



**Top Incomes in Scandinavia  
Recent Developments and the Role of Capital Income**

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*Published in:*  
Nordic Economic Policy Review 2018

*DOI:*  
[10.6027/a8f75d4b-en](https://doi.org/10.6027/a8f75d4b-en)

*Publication date:*  
2018

*Citation for published version (APA):*  
Søgaard, J. E. (2018). Top Incomes in Scandinavia: Recent Developments and the Role of Capital Income. In *Nordic Economic Policy Review 2018: Increasing Income Inequality in the Nordics* (pp. 66-99). Nordisk Ministerraad. TemaNord <https://doi.org/10.6027/a8f75d4b-en>



# **INCREASING INCOME INEQUALITY in the Nordics**

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Policy Review  
2018**

# Increasing Income Inequality in the Nordics

Nordic Economic Policy Review 2018

*Rolf Aaberge, Christophe André, Anne Boschini, Lars Calmfors,  
Kristin Gunnarsson, Mikkel Hermansen, Audun Langørgen,  
Petter Lindgren, Causa Orsetta, Jon Pareliussen, P-O Robling,  
Jesper Roine, Jakob Egholt Søgaaard*

TemaNord 2018:519

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ISBN 978-92-893-5511-7 (PRINT)

ISBN 978-92-893-5512-4 (PDF)

ISBN 978-92-893-5513-1 (EPUB)

<http://dx.doi.org/10.6027/TN2018-519>

TemaNord 2018:519

ISSN 0908-6692

Standard: PDF/UA-1

ISO 14289-1

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# Introduction

*Lars Calmfors<sup>1</sup> and Jesper Roine<sup>2</sup>*

In recent years income distribution issues have received increased attention in most economically advanced countries both in the public debate and in academic circles. This reflects an international trend towards increased income inequality, a trend which has also affected the Nordic countries long associated with far-reaching egalitarian ambitions. As the inequality increases in the Nordics have been among the largest in the OECD area over the past decades, developments here have received particular attention internationally (see, e.g., OECD 2011, OECD 2015 and Morelli et al. 2015). This, in turn, has led to an on-going debate between those who see the rising income disparities as a threat to the Nordic welfare model and those who emphasise that inequality has increased from historically low levels and that the Nordics still remain among the countries with the most even income distribution.

The inequality debate is sometimes difficult to follow for a very simple reason: it is not always specified what kind of inequality is referred to. Typically it is even less clear exactly which mechanisms that are thought to be at work when statements about negative (or positive) consequences of inequality are made. Inequality is a genuinely complex and multidimensional concept. There is no one obvious measure that would capture the “true inequality” in society.

Should we, for example, care more about inequality in income or in wealth or in consumption, or perhaps in some other dimension? Should we consider inequality between households or individuals or perhaps some other division of the population? Does it matter if inequality is driven by the poor falling behind or the rich becoming even richer? Should we measure income inequality at a fixed point in time or consider lifetime incomes? To further complicate matters, consequences of income inequality

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take on many forms, over different time spans and, importantly, they also interact with how society is organised. In particular, depending on the role of government in providing different goods and services, the link between disposable income and well-being may be very different.

This issue of the *Nordic Economic Policy Review* brings together a number of contributions dealing with various aspects of inequality in the four countries of Denmark, Finland, Norway and Sweden. Throughout, the articles focus on cross-sectional *yearly* data on *income* inequality between *individuals*. The income concept, however, varies both between and within the different papers. The analysis sometimes focuses on earnings or total market incomes before taxes and transfers, sometimes on equivalised disposable incomes (incomes after taxes and transfers taking household size into account) and sometimes even on extended income also considering public in-kind transfers. Recurring themes in the papers are how inequality may differ across these dimensions, how such differences may give important information about what causes changes in inequality, but also – somewhat paradoxically – how *trends* in inequality often look similar regardless of what measures are used: individual top income shares before taxes and transfers, Gini coefficients for (conventional or extended) equivalised disposable incomes or relative poverty rates using the same income measures. Another finding is that, while there are many similarities in general inequality trends as well as in levels among the Nordic countries, there are also often important differences, highlighting the importance of individual country studies.

## The articles in the volume

The volume contains five papers with associated comments which were originally delivered at a conference in Copenhagen on 26 October 2017.

### *The Nordics in an international perspective*

The first article by *Jon Pareliussen, Mikkel Hermansen, Christophe André and Orsetta Causa* gives an international perspective on the inequality developments in the Nordic countries. The authors show how inequality, as measured by equivalised disposable incomes, has indeed increased substantially in the Nordic



countries since the early 1990s, especially in Sweden and Finland. But it is also pointed out that inequality levels were historically very low in the 1980s and that the levels remain below the OECD average.

The paper emphasises that inequality increases have been driven by other factors in the Nordic countries than in the U.S. and other Anglo-Saxon countries. There, large increases in the dispersion of earnings and market incomes have taken place, probably caused to a large extent by skill-biased technological change and globalisation. This has not been the case in the Nordics. Tendencies towards increased wage dispersion have been relatively weak. This can be explained by strong trade unions and collective bargaining institutions, and education systems which have expanded the supply of skilled labour. Large increases in employment have also helped counteract tendencies towards increased dispersion of market incomes (see, e.g., Barth and Moene 2013).

Pareliussen and his coauthors instead stress weakened redistribution as a major cause of the increased dispersion of disposable incomes (especially in the lower end of the income distribution). Such weaker redistribution is partly an automatic consequence of the strong employment rise since the early 1990s (in Denmark, Finland and Sweden), but the reduction in redistribution is larger than can be explained by this mechanical effect. It is mainly associated with reductions in redistributive cash transfers, in particular unemployment and sickness benefits. These reductions may, however, have contributed to the favourable employment developments through strengthening of work incentives.

In addition, higher, and more unevenly distributed capital incomes, have been of large importance, especially for the widening of the income distribution at the top. Finally, demographic factors have contributed to the increase in measured income inequality in all the four Nordic countries studied.

### *Top-income shares*

One of the reasons for the increased inequality identified by Pareliussen and his coauthors, the increased income share going to top earners, is the topic of the paper by *Jacob Søgaaard*. The development of top incomes has received a lot of interest in recent years, especially after the publication of Thomas Piketty's (2014) *Capital in the Twenty-First Century*. *Søgaaard* surveys the strand of research – the so called top-income literature – that underlies much of this debate. This literature focuses on

taxable income, which makes it possible to construct long time series for incomes of high-income earners, since tax records for them are often available since the beginning of the twentieth century.

Historically, it appears that overall disposable income inequality and top-income shares have usually moved in the same direction. This is also the case in the Nordic countries where both the Gini coefficients (for disposable incomes) and the shares of (taxable) income going to the top one percent of the income distribution have both increased since the 1980s. The increases in the top income share have been smaller than in the U.S. and other Anglo-Saxon countries, but they still account for 2–3 percentage points of the increase in the Gini, which is a substantial contribution.

Søgaard shows that higher capital incomes for the top one per cent are an important reason for the increase in the share of total incomes going to this group in Finland and Sweden, whereas this is not the case in Denmark and Norway. An important point made in the paper is that a change in the composition of capital incomes for top income earners may also have been important for the rises in top income shares. Søgaard documents how the share of dividends in capital income has increased in the Nordics at the expense of interest income. Since dividends are much more concentrated to the top one per cent group than interest income, this has increased the group's share of total incomes. The article finds support for this hypothesis especially for Finland and Norway, but also for Sweden for the period after 1995.

### *Gender inequality*

*Anne Boschini and Kristin Gunnarsson* study another dimension of inequality that has also received much attention in recent years: that between men and women. This is an aspect where the Nordic countries are also often seen as global leaders, typically coming out on top in various rankings. Conventional analysis of income distribution assumes that incomes are split equally among the members of a household. However, to the extent that this is not true (and consumption levels of individual household members are instead linked to who earned the income), it is also relevant to measure inequality at the individual instead of at the household level.

Boschini and Gunnarsson discuss the relationship between aspects of the Nordic welfare state and gender, and then study how this dimension of inequality has developed over the period when overall inequality has increased. They find that, while overall gender inequality has decreased, there still remains inequality between men

and women at all levels of the income distribution. Labour income differences between men and women follow a U-pattern with the largest differences at the bottom and the top of the distribution. In terms of disposable incomes, the differences are largest at the top. The authors also document that inequality in disposable income is smaller among women than among men in all the four studied Nordic countries.

The article also decomposes the changes in the overall income distribution into a within-gender and a between-genders effect. For labour income the between-genders effect tends to reduce overall inequality, whereas the within-gender effect tends to reduce it in the four Nordic countries studied. The between-genders effect also works in the direction of reduced disposable income inequality in the four countries, whereas the within-gender effect varies among them.

Finally, Boschini and Gunnarsson note that the representation of women in the very top income groups has increased over time, but remains far from equal. Interestingly, they point to the fact that in an international comparison the Nordic countries have fewer women in the very top of the income distribution than countries that we typically consider less gender equal. This points to the possibility that some aspects of the Nordic model may contribute negatively to women's possibilities to reach the economic elite.

### *Demographic changes*

The study of gender and the potential changes in inequality that may result from differences in how men and women sort into different households illustrates a more general point: the composition of the population matters for income distribution. There are many dimensions of this: how large a share of the population belongs to different age groups, how many are students, how many are immigrants, etc. The impact of such compositional changes on measures of inequality is the topic of the contribution by *Jon Pareliussen and Per Olof Robling*.

By trying to answer the counterfactual question "What would be the level of inequality if the structure of the population was unchanged (at the level of the starting year) but everything else was as today?" the authors analyse the contribution of such compositional changes to the rise of inequality. The finding is that a significant part of the increased inequality in the Nordic countries is a result of changes in the population

structure. In general, an older population and more single households are the most important factors, but there are also important differences across countries.

Interestingly, the contribution from immigration is relatively modest according to the analysis. It should be emphasised, however, that data do not cover the most recent immigration wave and also that the method used does not directly take into account heterogeneity in the immigrant group (with an increasing share of low-educated non-European immigrants over time). When trying to consider this, the impact is larger (especially in Norway and Sweden), although still surprisingly small. This raises methodological questions for future research.

### *Public consumption*

An important feature (some would say the most important feature) of the Nordic welfare model is the generous provision of welfare services at low or zero cost to the individual. This obviously has an impact on the link between individual disposable income and individual well-being. How does the picture of inequality and poverty change if we include (the value of) these government-provided services in the measures used? This is the question posed in the article by *Rolf Aaberge, Audun Langørgen and Petter Lindgren*.

Relying on methods previously developed by the authors themselves they add the value of public services (such as child care services, education and health care) according to how these services are used depending on household characteristics and age, and recalculate measures of inequality and poverty across OECD countries using this extended income measure. Inequality and relative poverty levels are substantially reduced when adding these services. The effects are broadly similar among the OECD countries studied, implying that the inequality rankings remain more or less the same.

