independency during the retirement phase. *New social risks* theory argues that new risk groups (persons with instable labour market attachment and low wages) require adjusted social security protection. In the past, various advanced public earnings-related systems specifically required long contribution periods for men and women that may have particularly excluded women from pension claims due to their shorter contribution period as compared to men. On the other hand, the development of non-contributory systems might offer a viable alternative safety net for women; however, in some cases this development can be considered a necessity to secure adequacy of benefits due to insufficient pension system protection through contributory schemes throughout the working phase. Individual pension claims remained below a self-sufficient level.

The comparative view on *living arrangements* of the elderly around the world (Chapter III.1) proved that the elderly in developing countries, particularly Latin America, still heavily relied on family support instead of pensions, thus they were not living on their own. This contrasted Latin America from the Eastern European country group, where pension income was similarly important as in other advanced countries. Particularly in Western Europe, but also in Eastern Europe, independent single and two person households were more frequently observed as compared to the rest of the world. The Western European country group stuck out in comparative perspective with the highest share of independently living elderly persons, low employment rates, and comparatively high importance of pension income in the income mix.

Reflections on the variation of second-tier schemes – country-specific conclusions

After having clarified the presence of essential cultural and socio-demographic differences between developed and developing countries, but also between the advanced countries, this monograph was restricted to analyses of Western European countries that showed rather similar outcomes in terms of living arrangements of elderly persons and the maturity of pension systems: Denmark, Finland, Germany, Italy, Sweden, and the United Kingdom.

The main theoretical argument in this monograph is that different pension systems are expected to cause differences in pension outcomes and inequalities among the elderly. It is argued that specific inequality patterns can be explained by the interplay of public and private pension income along the income distribution. The comparative studies (Chapters IV, V, and VI) aimed at clarifying the role of complementary second-tier schemes for the pension income mix and income inequalities among the elderly. The reasoning is that institutional arrangements for second-tier schemes do not necessarily bear comprehensive coverage; on the contrary, coverage with such schemes can be very selective, depending on the bargaining power of corporatist actors in occupational welfare policies, and might drive inequality of pension outcomes.

Similarly, individual protection during the life-course varies in balanced public private pension systems as compared to purely public pension systems, which may result in a different pension outcome also on the aggregate level, the income distribution among the elderly. Labour force participation rates and concentration of low paid jobs vary across gender and states, which similarly affect the inequality of pension entitlements and final payments. Although these differences are particularly important for the explanation of cross-national differences in the income inequality of the elderly, labour market outcomes have been discussed merely theoretically, as the main focus of explaining inequalities has been placed on the pension system characteristics itself. A follow up study might better link observed differences in labour market outcomes to the income distribution among the elderly.

Methodologically, country-specific patterns of *income replacement* and *pension adequacy* were analysed by a cross-national comparative study that put country-specific outcomes in perspective to other countries. The comparative chapters aimed at a standardised procedure of classifying pension systems and measurement of pension outcomes.

More specifically, Chapter IV analysed in how far countries from the Beveridge tradition reveal different second-tier schemes and pension outcomes. The second study (Chapter V) aimed at contrasting the Bismarckian and Beveridgean pension systems and its consequences for pension outcomes. In contrast to the repeated cross-sectional designs of Chapters IV and V, the third study (Chapter VI) applied a longitudinal data design; its main focus was the analysis of current shifts in the income mix and the income distribution by birth cohorts. In the following, the main findings for each country are summarised.

The Finnish system offers a combination of minimum pensions and mandatory earnings-related pensions. It is considered a Beveridge type system, as public policy first concentrated on residence based universal pensions. Mandatory second-tier contributory schemes were already introduced in the 1960s, as an outcome of tripartite negotiations between the state, employers and trade unions. As a result, recipient rates and importance of these second-tier pensions also for the poorest elderly group was remarkably high. Consequently, the public basic pension scheme was abolished in 1996, so that most pensioners indeed only receive earnings-related benefits from the various second-tier schemes. The non-existence of income ceilings for contributions, and the fact that the administration of various schemes has been

shifted to financial institutes, clearly restricted the development of additional third pillar pensions. Throughout the income distribution of the elderly one can observe that labour market inequalities were broadly reproduced in old age. In addition the targeted minimum pension secured particularly persons in need in the lowest income deciles. However, single pensioners showed considerably higher poverty rates as compared to two person households. Particularly for the younger birth cohorts extreme poverty could be further reduced. Possible positive effects of the newly introduced guaranteed minimum pension in 2011 could not yet be observed with the data used.