However, when looking at the impact for different groups the importance of this perspective becomes very clear. Standard measures of inequality, using unadjusted equivalised disposable income, underestimate the relative living standards for some groups while overestimating them for others. Relative poverty rates are not much affected among childless single adults by taking the provision of welfare services into account, whereas there are substantial reductions among single adults with children and elderly households. The results highlight the importance of this kind of analysis before singling out certain groups as particularly disadvantaged.

## Possible policy conclusions

The authors in the volume are cautious regarding policy conclusions. The focus is mainly on documenting and explaining how inequality has developed rather than on prescribing various policy measures to influence the income distribution. This is understandable given the importance that subjective value judgements must play when assessing inequality and the various goal conflicts involved in any policy to affect it. These problems are likely to be much more important for income distribution policy than for other policies such as stabilisation, employment or growth policies, although they exist there as well.

No recommendations regarding income distribution policies can be given in the context of the Nordic countries without taking a stand on the degree of inequality in the 1980s. It is not necessarily the case that the increase in equality since then should be regarded as a problem. One could have the opinion that the *level* of income equalisation was then excessive in the Nordics, giving too weak incentives for employment, effort, growth, etc. Or one could have the view that it is instead the *increase* in inequality over the last three decades that is excessive. The conclusion depends on political preferences. We do not take a stand on these issues. Instead, we give some *conditional* policy recommendations. *If* one wants to counteract the increase in income inequality that has occurred in the Nordic countries and counterbalance further developments in this direction, what conclusions can be drawn on the basis of the analyses in this volume?

We draw six such policy conclusions:

1. Less redistribution has been an important cause of more relative poverty in the Nordics. This has been a consequence mainly of a reduction in redistributive cash transfers following from a slow up-rating of such benefits in line with wages. Reductions in unemployment benefit and sickness benefit replacement rates have strengthened the incentives for employment, but the overall effects are likely to have increased inequality. If one wants to prioritise equity objectives, it is important to prevent further downward slides in benefit replacement ratios. This could involve difficult trade-offs with efficiency objectives. Such trade-offs are, of course, less severe with general cash transfers not directly linked to non-activity, such as child or housing allowances. Although lack of indexation of various social benefits to wages may be advantageous from the point of view of long-run fiscal

- sustainability, it may be problematic for income distribution developments (see, e.g., Swedish Fiscal Policy Council 2011).
2. Public in-kind transfers through the provision of government welfare services at low or zero costs have been shown to decrease income inequality substantially. At the same time, there is an ongoing discussion on the long-run sustainability of public finances against the background of an ageing population and (likely) increased demand for welfare services as incomes grow (the Wagner effect; see, e.g. Bergh 2016 and *Ekonomiska vårpropositionen 2017*). It is often argued that this will put public finances under increased strain and that more welfare services must therefore in the future be financed through user charges. According to the analysis in the volume, such changes are likely to have large inequality-increasing effects. They should be avoided if one places a large weight on income distribution objectives.
  3. Pensions are generally lower than incomes from work. An ageing population will therefore tend to increase income inequality as measured by the distribution of yearly incomes. It is not obvious that this should be seen as a problem as lower pensions relative to work incomes do not change the distribution of lifetime incomes. At the same time, we know, at least from Sweden, that income inequality is larger among pensioners than in the rest of the population (see *Ekonomiska vårpropositionen 2017*). Indexation of the retirement age to longevity might be a way of mitigating problems with very low pensions, although, of course, other trade-offs will be involved. In addition, for pensioners the generous provision of public in-kind transfers makes an important contribution to reducing negative welfare consequences from having low cash income, as discussed above. Maintaining the level and quality of these in-kind transfers may be at least as important as reducing income inequality for this group.
  4. Increased top-income shares have made significant contributions to the overall increase in income inequality in the Nordic countries. The cause has been a larger importance of capital incomes, which are more unevenly distributed than labour incomes, and a widened distribution of capital incomes. If one wants to counteract the increase in the top-income share, this would seem to require changes in the taxation of capital income and wealth. The tax reforms in the 1990s in the Nordics involved the introduction of dual income tax systems with lower (nominal) tax rates for capital income than for labour income. Effective tax

rates on real (inflation-adjusted) capital incomes have subsequently fallen through lower inflation. Corporate tax rates have been decreased. Inheritance and wealth taxes have been abolished or reduced. Current real estate taxes are low in all the Nordic countries. It follows that changes in these various taxes should be contemplated if one wants to counteract the increases in top income shares. This may indeed be quite important if one wants to promote social mobility, as inherited wealth may lower such mobility. In addition, the introduction of the dual tax system (and other related tax rules) have created incentives to convert labour income into capital income (see, e.g., Pirttilä and Selin 2011, and Alstadsæter and Jacob 2016). Restricting the possibilities to do this would likely contribute to a more even income distribution.

When contemplating changes in wealth taxation, and especially real estate taxation, it is, important to consider the “cash-flow restriction” of households. The increases in asset values (in particular real estate values) imply that many households have substantial wealth, whereas their income flow consists mainly of labour income (often taxed at a high marginal rate). Taxing assets more heavily, including in particular housing, may therefore force sales of assets in a disruptive way. If the balance is shifted from taxation of labour income to taxation of capital, these risks need to be addressed.

5. Education and training efforts (including for adults) may be crucial for the integration of immigrants in the labour market and this way help alleviate poverty among this group. Successful education efforts have the advantage that they can alleviate potential equity-efficiency trade-offs by contributing both to growth through investment in human capital and to decreased inequality (to the extent that they target weak groups and are efficient). Education policy is not, however, likely to have much effect on top-income shares, since they are not strongly related to differences in education (see, e.g. Björklund et al. 2013).
6. Finally, the analysis of gender aspects of income distribution in the volume suggests that policies reducing gender differences are likely also to contribute to reductions in overall income inequality. The analysis also points to the possibility that some features common to the Nordic welfare states may have adverse effects on the possibilities for women to reach the top of the distribution. Research shows that much of remaining gender differences relate to women having children (see, e.g., Angelov and Karimi 2012, and Kleven et al. 2018).

Policies that reduce these “child penalties” for women are likely to reduce the gender gap. Such policies could, for example, include making parental leave less generous (thereby lowering employers’ expectations of career disruptions) or equalising (expected) parental leave between men and women by dividing these rights more equally between the parents.

The above items do not necessarily represent policy recommendations as income distribution goals must be weighed against other objectives relating to, for example, incentives for innovation, entrepreneurship and (human and real) capital investment, employment and fiscal sustainability. But the options should be considered if one wants to put more emphasis on equity goals than has been the case recently.

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# Income Inequality in the Nordics from an OECD Perspective

*Jon Kristian Pareliussen, Mikkel Hermansen, Christophe André and Orsetta Causa<sup>1</sup>*

## Abstract

We provide an overview of inequality developments in the Nordics compared to other OECD countries, starting from the early 1990s. Some of the largest inequality increases in the OECD have taken place in Sweden, Finland and Denmark, but from very low initial levels. A coherent set of institutions underpin high employment and have likely dampened the inequality-increasing forces from skill-biased technological change and globalisation. Demographic trends have increased inequality in the Nordics, but the main mechanisms vary between countries. Redistribution has weakened considerably, mainly driven by weaker insurance transfers to working-age individuals, but these reforms have contributed to including more people in the labour market.

Keywords: Inequality, technological change, demographic trends, redistribution.

JEL classification: D63, J11, H33, O15, O33.

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<sup>1</sup> All authors work in the OECD Economics Department. The authors are grateful for valuable comments from the editors, John Hassler, Jørgen Elmeskov, two anonymous referees and participants at the 2018 NEPR conference in Copenhagen. This article draws on previous OECD work in the OECD Economic Survey of Sweden (2017) and Causa and Hermansen (2017).

## Introduction

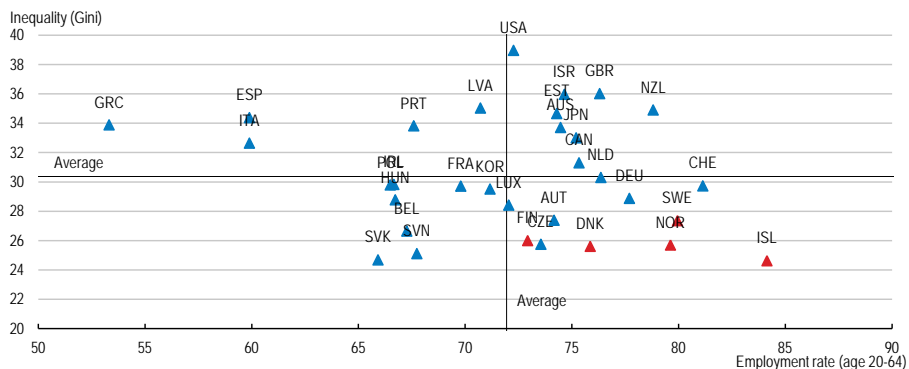
Even though labour market developments, demographic forces and redistribution have affected income distribution differently across the Nordic countries, it is no coincidence that this group of countries displays among the lowest levels of income inequality in the OECD. A number of key institutions, notably collective bargaining, activation policies and wide access to high-quality education, reinforce each other, allowing a compressed wage distribution and extensive redistribution to co-exist with the high employment necessary to fund the extensive public services and transfers. In addition to fostering inclusiveness and social cohesion, these policies increase the acceptance of economic adjustments imposed by globalisation and technological change, thus promoting market flexibility and openness underpinning productivity, innovation and competitiveness. Seen from this perspective, the similarities between the Nordics outweigh their differences.

Figure 1 provides a snapshot of the performance of OECD countries in the employment and inequality dimensions. The Anglo-Saxon countries achieve relatively high employment rates, but combined with relatively high income inequality. Austria, Germany, the Netherlands and Switzerland come closer to the Nordics, even though they still display significantly higher inequality. Mediterranean countries tend to combine low employment rates and high inequality, while Eastern European countries tend to display both low employment and low inequality.

From the 1990s to present, Nordic policies and institutions have been able to largely counter pressures from globalisation, technological change and job polarisation towards increasing inequality of wages. They have also dampened inequality increases resulting from demographic trends. Nevertheless, income inequality has trended upwards, except in Iceland. Redistribution from taxes and transfers has decreased more in the Nordics than in most other OECD countries. However, this should be seen in the context of very high initial redistribution and thus a likely binding trade-off with economic efficiency. Education, employment regulations and wage bargaining have also seen significant changes since the 1990s, and there are no doubt further challenges and need for reforms looming. However, the Nordics have so far been able to adjust their policies in such a way that equality, opportunity and economic efficiency co-exist relatively well compared to the rest of the OECD.

**Figure 1: The Nordics combine low income inequality and high employment rates**

Gini index for household disposable income and employment rates, 2014 or latest available year



Note: All OECD countries included except Chile, Mexico and Turkey. Data refer to 2012 for Japan; 2015 for Finland, Israel, Korea, the Netherlands, the United Kingdom and the United States; and 2014 for the rest.