The Italian system has been foremost studied due to its expected similarity in outcomes of second-tier schemes with the Finnish pension outcomes. Similarly as in Finland, the third pillar is currently underdeveloped due to the high income ceiling for contributions to the public pension system. In contrast to Finland, Italy is considered as a Bismarckian system due to its historical development. Although the system later on incorporated a targeted minimum pension to the elderly poor, the ppp-adjusted equivalised income for the lowest income group was the lowest in this six country comparison, which resulted in the highest poverty rates in this country group. Pension outcomes for the middle and high-income group supported again a close reproduction of labour market inequalities. Although the Gini coefficients revealed a reduction for the younger cohorts, inequality remained the highest for the six elderly samples.

The German system is the origin country of Bismarckian social insurance; however, at a second look, it reveals an explicit modification. Only the low-to-middle income earners were included in the extension of the public social insurance system; the income ceiling limited contributions for the high-income group. Alternatively, various collective agreements and firm specific plans, and since the early 2000s tax favoured personal savings plans (in particular *Riester* pensions) developed. Instead of an integrated minimum pension as part of the first pillar Germany offers an independent scheme (*Grundsicherung im Alter*) which is part of the social assistance system, the benefit needs to be specifically claimed. Pension payments from the various mandatory and voluntary complementary second-tier schemes contributed considerably to the income mix. Private pensions were increasingly important along the income distribution, whereas in the lowest income quintile almost no one received private pensions, in the highest quintile every second elderly showed a mixed income from public and private pensions. Although, the various complementary public and private second-tier schemes only supplemented the income, the analyses revealed that these schemes increased inequalities at the upper end of the income distribution as compared to the Italian and Finnish system; those who received complementary pensions were financially best off in this comparison. Unfortunately, for the observed birth cohorts the combined effect of reduced generosity of public pensions and strengthened personal pensions could not yet been observed.

The Swedish system is classified as a hybrid system; the state already early on introduced a balanced approach between Beveridge type minimum pensions and Bismarckian social insurance. In the mid-1990s the government initiated a transformation of the old public system to a notional defined contribution system, which resolved the problem of low public

pension benefits for middle-to-high income earners. Two main complementary second-tier schemes were built up on top. First, as a result of various collective agreements in the 1960/1970s, most individuals accumulated contributions through mandatory occupational schemes. Second, since the mid-1990s, individuals were required to also make contributions to personal investment accounts (*premium pensions*). It was observed that the younger cohorts increasingly replaced their income by additional private pension plans. This development resulted in a strong inequality increasing effect driven by the strongly increasing incomes in the fourth and fifth income quintile. At the bottom of the income distribution the Swedish pensioners were comparatively well protected through a guaranteed minimum pension. Since work income and occupational income are excluded from the income-test, the system creates a very flexible situation for continued work after statutory retirement age.

The Danish public system provides a combination of two Beveridge type minimum schemes. One element of this scheme aims at *poverty prevention* through a residency based universal minimum pension. Another supplement to this scheme is income-tested, and respectively reduced if other income above a certain threshold is received. Although, mandatory public second-tier schemes (with exception of the negligible working hour's related scheme ATP) were practically absent, until the early 1990s, saving in occupational pensions remained a voluntary decision. Since then, through collective agreements the various voluntary schemes were gradually transformed to mandatory schemes, so that the complementary second-tier schemes by the employers can be considered as quasi mandatory since the mid-1990s. It could be shown, that the Danish design of minimum pensions guaranteed the highest pensions for the lowest income group. However, the middle-income group showed rather low income levels. This can be explained by the former voluntary second-tier schemes. Pensions for the middle-income group were the lowest in this six country comparison with respect to society's median living standard. The high-income group, however, revealed a strong importance of private pensions also for the oldest birth cohorts. Similarly as in Sweden, particularly the incomes of the fourth and fifth income quintile increased due the strongly increasing importance of second-tier schemes. In contrast to Sweden, this trend had no inequality increasing effect among the elderly cohorts.

The United Kingdom shows the most advanced public-private provision mix in this European country group. The state approach provides a targeted pension based on years in employment, and a mixture of public, occupational, and personal second-tier schemes. When an individual already contributes to an occupational pension scheme or an *approved personal plan*, then a *contracting out* of the public second tier is possible. As benefits from both first and second-tier public schemes were expected to be low, various alternative private schemes developed that all had one feature in common, voluntary inclusion. Although the Danish and British system had voluntary private second-tier schemes in common, in the United Kingdom a much stronger coverage with occupational and personal pensions throughout the income distribution was observed. These main differences can be explained by the fact that British workers were at least obliged to contribute to one public or private scheme. Since the minimum pension also provided much lower benefits as compared to Denmark, individuals

could be expected to consider more seriously an additional need for second-tier benefits as compared to Denmark. However, the analyses showed that the mixture of public and private schemes resulted in comparatively low pensions for the low, middle, and to some extent also the high-income group. Vertical and horizontal redistribution worked insufficiently; the low-income group had a high risk of poverty and the middle and high-income groups received rather low pension income due to the mixture of low public pensions and selective coverage with private schemes. The British government seeks to increase private pension savings behaviour by automatic enrolment to occupational pensions. Although the highest income group was financially well off in cross-national perspective, given the high wage dispersion in the United Kingdom, this group was still surprisingly low secured; net pension income lagged far behind the German ppp-adjusted values and was not much higher as compared to the equal Nordic societies. Due to this low protection of the middle and high-income groups, the Gini coefficient substantially decreased among the elderly as compared to the total British society, but remained second highest behind the Italian one.

What have we learned? - Implications for pension system design and social inequality

The measurement of inequalities of pension outcomes and tracing it back to differences in the pension system design is a difficult endeavour, due to various reasons. First, contribution-based pension systems need to develop over a long time to show their outcome. Nevertheless, for the observed cohorts it could be shown that pensions were slightly increasing, but also that the combination of pension income mixes along the income distribution was changing very slowly over the cohorts. Second, the measurement is also complex due to the interactions between public pensions and the variation in their non-public pension counterparts. And third, individual contribution payments follow increasingly less standard un-interrupted employment careers; thus not only the regulations as such, but also the actual labour market attachment increasingly influence on the final pension outcome across the elderly population. Similarly, occupational schemes might focus primarily on protection of labour market *insiders*, but exclude *outsiders*. Last, pension systems are primarily designed to pay individual benefits, whereas poverty and inequality measures are typically measured at the household level, considering shared resources among the household members.

Summing up, the analyses support that in all countries under study, where private second tier-schemes were present, these schemes strongly affected income inequality of pension income, as these schemes disproportionately tended to lift up persons in such households in the highest income deciles. Among the highest income deciles the income share of private pensions was by far the highest in all countries. However, one should be careful to conclude that private pensions increase inequality. As soon as private pensions are considered as a partial substitute to otherwise public contributions, inequalities from multi-pillar and public dominant systems create quite similar inequalities, which will be elaborated in detail in the following.

Pension systems among other goals (e.g. long-term sustainability) should provide *poverty prevention* and *income maintenance*. Both goals are intertwined, particularly for the low-income group *income maintenance* not necessarily secures *poverty prevention*, whereas when for the middle-and-high income group *income maintenance* is secured, implicitly *poverty prevention* is reached.

Thus, following up on these considerations, in an idealised scenario, where future retirees during his/her working career are sufficiently covered with a reasonable contribution period resulting from rather stable labour market attachment and where average earnings were above the poverty threshold, these retirees could expect pension income from contributory pension schemes that secures both *poverty prevention* and *income maintenance*. Mandatory contributions to public or private second-tier schemes can enforce this kind of independency in old age. Although this scenario seems very simple, it is a heavily debatable one due to various reasons. In the next paragraphs, I will first specify this scenario with respect to *poverty prevention*, and then focus on *income maintenance*.

First of all, those who cannot acquire sufficient contributions during their working career need specific security to be effectively protected against poverty. This protection might be provided either through minimum pension or social assistance schemes. It is argued that the elderly are a specific group at risk for whom automatically a minimum pension should be foreseen, if pension income is not sufficient. There exist three alternative designs for this minimum pension. First, a separate scheme that provides benefits based on residency. Second, a separate scheme that pays targeted benefits as soon as other personal/household pension or total income is below a certain threshold. Third, an embedded minimum pension amount in the mandatory contributory second-tier scheme. All three solutions suggest that public solutions may be better suited than private ones, as payments can be (cross-) financed through the general budget. The Nordic country's basic and guaranteed minimum pension schemes seem to work best, as these schemes do not only prevent mostly extreme poverty (measured relatively as 40 per cent of median income), but also provide the highest ppp-adjusted net and gross incomes for the income poorest decile.