Source: OECD Income Distribution Database; OECD Labour Force Statistics.

This article is structured as follows: The second section outlines inequality developments since around 1990. The third section discusses how market forces, demographic trends and redistribution have affected inequality trends. The fourth section summarises and discusses some challenges going forward.

## Income inequality in the Nordics in a comparative perspective

Income inequality has risen in most OECD countries since the mid-1980s (OECD 2015a). Some of the largest increases in inequality, as measured by the Gini coefficient, have taken place in Nordic countries. At the same time, both the overall trend and the timing of inequality increases differ substantially between the Nordics. Figure 2 shows trends in the Gini coefficient for household disposable income, which increased since the early 1990s by almost eight points in Sweden, five points in Finland and four points in Denmark. This widening in inequality is well above the average increase of around two Gini points across the OECD, notwithstanding substantial increases in countries like Germany (three points) and the United States

(five points).<sup>2</sup> Still, the three Nordic countries started from very low levels of inequality and remain among the most equal OECD countries. By contrast, inequality in Norway was at a comparatively higher level in 1995 and remains about the same level in 2014, interrupted by a temporary increase in the mid-2000s, to a large extent driven by extraordinarily high dividends in response to a capital taxation reform in 2006 (NOU 2009).<sup>3</sup> Lastly, a substantial decline in inequality since the crisis broke out in 2008 has shifted Iceland from near the OECD average to the most equal OECD country in 2014.

The widespread increases in inequality across OECD countries mostly took place in the 1990s and early-2000s. This was also the case for Finland, while Denmark and Sweden have experienced more persistent upward trends in inequality. Focusing on the more recent period, inequality has been rather stable since around 2010 in the Nordics, with the exception of Sweden. This is in line with developments in most OECD countries in the initial phase of the great recession, when high incomes were hit by the financial crisis, while automatic stabilisers and discretionary measures mitigated income losses for low-income households. During the prolonged recovery period, average inequality in the OECD displayed little change, but this hides much heterogeneity across countries (OECD 2017a).

Rising inequality can reflect different patterns of income growth across the distribution. This calls for a broader analysis of the inclusiveness of the growth process (Hermansen et al. 2016, OECD 2017a). Strong household income growth in the Nordics has lifted incomes from the bottom to the top of the distribution from the mid-1990s to 2014 (Figure 3). This contrast with developments in Germany and the United States, where stagnating incomes at the bottom of the income distribution imply that material living standards have improved very little relative to the mid-1990s. In fact, income growth rates for the bottom 20% in Finland, Norway and Sweden have been close to or exceeded average income growth rates in a number of large OECD countries as well as the OECD average.<sup>4</sup>

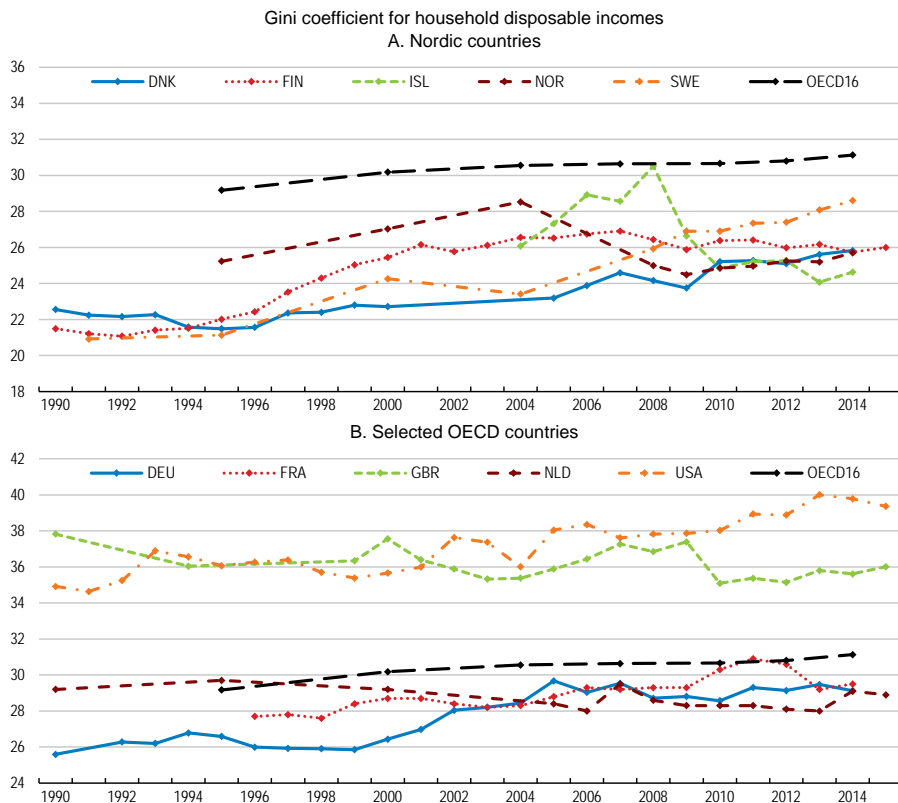
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<sup>2</sup> Among countries for which comparable data are available from the mid-1990s.

<sup>3</sup> The development for Norway should be taken as a rough indication given the limited number of observations prior to 2008. National sources report an increase around four Gini points from 1990 to 2014 (Statistics Norway), but the applied household income definition is not fully comparable with the one used for OECD figures (see Causa et al. 2016 for a comparison of inequality figures between different sources in the case of Denmark).

<sup>4</sup> Such cross-country comparisons should be taken with caution given differences in the cyclical position in initial and terminal years. In particular, weak economic conditions in the mid-1990s as a result of the Nordic banking crisis and

**Figure 2: Inequality developments have been diverse in the Nordics**



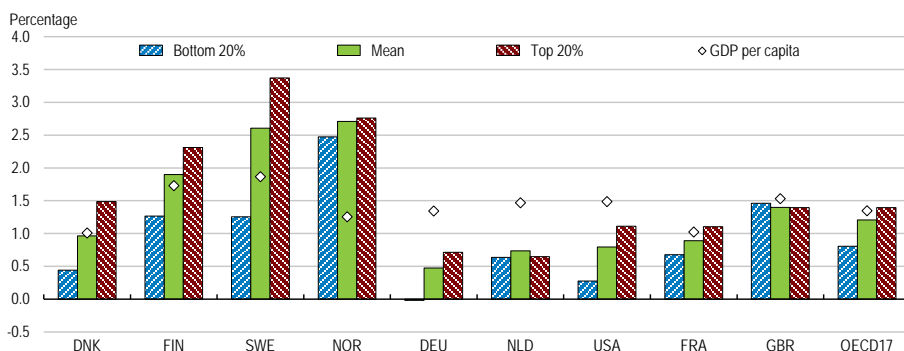
Note: OECD16 is a simple average across 16 OECD countries (Australia, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Israel, Italy, the Netherlands, Norway, New Zealand, Sweden, the United Kingdom and the United States) with available information since mid-1990s. A change in the income definition implies a break in the series around 2011 for some countries and estimated series correcting for the break have been used. As a result the value for the latest year may differ from that in Figure 1.

Source: OECD Income Distribution Database.

associated recession tend to boost growth rates for the Nordics. Nevertheless, results are robust to starting in year 2000 instead.

**Figure 3: Inequality has increased in the Nordics, but incomes have risen across the distribution**

Average annual growth of household disposable incomes, mid-1990s to 2014 or latest available year



Note: Based on equivalised household disposable incomes, deflated by consumer price indices. OECD17 is a simple average across 17 OECD countries (see note to Figure 2 and adding Japan). Data refer to 1994–2014 for the United Kingdom; 1995–2015 for Finland, the Netherlands and the United States; 1996–2014 for France; and 1995–2014 for the rest. Divergences between the evolution of GDP per capita and household incomes, as observed here, may occur for a number of reasons (for details, see e.g. OECD 2016a and Noland et al. forthcoming).

Source: OECD Income Distribution Database.

Rapidly growing incomes in the top of the distribution have been an important driver of rising inequality in a number of OECD countries, particularly the United States (Morelli et al. 2015). Top incomes are also an important source of rising inequality in the Nordics (see below), but far from the only reason, as can be seen from the growth incidence curves in Figure 4.<sup>5, 6</sup> The slope of these curves show in what way the income distribution has evolved. In Denmark, Finland and Sweden average income

<sup>5</sup> Household income statistics tend to suffer from underreporting of top incomes. This is also the case for the figures presented in this paper based on the OECD Income Distribution Database. Yet, this is much less of a problem for the Nordic countries for which income statistics are mostly register-based. For most other countries with survey-based statistics, the development at the top should however be taken with care.

<sup>6</sup> Cross-country comparable household income data are only available by deciles. Ideally the growth incidence curve should be presented at a further disaggregated level, e.g. by percentiles.

has grown at a significantly higher rate in the top decile than in all other deciles from the mid-1990s to 2014. Still, the curves are upward sloping at almost any point from the first to the tenth decile, indicating increasing dispersion across the entire distribution.

An important caveat to this approach, and the assessment of inequality based on a single year in general, is that the growth incidence curve is anonymous – it relates average households incomes in a given decile to the same decile in a previous year, irrespective of their composition, thus ignoring that individuals' relative position in the income distribution may shift over time. Yet, from a welfare perspective income mobility also matters, in particular whether the same households are stuck at the bottom of the distribution for several years or the low-income state tends to be temporary. However, cross-country comparable data for assessing inequality in a dynamic or lifetime perspective are still relatively scarce, ruling out further analysis in this direction for the purpose of this article.<sup>7</sup>

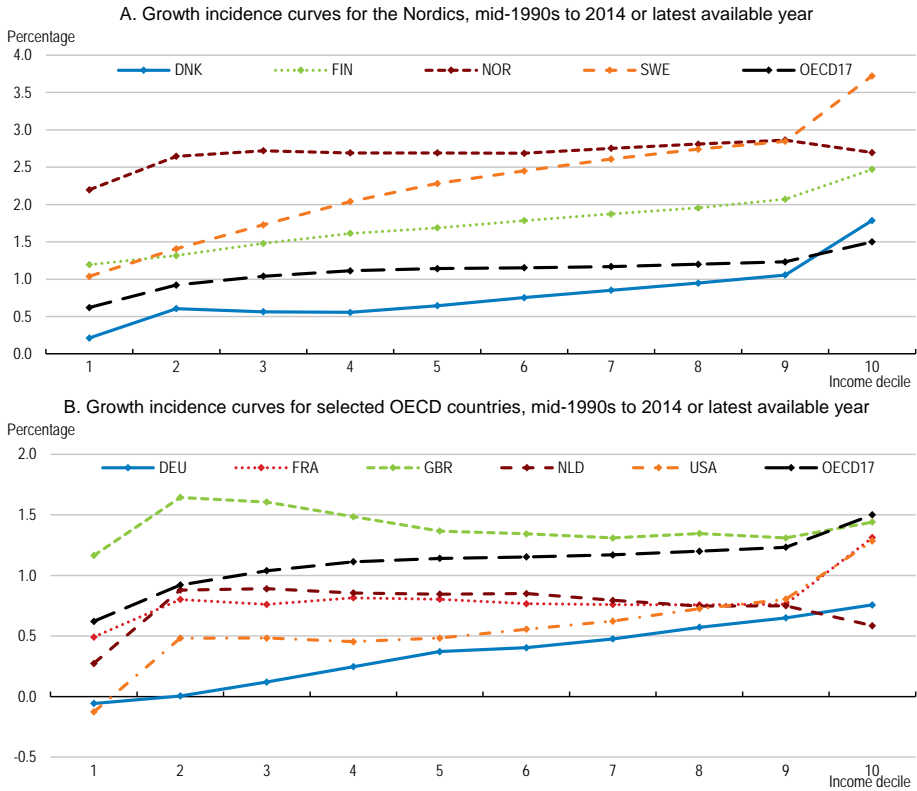
A closer look at the bottom of the income distribution shows that relative poverty, here measured as the share of households with incomes below 50% of the median, is low in the Nordics compared to most OECD countries (Figure 5, Panel A). Nevertheless, the average gap between those living in relative poverty and median household income, the depth of relative poverty, is close to or above the OECD average in Denmark, Iceland and Norway. But developments have differed substantially between the Nordic countries, notably between Denmark and Sweden, since the mid-1990s: in Sweden the share of low-income households rose more than five percentage points, but at the same time the mean income gap declined by a similar amount. In contrast, the share of low-income households changed little in Denmark, while average income within the low-income group fell behind the median by almost ten percentage points. However, part of this may reflect an increasing number of students in Denmark as they tend to receive income from public transfers only and concentrate at the bottom of the income distribution (Danish Ministry of Economic Affairs and the Interior 2017, and Pareliussen and Robling 2018).

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<sup>7</sup> See Danish Ministry of Economic Affairs and the Interior (2017), NOU (2009) and Statistics Sweden (2016) for evidence for Denmark, Norway and Sweden, respectively.



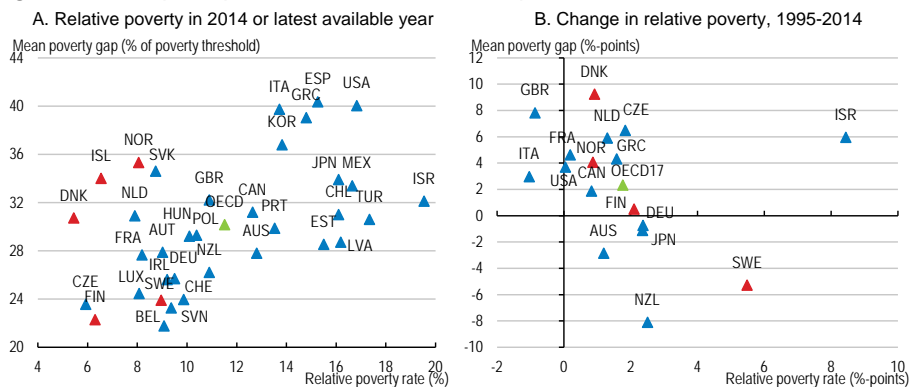
**Figure 4: Higher inequality reflects greater dispersion across the distribution, but particularly strong increases in top incomes**



Note: The (anonymous) growth incidence curve reports the average annual growth rate of average household disposable incomes by deciles. The slope of the curve illustrates in what way the income distribution has become more or less equal between the two years. The curve is anonymous in the sense that the same household need not be in the same decile in the initial and terminal year. See note to Figure 3 for country-year coverage.

Source: OECD Income Distribution Database.

**Figure 5: Relative poverty is low in the Nordics, but its depth varies**



Note: The relative poverty rate is defined as the share of individuals with incomes below 50% of median equivalised household disposable income. The mean poverty gap is the mean difference between poor households and the relative poverty threshold, expressed in percentage of the threshold.

Source: OECD Income Distribution Database.

## Market, structural and policy drivers of inequality

Changes in the income distribution may come from multiple sources. Demographic trends, such as the age structure of the population, immigration, educational attainment and household structure can significantly impact inequality (Robling and Pareliussen 2017, Danish Economic Council 2016 and NOU 2009). Market trends influencing the distribution of wages and capital income, such as skill-biased technological change and globalisation offer an additional perspective (Danish Economic Council 2016 and Piketty 2014). Common to the two categories is that they are not primarily policy driven, even though policies influence both the trends and the extent to which they affect inequality. Redistribution through taxes and transfers directly alters the distribution of disposable income, but may also indirectly influence market incomes by affecting people’s incentives to work and save (Bargain and Callan 2010). All the factors above are interrelated. As an example, ageing will normally increase income inequality, as pensions are generally lower than earnings and earnings dispersion is generally higher in older cohorts, but the final effect depends critically on the tax and transfer system, pension savings and individual retirement

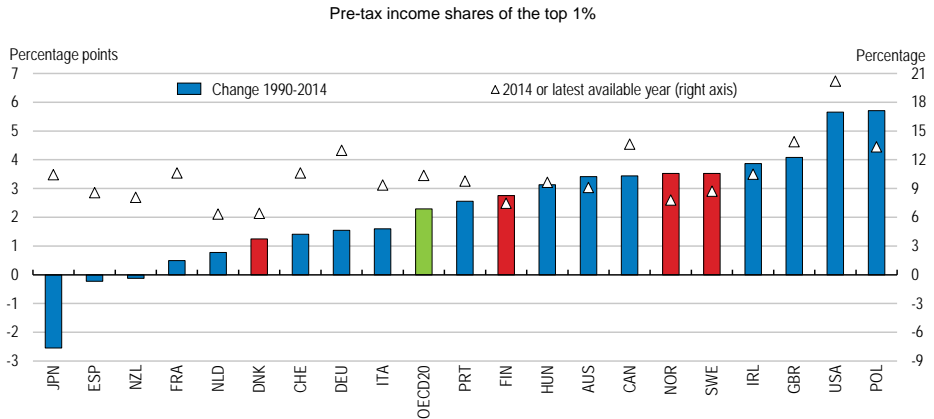
decisions. Given this multitude of interrelated factors, any analysis of driving forces behind inequality trends is necessarily only partial and gives a particular perspective on inequality.

Income inequality should be seen in light of all these factors and how they interact. The Nordics are characterised by a compressed earnings distribution combined with high employment. And this high employment, together with a relatively high tax take, finances public transfers and services. Key institutions underpinning this “Nordic model”, notably public education, collective bargaining and the social safety net dampen pressures towards higher inequality coming from current market and demographic trends.

### *Trends in the market income distribution*

Higher wage dispersion and rising capital incomes at the top of the income distribution have been the main forces behind rising market income inequality in many OECD countries (OECD 2011, 2015a and Björklund and Jäntti 2011). This has also been the case in the Nordics as can be seen from the rise in pre-tax income shares going to the top 1% (Figure 6). Nevertheless, top 1% income shares in the Nordics remain among the lowest across all OECD countries for which data are available. Isolating the impact of capital incomes in a cross-country perspective requires careful attention to the data quality and potential influence of tax reforms, which is beyond the scope of this paper. Sogaard (2018), which is part of this volume, provides evidence of the role of capital incomes for the top 1% in the Nordics and the respective influence of interest and dividends, and we offer some thoughts about taxation of wealth and inheritance in the concluding section of this article.

**Figure 6: Pre-tax top income shares have risen in most OECD countries**

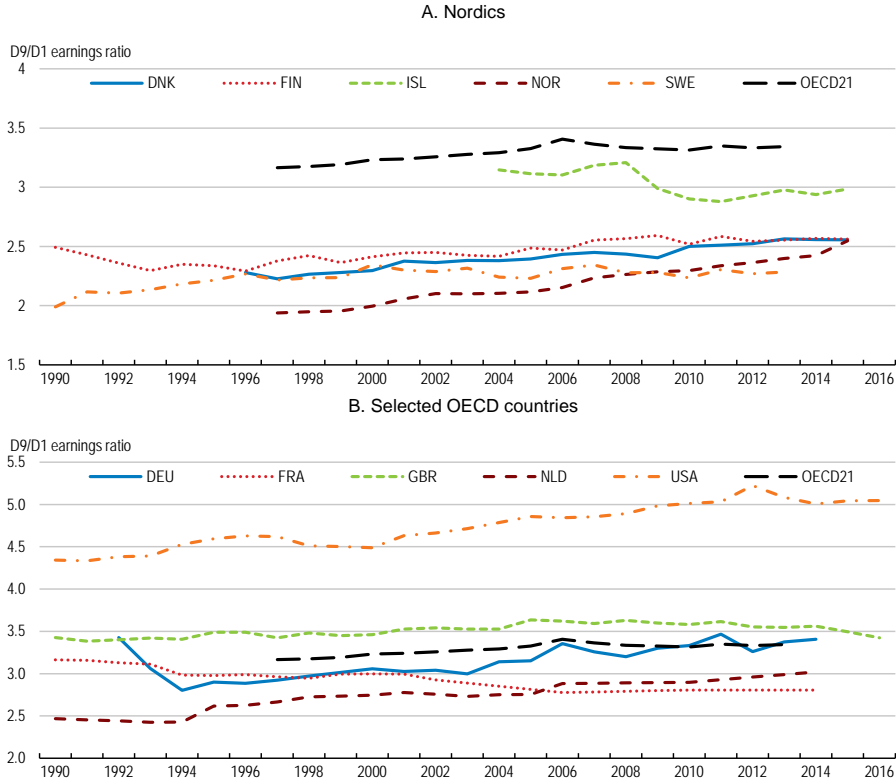


Note: Based on pre-tax national income for individuals; see WID.world for details. Data for 1990 refer to 1989 for Finland, Germany, Portugal and Switzerland; 1992 for Hungary and Poland. Data for 2014 refer to 2005 for Portugal; 2008 for Hungary; 2009 for Finland, Ireland and Italy; 2010 for Canada, Denmark, Japan and Switzerland; 2011 for Germany and Norway; 2012 for the Netherlands and Spain; 2013 for Sweden; and 2015 for Poland.

Source: Authors' calculations based on World Income and Wealth Database (WID.world).

Rising wage dispersion, notably for men, is identified as a strong common inequality driver across OECD countries (OECD 2011). A non-exhaustive list of explanations to this phenomenon includes skill- and task-biased technological change coupled with globalisation, the weakening of workers' bargaining power, rising non-standard work, the changing nature of work and weakening unemployment insurance and employment protection legislation. Wage inequality has also risen somewhat in the Nordics, especially in Norway and Sweden, when measured in full-time equivalent wages, but is still at an extremely low level compared to other OECD countries (Figure 7). However, inequality from the labour market depends not only on the distribution of earnings, but also on the distribution of employment. The increasing wage differentials from the mid-1990s to 2014 are found to be mitigated by rising employment in Sweden and Denmark (Swedish Ministry of Finance 2016 and Danish Ministry of Taxation 2017), leaving a neutral effect on overall household income inequality for Sweden and reduced inequality for Denmark.