There are two major reasons that reflect the need for minimum pensions, in general; first, the existence of periods of inactivity during working age, and second, work histories, where average earnings are so low that contribution-based pensions during retirement cannot effectively prevent poverty. Especially the combination of both create a particular group at risk that is put in spotlight by *new social risks* theory, the increasing challenge to stay in well paid and stable jobs for the low educated.

Reasons for inactivity can be rising of children and taking care of other family members, unemployment, and long-term sickness, invalidity, or disability. But inactivity can be also a deliberate decision by couple households to restrict one partner's role to function as a homemaker. In many public contributory systems, periods of inactivity are already accounted for. Again, these features seem more easily to be realised by a public system that allows a cross-financing from general taxation. It is challenging to rationalise additional payments to account for periods of inactivity without contribution payments in a fully-

funded pension scheme financed by personal contributions and administered by employers or financial institutes. However, the introduction of social security funds which could cross-finance pension funds might be a solution to complement also privatised pension schemes with a personal account structure.

The scenario of low contributions due to low average life-time earnings is slightly different. For decades it has been feared that due to wage competition the increase in social security contributions should be restricted; along these lines, labour market regulations (for example in Germany *mini* jobs) that allowed exemptions or reduced social insurance contributions, were introduced. However, if persons continue working a long period in low-wage jobs they no longer accumulate considerable own pension entitlements. Thus minimum pensions seem an inevitable need to prevent poverty in old age. An alternative approach can be seen in a direct subsidy to low contributions that at least may allow those who keep a close attachment to the labour market (with a reasonable period of own or partly subsidised contribution payments) to receive personal pension incomes above the minimum pension. Again, in principle this kind of subsidised contributions through the state/employers could be made to any public, occupational, or personal savings plan. Whereas subsidised contributions can favour a personalised pension income and independency in old age, it cannot provide *poverty prevention* per se, as persons with a low contribution period still are at risk and need additional support by a minimum pension scheme or social assistance scheme.

The non-existence of a minimum pension is for example heavily discussed in Germany, and the evolving new scenario from public pensions and marginal employment (*mini* jobs) might create an increasing group at risk in the future (Hauser 2008; Hinrichs 2008); indeed, already now the elderly low-income group in Germany revealed a comparatively strong poverty gap and insufficient *pension adequacy*.

Having clarified the need of public minimum pensions to reach *poverty prevention*, I will now focus on the interplay of public and private pensions in fulfilling the goal *income maintenance*. As shown throughout the theoretical and empirical sections in this monograph, various pathways in second-tier pension provision can be observed, among which are for example a purely public social insurance system without income ceiling, a mainly public system with income ceiling and complementary private schemes, a mixed system with reduced public contributions and major complementary private schemes, a hybrid system designed by public and private actors, or a privatised system that is regulated by the state.

In systems, where mandatory public second-tier contributions were comparatively low and where no private mandatory counterparts have been introduced (in this study represented by Denmark and the United Kingdom), pension income of the elderly middle and high-income groups as compared to society's median income were the lowest. Voluntary second-tier schemes seem not to have been attractive enough to reliably supplement the future low public pension claims with voluntary privatised pension plans. Thus a comprehensive mandatory second-tier scheme with reasonably high contributions seems the superior option to reliably secure *income maintenance*, also in the sense of *pension adequacy*, so that the elderly can maintain their living standard at a suitable level. This solution of comprehensive

mandatory second-tier schemes may also favour the opportunity of low-wage workers to accumulate own pension entitlements that only need to be topped up by a minimum pension, if the pension claims remained below a certain threshold.