**Figure 7: Earnings inequality has risen in most OECD countries, including the Nordics**



Note: Based on gross earnings of full-time dependent employees. For some countries and years series have been spliced and some data points interpolated. The OECD average is a simple average across Australia, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Korea, the Netherlands, New Zealand, Norway, Poland, Sweden, Switzerland, the United Kingdom and the United States.

Source: OECD staff calculations based on the OECD Earnings Database.

### Skill-biased technological change and globalisation

Skill-biased technological change where job growth is concentrated in high- and low-skill occupations is perhaps better understood as task- or (routine-) biased technological change. Routine jobs are often concentrated in the middle part of the skill- and wage distribution, for example in manufacturing, and are more easily replaced by machines than non-routine jobs. At the same time high-skilled individuals

are complementary to new technologies, boosting their productivity. This trend has been identified as one of the most important drivers of rising wage dispersion and thus income inequality over the past few decades (see for example Autor and Dorn 2009, Goldin and Katz 2008, Goos et al. 2009 and Goos et al. 2014). Technological advances increase the wage premium for skilled individuals in non-routine jobs, and may reduce demand for workers with low- and middle-skill routine tasks, who are relatively easily replaced by machines. Trade, outsourcing and financial globalisation can have relatively similar effects on the income distribution. Furthermore, technology facilitates globalisation, and globalisation speeds up technology's dissemination. Tasks involving social interaction (for example within healthcare or sales) are less easily outsourced or replaced by technology, even when they require fairly low skills. Empirical studies generally find less pronounced effects from globalisation than from technological change, but globalisation can have persistent negative effects in affected regions and communities (Förster and Tóth 2015, Eurofound 2017 and OECD 2017b).

A polarisation pattern, where middle-paying occupations lose employment shares to low- and high-paying occupations is relatively well documented in the United States (Wright and Dwyer 2003, and Autor and Dorn 2013) and the United Kingdom (Goos and Manning 2007). A much more diverse picture can be found in European countries, with polarisation in some countries (e.g. the Netherlands, France and Germany), and upgrading in others, with growth mainly in high-paying occupations (e.g. Italy, Portugal and Luxembourg) up until 2007. During the recession years from 2008 to 2013, polarisation was more widespread across European countries (Eurofound 2017).

The employment share of middle-paying occupations declined in all the Nordic countries from 1993 to 2006. This development was accompanied by increasing employment shares in high-paying occupations in Sweden and Denmark, and by growth in low-paying non-routine service sector occupations in Finland and Norway (Goos et al. 2009). More recently, job losses in Finland were more concentrated in permanent employment in low- and middle-paying sectors. Denmark, and Sweden even more, continued to see strong employment growth in high-paying occupations (Eurofound 2017).

Whether or not the observed polarisation contributes to rising wage inequality depends on the importance of inequality within and between declining versus growing occupations. OECD (2017c) finds that for the OECD as a whole, polarisation has first

and foremost come from increasing wage differentials within occupations, which explains two-thirds of observed polarisation. Changes in the occupational structure explain the remaining third. Widening wage differentials within sectors are a likely reflection of rising productivity dispersion between “frontier firms” and the rest in each sector, and most of this dispersion is reflected in wage dispersion between firms (Andrews et al. 2016 and Song et al. 2016).

There are however some indications that the impact of technology and globalisation on wage dispersion and inequality has affected the Nordics differently than other OECD countries, which is consistent with coordinated wage bargaining and flexible labour markets (see below). Eurofound (2017) finds that wage differentials between sectors partly reflect the human capital of those who choose a particular sector in most countries, but only to a quite limited extent in Sweden. In Finland wage differentials within sectors even narrowed over time, contributing to overall declining wage inequality between 2005 and 2014.

Recently the impact of rising trade with China on regional employment has attracted much attention, especially in the United States (Autor et al. 2013). For the Nordics, a number of studies point to weaker effects of Chinese trade on employment and no or limited impacts on wages, which may be attributed to the influence of coordinated bargaining and high labour market mobility (Ashournia et al. 2017, Balsvik and 2015, Hakkala and Huttunen 2016). To the extent that the Nordics differ from other advanced economies, this can be because productivity is more evenly dispersed between companies and between sectors, because of a weaker link between productivity and wages, or a combination of the two. Kristoffersen et al. (2017) show that productivity growth in Denmark has been fairly evenly spread across firms with no gap to domestic frontier firms.

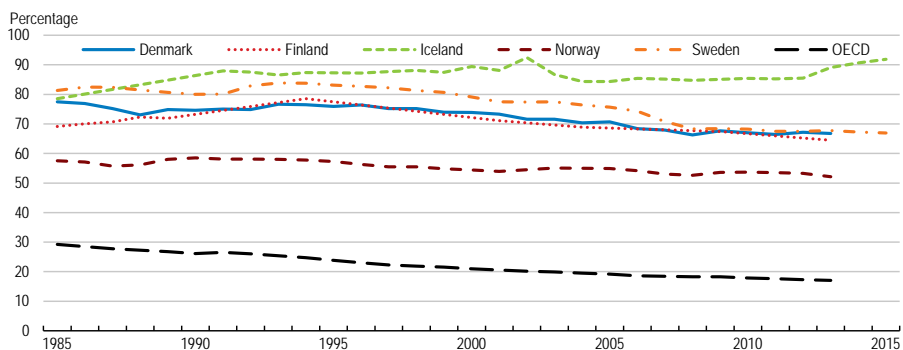
### **Unions and collective bargaining**

Collective bargaining can reduce inequality by narrowing the wage distribution and by securing a larger share of value added for workers due to increased bargaining power. The effect of collective bargaining on economic performance and inequality depends on the specific features of the system of each country, how they interact with other labour market institutions, such as employment protection, unemployment insurance and minimum wage legislation (OECD 2017c). However, the equalising effect on earnings from coordinated wage bargaining does not automatically reduce income inequality, notably because wage bargaining can entail negative employment effects.

Empirical analyses find negative, positive or inconclusive effects depending on methodology and country coverage (Förster and Tóth 2015). The Nordics seem, however, to have found an equilibrium combining wage compression from coordinated bargaining with high employment, aided by public education and activation policies, as discussed below.

High degrees of unionisation and coverage of collective bargaining tend to have an equalising effect on earnings, as unions strive for wage standardisation, promote social expenditures and create shared norms of fairness. Highly coordinated bargaining further broadens norms of distributive justice. Bargaining in the Nordics is more inclusive than in the average OECD country, with high shares of organised workers (Figure 8) and firms, and high coverage of collective agreements (OECD 2017c). This also contributes to trust, together with long-standing cooperation, peace clauses, effective mediation and a high level of firm-level worker representation. Unionisation has steadily declined in the OECD since the 1980s. This is also the case in the Nordics (except for Iceland), but membership is still very high compared to other countries.

**Figure 8: Union density remains high in the Nordics despite declines**



Note: Percentage of employees. OECD is the weighted average of the 35 OECD member countries.

Source: OECD Employment Outlook (2017).

Coordinated bargaining between encompassing labour market organisations ensures that a broad set of interests are taken into account in the bargaining process, and may therefore lead to more efficient outcomes, including higher employment, than if wage bargaining happened at the industry level without such coordination. This effect is



known as the Calmfors-Driffill hypothesis, following Calmfors and Driffill's (1988) highly influential paper. Equalisation of wages within and across sectors can lead to convergence of productivity, as companies with low productivity are forced to invest or scale down, and investments in human and physical capital and the transition of workers from ailing to growing companies and industries are incentivised (OECD 2017c). The Nordics are generally classified among the most coordinated wage bargaining systems in the OECD. In Norway, Sweden and Denmark, the tradables sector (manufacturing) determines a norm for wage increases which is then followed by other sectors (pattern bargaining). Coordination follows similar principles in Iceland, but has tended to break down, especially during upturns (OECD 2017d and Swedish Labour Policy Council 2017). Wage growth has traditionally been set in tripartite negotiations with the social partners and the government in Finland, and outcomes have been binding to most workers by legal extension, although the 2017–2018 wage bargaining round will, if successful, likely move Finland towards pattern bargaining as the main wage bargaining model (OECD 2017c).

Notwithstanding strong coordination, sectoral and firm level agreements play an important role, opening up for flexible solutions adapted to local or individual circumstances and thus contributing to economic efficiency. Such organised decentralisation is quite common in those OECD countries with sectoral or central level bargaining (except Greece and Spain). However, the social dialogue on all three levels is relatively unrestricted in scope in the Nordics. It encompasses for example sectoral minimum wages and firm-level working-time arrangements. In many other OECD countries the scope of lower-level negotiations is more restricted by, and subordinate to, higher-level agreements and detailed labour laws (OECD 2017c). Furthermore, in Sweden, Denmark and Norway, the industry level agreements often give great flexibility to the local union and the firm on how to distribute the agreed total wage increase among employees. A trend towards more decentralisation has been found to contribute to higher wage dispersion in Denmark (Dahl et al. 2013).

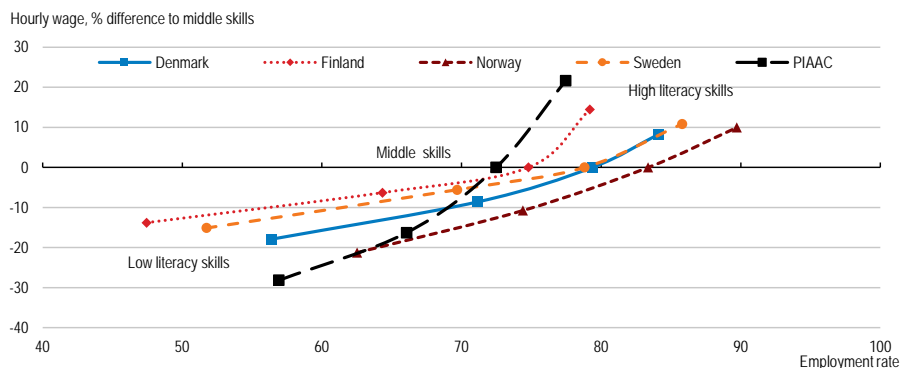
### **Education and skills**

As collective bargaining compresses the wage structure, skill premiums are relatively low in the Nordics, but the levels of education and skills remain powerful determinants of employment (Figure 9, OECD 2015b). Educational attainments have increased substantially across OECD countries over the past decades. In the Nordics, the vast majority of the 25–34 year olds reached upper secondary education already in the

1980s and 1990s (OECD 2017e), whereas the more recent educational expansion has taken place at the tertiary level (Figure 10). The impact of rising educational attainment on inequality is ambiguous in theory due to the interplay between compositional and rate of return (wage) effects (Knight and Sabot 1983). Advanced economies have typically lowered inequality by reducing the number of people with only basic education. An increase in the share with higher education can increase inequality at first, before eventually dampening it when a majority obtains higher levels of education (the composition effect). An increasing supply of high-skilled workers will also reduce the wage premium (the wage effect). Goldin and Katz (2008) describe a “race between education and technology”, where technological change increases demand for workers with tertiary education (see the earlier discussion about skill-biased technological change), and the wage premium of skilled workers increases if the growth of their supply does not keep up with technological change. Increasing human capital is therefore an important bulwark against the dis-equalising effects of skill-biased technological change.

The overall effect of expanding higher education on inequality is thus an empirical question, and most studies including OECD countries find an ambiguous or equalising effect from higher educational attainments (Förster and Tóth 2015, OECD 2011, Fournier and Koske 2012 and OECD 2017a). Contrary to this general finding, Kjeldsen (2016) finds that the compositional effect of higher educational attainment in Denmark has contributed substantially to increasing inequality. For Sweden, Robling and Pareliussen (2017) find that the compositional contribution to Gini inequality is negligible, but higher educational levels have increased the median income, pushing up the relative poverty threshold and thus increasing poverty. Even though it is possible that the compositional effect of rising educational attainments in the Nordics is to increase income inequality somewhat, the wage effect is likely to pull in the opposite direction. It should be noted, however, that this analysis does not take effects of lifetime income inequality and the importance of education for intergenerational mobility into account (OECD 2016b).

**Figure 9: High-skilled individuals are more likely to be employed, but the wage premium is modest in the Nordics**

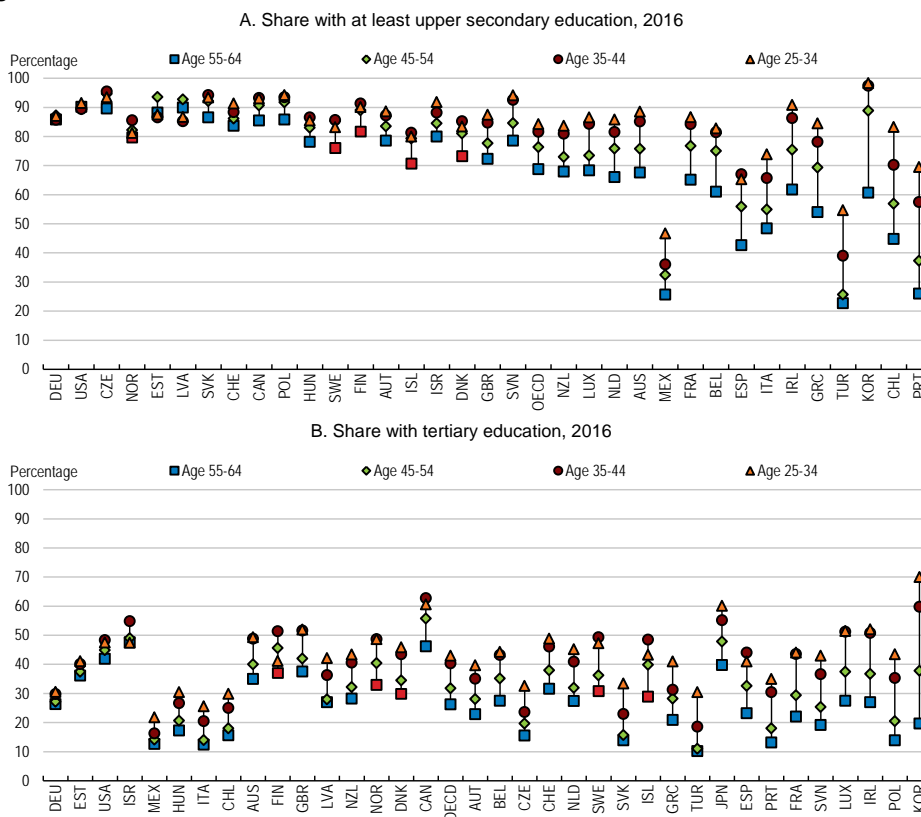


*How to read this figure: The Nordics show high employment rates for middle- and high-skilled individuals, but low employment for the low-skilled (Level 1 and below). At the same time wages are high for those low-skilled individuals who are employed and wages increase less with skills than for the PIAAC average, indicating that due to wage compression the returns to skills are mainly manifested in higher likelihood of employment rather than higher wages.*

Note: "Literacy skills" refer to the literacy score in the OECD Survey of Adult Skills (2012), part of the OECD Programme for the International Assessment of Adult Competencies (PIAAC). Literacy scores are translated into functional skill levels ("PIAAC levels"). The four data points in each graph refer to PIAAC level 1 and below (Low literacy skills), level 2, Level 3 (Middle skills) and level 4 and 5 (High literacy skills). The hourly wage is calculated as the % difference to level 3. The PIAAC average is the unweighted average for Australia, Austria, Belgium (Flanders), Canada, Estonia, France, Germany, Ireland, Italy, Japan, Korea, the Netherlands, Poland, Spain, the United Kingdom (England and Northern Ireland) and the United States.

Source: OECD Survey of Adult Skills (2012).

**Figure 10: In the Nordics educational attainment has mainly increased at the tertiary level across generations**



Note: Countries are sorted according to maximum difference between two age groups.

Source: OECD Education at a Glance Database.

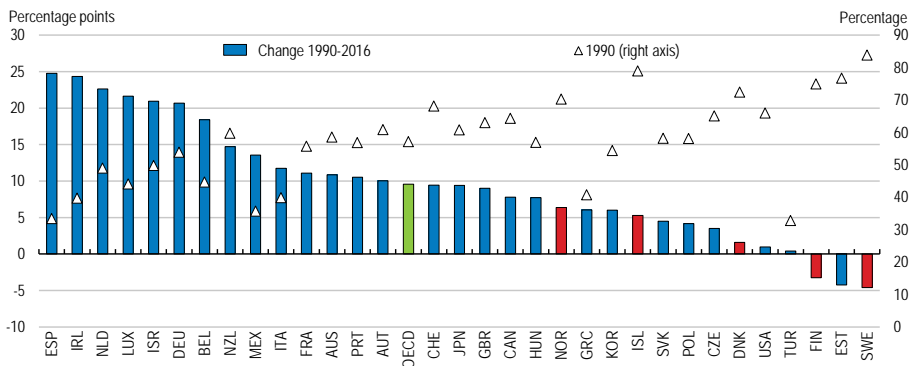
## Employment

Employment is high in the Nordics, even in Finland, which lags behind the other Nordic countries in this respect (Figure 1). The favourable employment outcomes are often attributed to a combination of high and relatively equally distributed skills, constructive labour relations and well-designed packages of active and passive support for unemployed rendering labour markets relatively flexible and dynamic.

Impressive employment rates aside, looking at male employment only, the Nordics are less exceptional. It is clear that high female employment in absolute terms, and the low employment gap to men are what truly separate the Nordics from the majority of OECD countries. Indeed, the gaps in employment between men and women are among the lowest in the OECD in all the Nordics, and close to zero in Finland (OECD 2015a).

Empirical studies generally find that a more gender-equal labour market reduces inequality. Women’s increasing employment, work hours and an increasing share of women working in skilled jobs taken together have held back inequality by almost one Gini point on average in a subset of OECD countries, not including the Nordics (OECD 2011). The impact was high in countries such as Belgium, the Netherlands, Spain and the United Kingdom, where the share of working-age households with female workers increased greatly. Compared to other OECD countries, the male-female employment gap was low already in the early 1990s in the Nordics, and has therefore not changed much over the past few decades (OECD 2015a, Figure 11). Increasing work intensity, more women in skilled jobs and reduced wage gaps may have helped hold back inequality growth in the Nordics countries in recent decades, but the effect has likely been smaller than elsewhere.

**Figure 11: Women's employment has changed little in the Nordics, but started at high levels**



Note: Employment to population ratios among 20–64 year olds.

Source: OECD Labour Force Statistics.

### *Structural changes in the age and socioeconomic composition of households*

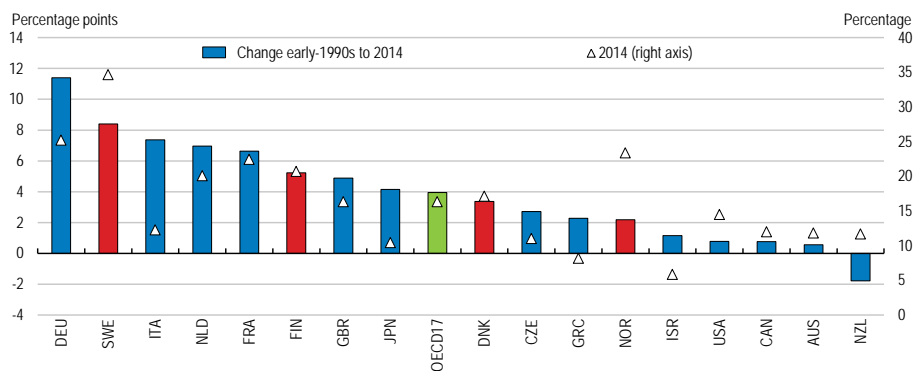
OECD countries have seen significant demographic changes over the past few decades, and the Nordics are no exception. Ageing, changing family structures, assortative mating, increasing educational attainment (see previous section) and immigration have affected the distribution of incomes, but with considerable variation in the timing and strength of these trends. Furthermore, these trends interact with market forces, institutions and redistribution so that the resulting inequality from comparable demographic trends is not uniform across countries, even in the Nordics. Pareliussen and Robling (2018) find that changing household composition, ageing, assortative mating and increasing student- and immigrant shares combined have increased disposable income inequality by approximately 1.4 Gini points in Norway, 1.1 in Denmark, 0.9 in Finland, and 0.6 in Sweden from 1995 to 2013. For Denmark, Kjeldsen (2016) find that 25% of the inequality increase from 1994 to 2014 can be attributed to ageing, immigration and education, with the largest contribution coming from rising education levels.

#### **Household structure**

The number of single-adult households has grown substantially in most OECD countries (Figure 12). This tends to increase inequality, since such households often have relatively low incomes and because it reduces overall income sharing among household members. In the Nordics, the shares of single-adult households and couple households without children have risen from high initial levels since the early 1990s, especially in Sweden and Finland. Changing household composition has been shown to contribute significantly to inequality in individual studies for the United States, Germany and Canada (Förster and Tóth 2015), and has also increased inequality substantially in the Nordics from 1995 to 2013, with the largest impact being found in Norway (Pareliussen and Robling 2018). This conclusion is consistent with NOU (2009), which found that almost 20% of the inequality increase from 1986 to 2006 was accounted for by changing household structure, and Robling and Pareliussen (2017), which found that changed household composition accounted for 16% of the overall disposable income inequality increase in Sweden from 1987 to 2013. These findings are also qualitatively in line with OECD (2011).