The importance of private second/third-tier schemes can be also determined by the existence of an income ceiling for contributions in the main public system (in this study represented by Germany and Sweden). Depending on the income ceiling, the middle and high-income group or only the high-income group may need complementary schemes to reach *income maintenance*. When contrasting the mixed pension outcomes from the pension systems with second-tier schemes with income ceilings against those pension systems without ceilings (in this study represented by Finland and Italy), one can conclude that the high-income groups in systems with income ceilings seem comparatively well covered. One could argue that this group is more likely to be financial literate as compared to the low-to-middle income group; however the major reasons might be better opportunities and financial resources to make additional contributions to occupational and personal pension plans. From an inequality perspective this might even create an inequality increasing effect when an 'overprotection' with additional mandatory or voluntary pension plans occurs. In contrast to this, pension systems with no income ceilings hardly left scope for a *crowding in* of supplementary second/third-tier schemes; thus elderly's income distribution strongly reproduced inequalities of the labour income distribution (Finland and Italy).

In conclusion, it is not so much the question *Who provides second-tier pension schemes*?, but more the question *How are second-tier pension schemes designed*? that will create stable financial resources and *income maintenance* for the broad majority of the elderly. For most advanced countries issues of portability and securing payments in the case of insolvency for occupational pensions have been already addressed (Ebbinghaus and Wiß 2011); thus, individuals in advanced societies may experience disadvantages with occupational pensions as compared to public pensions only when there are no credits for interruptions of working careers foreseen, as frequently introduced in public second-tier schemes. The introduction of more flexible pension accounts would allow continued contribution payments to occupational accounts even during working career interruptions; additionally the state's role would be to subsidise these reduced contributions in order to incentivise uninterrupted contribution periods (for example *Riester* pension in Germany). This proposed reform scenario favours again a development towards more individualised pension entitlements, however, embedded in the regulations in state and occupational welfare policies.

Outlook

In the following, additional remarks on shortcomings and limitations of this study, as well as alternative measurement techniques and perspectives on policy advice will be presented. These considerations focus on a better reflection of individual risk profiles, for example the implication of shorter contribution periods through interrupted working careers.

The on-going trend towards multi-pillar pension systems not only refers to a stronger institutionalised role of private savings, but entails also a more personalised risk structure.

Thus, if individuals aim for independency in old age, in the sense of pension annuities above the minimum pension level, then they need to select the respective savings instruments partly on their own, particularly when second-tier schemes in multi-pillar pension systems neither foresee comprehensive coverage nor credits for interrupted working careers. Therefore, Hinrichs and Jessoula (2012) emphasize that this more personalised risk structure entails a need for studies that particularly focus on individual pension entitlements to better understand risk profiles and risk prevention. This concern is shared by the author; an individualised perspective is considered a valuable extension to the studies in this monograph, as inequality of pension income and insufficient protection can be additionally explained by specific careers of under-protection respectively accumulated years of low contributions/protection.

In general, individual risk and entitlement can be studied at various points in time. First, during retirement, such analyses simply evaluate pension outcomes of previous entitlements as it has been also studied in this monograph. Second, at a specific stage during the working career; such analyses might mirror under-protection of social risk groups even before reaching retirement age. The latter analyses seem promising, as for example analyses of birth cohorts over time could immediately reveal if specific reforms influenced savings behaviour and respectively increased individual pension entitlements effectively in order to prospectively maintain living standards above the secured minimum level.

As promising as these studies of pension entitlements and pension assets during the working career seem, they include a series of limitations. First, they require detailed information about individual working careers and/or current pension entitlements/assets, but second, even if this information exists, it is not clear how future labour market attachment, savings behaviour and individual entitlement will turn out. Thus, until retirement many determinants will still affect the final individual pension income mix. Among these determinants are the stability of jobs, changing family patterns and care obligations, which again impact on the labour market attachment and stability of contributions to pension systems. Personal skills development might also positively affect wages and contributions in later stages of the working career; *defined-benefit* occupational schemes may particularly consider the final salary or salaries over the last years before retirement, rather than the lifetime earnings for the final pension. As a result, pension assets might look comparatively low in the middle of their career.

With regard to pension asset measurement, this endeavour is rather complex and future pension promises might look rather different as the one of today. Besides the already above mentioned differences in future labour market attachment and contributions, also different pension scheme structures complicate a calculation of current and future pension assets. Pension schemes with *defined-benefit* structure (which is the typical set of the public *pay-as-you-go* scheme) might foresee various specific elements in their benefit calculation formula, such as taking into account periods of unemployment and inactivity, or final salary. Thus personal contributions are valued very differently as compared to a *defined-contribution* scheme, where individual pension assets are accumulated in individual pension balance

accounts and mostly affected by the development of interest rates and return on investments. In pension systems that combine various *defined-contribution* and *defined-benefit* schemes, it becomes a tricky endeavour to calculate pension assets in a comparative way (see for example Frick and Grabka 2010; Kennickel and Sundén 1997).