**Figure 12: The incidence of single-adult households has increased**

Share of working-age population (age 18-65) living in single-headed households



Note: Single-headed households include households with and without children. Data for early 1990s refer to 1989 for the United States; 1991 for Italy and Sweden; 1992 for Czech Republic; 1994 for Greece; 1995 for Japan and Norway; 1996 for France; and 1990 for the rest. Data for 2014 refer to 2012 for Japan; 2015 for Finland, Israel, the Netherlands, the United Kingdom and the United States; and 2014 for the rest.

Source: OECD Income Distribution Database.

In couple households a trend towards greater similarity of spouses' education and earnings levels (so-called "assortative mating") has also been observed in many countries (OECD 2011), which may contribute to inequality. However, rising education levels, especially among women, mechanically increase the share of households in which both spouses have higher education. Defining and measuring the impact of assortative mating on inequality is therefore not an easy task, and cross-country evidence is rare (Förster and Tóth 2015). A recent study by Eika et al. (2017) measures assortative mating as a higher propensity to enter homogeneous marriages in terms of education level relative to random assignment. They find a general positive effect on income inequality, but barely any change over time since the 1980s across five OECD countries (Denmark, Germany, Norway, the United Kingdom and the United States).<sup>8</sup> This is shown to result from a decline in assortative mating for highly

<sup>8</sup> For Denmark, Breen and Andersen (2012) also find that assortative mating has not contributed significantly to rising inequality, while changing composition of education has.

educated and an increase among low educated individuals. Limited contributions to the trend increase in inequality were found in OECD (2011). Pareliussen and Robling (2018) also find very limited contributions from assortative mating, measured as relative individual income rankings within couples in the gender-specific income distributions.

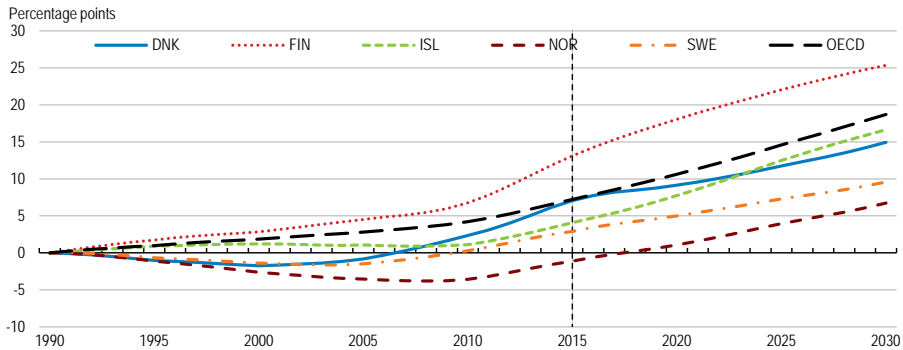
### Ageing

The age structure of the population can have a significant impact on inequality via different channels. For example, earnings dispersion increases during working life, while pensions are generally lower and more uniform than earnings. Shifting age structures have also induced shifts in the retirement age, and may alter government policies as the age of the electorate moves upwards (Förster and Tóth, 2015). Ageing has been relatively benign in the Nordics compared to the OECD average (Figure 13). Denmark, Norway and Sweden experienced a temporary peak in the old-age dependency ratio in 1990 and only since the mid-2000s has it started to increase. Finland stands out with considerable ageing since 1990, and this has increased inequality of disposable income by approximately a half Gini point, while ageing only had limited effects in the other Nordics from 1995 to 2013 (Pareliussen and Robling 2018). Such results reflect different timing and strength of ageing trends, and the choice of time period under study therefore matters. As an illustration, a study of Sweden showed that changing age composition from 1987 to 2013 can explain 11% of the increase in inequality in Sweden (Robling and Pareliussen 2017). Furthermore, the Nordics have implemented significant reforms of pension systems to address ageing. Simulations show that indexation of the retirement age to longevity in Denmark may curb the upward ageing effect on inequality (Danish Ministry for Economic Affairs and the Interior 2017).



**Figure 13: Ageing has been relatively modest in the Nordics, except for Finland**

Old-age (65+) relative to working-age (20-64) population, change since 1990



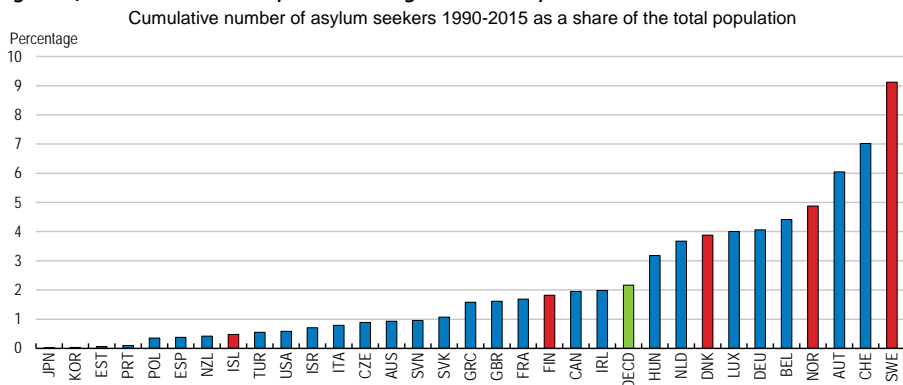
Note: Projections after 2015. OECD is the simple average across 35 OECD countries.

Source: United Nations, World Population Prospects: The 2017 Revision.

### Immigration

The effect of immigration on inequality depends on a number of factors, notably the skills of immigrants and natives, the speed and quality of integration, and the differences in household composition between migrants and natives. The effect is thus dependent on country and context. However, immigration to the Nordics shows some distinct characteristics, shared by some other countries, such as Austria and the Netherlands. These countries have received a large share of refugee immigrants (Figure 14), which poses challenges, especially in the context of a compressed wage distribution and a scarcity of low-skilled jobs (Swedish Labour Policy Council 2016, 2017 and OECD 2017f).

**Figure 14: The Nordics have experienced a high inflow of asylum seekers**



Note: Total population for 2015 applied. Data only available since 1991 for Poland; 1992 for Slovak Republic; 1996 for Greece; 1997 for Korea; 1998 for Estonia and Slovenia; 1999 for Iceland and Israel.

Source: International Migration Database; United Nations, World Population Prospect: The 2017 Revision.

Inflows of refugee migrants are determined by a number of factors (geopolitical, domestic and EU/Schengen policies toward migration). Compressed wage structures and generous social safety nets in the Nordics can make these countries attractive to immigrants with relatively low skills, even though this effect is disputed (Borjas 1987, Grogger and Hanson 2011 and Pareliussen 2017).

Table 1 shows the estimated impact of immigrant background on literacy skills, as measured by the literacy module of the OECD Survey of Adult Skills (2012), as well as employment, earnings and the incidence of being over-qualified. The table shows that an increased supply of low skills in countries where the labour markets are centred on high skills creates a challenge. A relatively large share of immigrants from non-Western countries are not in employment in the Nordics. This is largely related to the combination of non-Western immigrants' (not from North America or Western Europe) lower education and lower language- and processing (literacy) skills at each education attainment level compared to natives. A statistically significant employment penalty remains for non-Western, non-European immigrants ("immigrants from the rest of the world" in Table 1) in the pooled Nordic sample and in Denmark when controlling for education and literacy. Migrants in employment are also prone to earn less than natives and work in jobs with requirements below their

actual qualifications. This over-qualification is lower for immigrants who have acquired their qualifications in the country of residence, and does not seem to be related to literacy skills. Labour market outcomes of non-Western immigrants to the Nordics are consistently inferior to the OECD Programme for the International Assessment of Adult Competencies (PIAAC) average, even when controlling for education, literacy and socio-economic background.

Immigration from 2000 to 2013 has increased the Gini coefficient by almost a half Gini point and the poverty rate by 0.8 percentage points in Norway, and increased inequality by around 0.2 Gini points in Denmark and Sweden (Pareliussen and Robling 2018). A relatively modest increase in inequality as a consequence of immigration for Denmark is also reported in Kjeldsen (2016). However, the decomposition methodologies applied in these two papers only capture the effect from a changing population share of immigrants. Pareliussen and Robling (2018) show that also taking into account the changing composition of immigrants leads to a static effect from immigration two to three times greater than the original estimates. The impact in Norway is higher than in the other countries across specifications, which is consistent with findings by Statistics Norway (2017), and needs to be seen in light of weak attachment to the labour market, high benefit dependency, low intra-generational income mobility and relatively large single-earner families among immigrants from non-western countries. The refugee immigration wave in 2014 and 2015 is not reflected in any of the studies mentioned above, but should be expected to amplify income inequality.

**Table 1: Literacy proficiency and labour market outcomes of immigrants, difference to natives**

	PIAAC <sup>1</sup>	Nordic <sup>2</sup>	Denmark	Norway	Sweden
<b>Literacy score (OLS regression)<sup>3</sup></b>					
Immigrants from North America and Western Europe	-0.09	-0.14	-0.11	-0.02	-0.21
Immigrants from Central and Eastern Europe	-0.48**	-0.95**	-0.90**	-0.99**	-0.95**
Immigrants from the rest of the world	-0.61**	-1.12**	-0.93**	-1.09**	-1.20**
<b>Employment log odds (Logit regression)<sup>4</sup></b>					
Immigrants from North America and Western Europe	0.05	0.03	-0.26	0.11	0.15
Immigrants from Central and Eastern Europe	0.02	-0.07	-0.28	0.23	-0.03
Immigrants from the rest of the world	0.38**	-0.40**	-0.70**	-0.45	-0.15
<b>Over-qualification log odds (Logit regression)<sup>4</sup></b>					
Immigrants from North America and Western Europe	0.03	0.76**	0.67*	0.86*	0.79*
Immigrants from Central and Eastern Europe	0.63**	1.32**	1.93**	1.14**	1.22**
Immigrants from the rest of the world	0.19	1.64**	1.67**	1.35**	1.74**
<b>Log hourly earnings (OLS regression)<sup>4</sup></b>					
Immigrants from North America and Western Europe	0.08	-0.03	-0.11	-0.04	0.02
Immigrants from Central and Eastern Europe	-0.10*	-0.12**	-0.10*	-0.03	-0.19**
Immigrants from the rest of the world	-0.04	-0.15**	-0.18**	-0.16**	-0.13**

Note: The table shows the impact of immigrant dummies in four separate regressions on literacy skills, as measured by the literacy module of the OECD Survey of Adult Skills (2012), as well as employment, earnings and the incidence of being over-qualified. Immigrant dummies have the following country coverage: Central and Eastern Europe: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, Turkey, former Yugoslavia. Western Europe and Northern America: Austria, Belgium, Canada, Cyprus, Denmark, Faroe Islands, Finland, France, Germany, Greece, Greenland, Ireland, Iceland, Israel, Italy, Luxembourg, Malta, the Netherlands, Norway, Portugal, San Marino, Saint Pierre and Miquelon, Spain, Sweden, Switzerland, the United Kingdom and the United States. 1. Due to data limitations, only the following ten countries are included in the PIAAC average: Austria, Belgium (Flanders), Canada, France, Ireland, Italy, the Netherlands, Spain, the United Kingdom (England and Northern Ireland) and the United States. 2. An average of Denmark, Norway and Sweden. 3. Literacy scores are scaled by the standard deviation for ease of interpretation. Results are obtained controlling for education, demographic and socio-economic characteristics. Country fixed effects are included in the pooled regressions (see Bussi and Pareliussen, 2017 for details). 4. Controlling for literacy, education, demographic and socio-economic characteristics. Country fixed effects are included in the pooled regressions (see Bussi and Pareliussen, 2017 for details).