Nevertheless, a pioneer cross-national study in this field by Grech (2013) stresses the need to comprehensively measure current and future pension wealth in order to alternatively measure *pension adequacy*, a promising field of study that allows to link pension annuities with pension assets and wealth. In general, a restricted perspective that only looks at income can be considered as too narrow and one-sided for analysing social inequality. A better understanding about the interrelations between wealth, pension assets, and income seems essential for explaining poverty and pension income inequalities among the elderly population in advanced economies.

The recently introduced data projects such as the ECB's *Household Finance and Consumption Survey* (HFCS) and LIS' *Luxembourg Wealth Study* (LWS), are extending the perspective for comparative studies on wealth, pension assets, and income. Surveys that additionally integrate also a complete measurement of household consumption are particularly promising. Such data allow a joint measurement of incomes, assets, and consumption, and thus create a scope for further development of multidimensional poverty measurement techniques.

So what is finally left for cross-national comparative studies and policy advice in this increasingly individualised old-age protection scenario? First, when old-age security becomes increasingly individualised, it can be expected that a variety of savings instruments and flexible options will be offered and combined by the future elderly to secure themselves against poverty in old age. For example, increased women´s participation in additional personal pension schemes might be a considerable outcome of individualised pension schemes, given the possibly lower inclusion to occupational schemes, while holding part-time employment jobs. Subsidised contribution payments during periods of inactivity might increase the attractiveness of personal savings plans.

Finally, it has become more unrealistic to expect a comparative situation of income mixes in the future. Besides public protection, alternative old age protection products range from occupational and individual old-age savings plans over individual life insurances, survivor or disability insurance plans to traditional savings plans. At the same time, for example the possibility of withdrawing lump-sums from balance accounts of (old-age) savings plans for home purchase and/or renovation, might strongly affect individual's decision which savings instruments to choose best for old-age protection. Consequently, the elderly may indeed show more diversity in their income mixes (and wealth portfolio) in the coming years. For example in Australia individual's decision to withdraw a lump-sum from their superannuation accounts for home purchase is one major source explaining comparatively high income poverty rates for the elderly (Barrett and Chapman 2001).

A variety of such hybrid systems and outcomes developed in Latin American countries, which during the 1980s and 1990s faced a second transformation of their pension systems (see for example Müller 2002; Yermo 2000). As summarized by Yermo (2000), there can be a divergent trend observed when comparing Latin American's individualized old-age protection schemes against most individual protection schemes in OECD countries. Whereas many OECD countries favoured the development of specialized financial products for old age, Latin American countries mostly created a broad range of alternative investment products that at the same time were utilized to build up stable capital markets with stratified risk portfolios.

These varieties of saving portfolio options seem primarily relevant from a macro-economic perspective, but can be studied also from the perspective of socio-economic inequalities among future retirees and elderly population. As reforms in Latin American countries followed foremost an individualised approach through mandating private savings plans (see Yermo 2000), these experiences provide interesting counterparts to the European and other advanced economies, where supplementary second-tier schemes were foremost provided by employer-based occupational pensions combined with a much stronger role of trade unions and employer associations.

Some more general challenges remain for outcome oriented studies. In general, each study, which is based on data collection and observed outcomes, can only function as a snap shot of inequalities at a specific point in time. When repeated at a later stage, outcomes will differ coupled with the development of inequalities in labour market participation rates and labour market incomes by age and gender, changes in pension system design, and societal change.

Thus national studies, which aim at adopting other country's national experiences to their own national context, need to carefully analyse comparability of the surroundings such as labour markets and individual labour market attachment, living arrangements, and other cultural differences. Once these cross-national differences are carefully considered, comparative studies on alternative pathways of pension policy and outcomes are promising for national reform scenarios that for example reassess the minimum pension income level, the income ceiling for mandatory contributions to the public system, or the implication of tax or contribution subsidies for voluntary personal pensions.

At the same time, such national reform-oriented studies require also elaborate sections on cost containment and long-term sustainability of proposed reform measures. For this purpose, a less restricted access to administrative data sources and tax records for research purposes should be reached. From the perspective of future retirees, it can be argued that pension asset accumulation and its multiple pathways need more transparency in order to save today and be secure tomorrow.

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