Source: Authors' calculations based on the OECD Survey of Adult Skills (2012), following the methodology in Bussi and Pareliussen (2017).

## *The role of tax and transfer reforms*

High income taxation and generous cash transfers remain distinguishing features of the Nordic societies. The inequality-reducing effect of personal income taxes and social cash transfers is usually quantified as the difference between the Gini coefficient for household market incomes (i.e. inequality before taxes and transfers) and disposable incomes (i.e. inequality after taxes and transfers) and expressed in percent of market income inequality (Reynolds and Smolensky 1977). This provides a simple and tractable metric for analysing redistribution across countries and over time, but an important limitation is that it does not allow for separating the mechanical effect of tax and transfer schemes on household incomes from the effect induced by behavioural responses to policy changes.<sup>9</sup>

Declining redistribution has been relatively widespread across OECD countries for which comparable data are available since the mid-1990s (Causa and Hermansen 2017). Denmark, Finland and Sweden have experienced some of the largest declines in the level of redistribution, bringing them relatively close to the OECD average in 2014 (Figure 15, Panel A). This decline has been a critical driver of the overall rise in disposable income inequality in these countries.<sup>10</sup> In the case of the Nordics, part of the decline in redistribution reflects the business cycle recovery and reductions in structural unemployment since the crisis and recession in the mid-1990s. However, a simple cross-country comparison between changes in redistribution and changes in employment rates over the period indicates that redistribution has declined substantially more in the three Nordic countries than can be explained by the mechanical effect from changes in labour market status among the working-age population (Figure 15, Panel B).

In addition, within the group of Nordics, redistribution has converged following a strong increase in Iceland after the crisis and a minor increase in Norway. Nevertheless, this assessment cannot capture the full redistributive effect of tax and transfer systems since the data do not allow for including the impact of social

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<sup>9</sup> See Section 3.4 in Causa and Hermansen (2017) for a thorough discussion of the approach and its limitations.

<sup>10</sup> Redistribution figures are reported for the working-age population (age 18-65) to avoid some major problems inherent in comparing incomes between people who are at very different stages of their lives. This also improves cross-country comparisons of redistribution since differences in the institutional settings governing the funding of pension systems, depending on the recording of income flows in capitalisation compared to pay-as-you-go systems, risk hampering redistributive analysis covering the elderly (see Causa and Hermansen, 2017).

transfers in-kind (e.g. healthcare and education) and consumption taxes among others. This is an important limitation from a Nordic perspective since the provision of extensive public services is an essential part of redistribution in the Nordic societies.<sup>11</sup> Aaberge et al. (2018) show that the ranking of countries according to the Gini coefficient is relatively insensitive to the inclusion of public services. However, public in-kind transfers generally reduce inequality considerably, and reduce poverty among the elderly and families with children markedly in the Nordics.

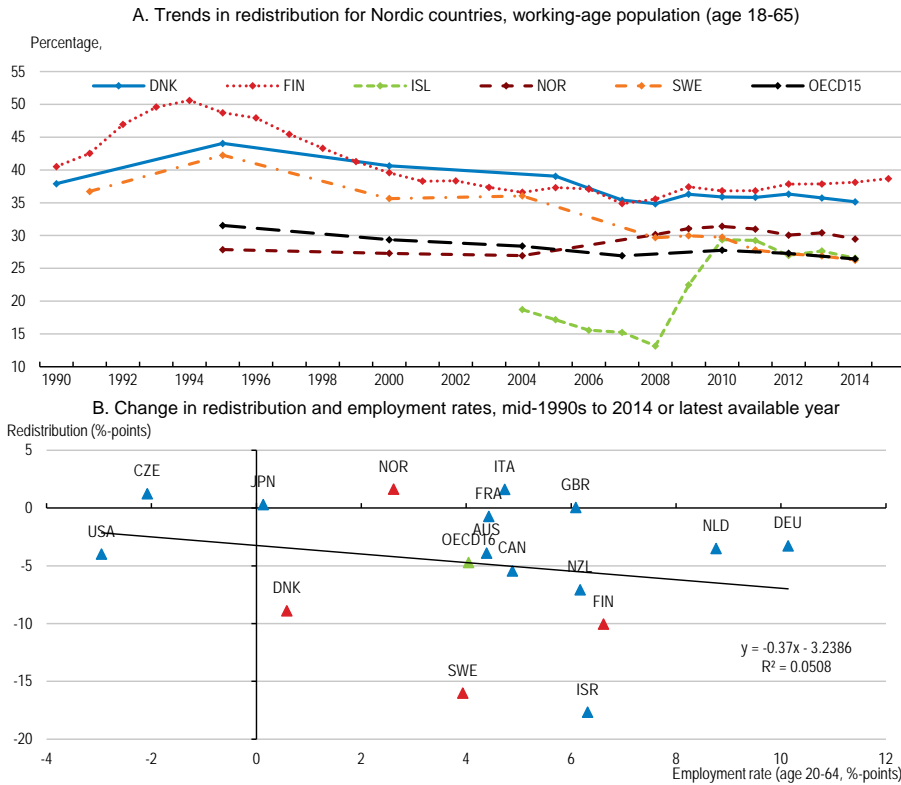
The weakening redistribution in Nordic countries is likely to partly reflect a series of reforms aimed at spurring work incentives and raising employment (see below). Behavioural responses can have dampened the inequality impact before taxes and transfers as a result of moving workless people with little market income into employment. Figure 16 suggests that this has to some extent been achieved: market income inequality in Finland has declined from the mid-1990s to 2014, while Denmark and Sweden experienced relatively minor increases.

Small or no change in market income inequality in parallel with strong increases in disposable income inequality makes Finland and Sweden stand out in comparison with the rest of the OECD. One interpretation is that since the Nordics may have long been close to the best policy frontier along several dimensions, the scope for reforms boosting both growth and equity has been limited. Facing a trade-off between redistribution and efficiency, the Nordics chose to unwind parts of the welfare state expansion that had taken place up to the 1980s (Domeij and Flodén 2010, Andersen and Maibom 2016 and OECD). Recent examples of such reforms to the Finnish unemployment insurance are thoroughly analysed in Kyrrä *et al.* (2017) and Kyrrä and Pesola (2017). Another example is the earned income tax credit introduced in Sweden in 2007, later increased in four additional steps. The reform is estimated to have increased employment significantly, but also to have increased income dispersion in the bottom of the distribution (Fiscal Policy Council 2014).

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<sup>11</sup> See Causa and Hermansen (2017) for a discussion and references to evidence on the distributive effect of in-kind transfers and consumption taxes. Hermansen (2017) provides tentative evidence on the impact of social transfers in-kind on inequality trends across different country groups, including the Nordics.

**Figure 15: The redistributive effect of taxes and transfers has declined substantially in Denmark, Finland and Sweden**

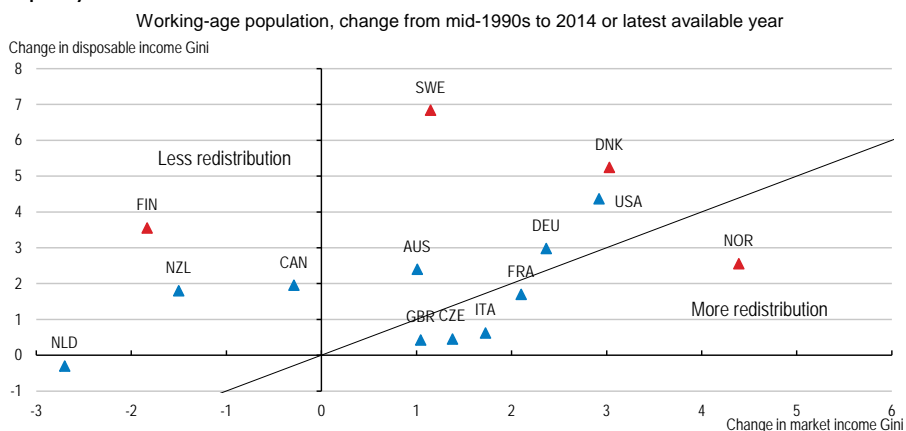


Note: Redistribution is measured by the difference between the Gini coefficient before personal income taxes and transfers (market incomes) and the Gini coefficient after taxes and transfers (for disposable incomes) in per cent of the Gini coefficient before taxes and transfers. The working-age population include all individuals aged 18–65. OECD15 is a simple average across 15 OECD countries (Australia, Canada, Czech Republic, Denmark, Finland, France, Germany, Israel, Italy, the Netherlands, Norway, New Zealand, Sweden, the United Kingdom and the United States) with available information since mid-1990s, applying closest year for some countries and years. A change in the income definition implies a break in the series around 2011 for some countries and an estimated series correcting for the break have been used. For Panel B data refer to 1994–2015 for the United Kingdom; 1995–2012 for Japan; 1995–2015 for Finland, Israel, the Netherlands and the United States; 1996–2014 for Czech Republic and France; and 1995–2014 for the rest.

Source: OECD Income Distribution Database; OECD Labour Force Statistics.

In all OECD countries, including the Nordics, the majority of the inequality-reducing effect of redistribution comes from cash transfers, although income taxes also play an important role, especially in Iceland (Causa and Hermansen 2017).<sup>12</sup> Transfers account for most of the widespread decline in redistribution across OECD countries since the mid-1990s, including in Denmark, Finland and Sweden (Figure 17).<sup>13</sup> On average across OECD countries, this resulted mainly from a reduction in redistributive insurance transfers, like unemployment and sickness benefits, which was only partly compensated by rising assistance transfers, often means-tested and thus more targeted towards low-income households (Causa and Hermansen 2017).

**Figure 16: The Nordics experienced stability in inequality before taxes and transfers but increases in inequality after taxes and transfers**



Note: The 45-degree line represents a hypothetical scenario in which there is no change in redistribution and, as a result, changes in pre-tax and transfer inequality correspond perfectly to changes in post-tax and transfer inequality. Positions above the 45-degree indicate a larger rise in disposable income inequality relative to market income inequality, implying less redistribution, and vice versa below the 45-degree line.

Source: OECD Income Distribution Database.

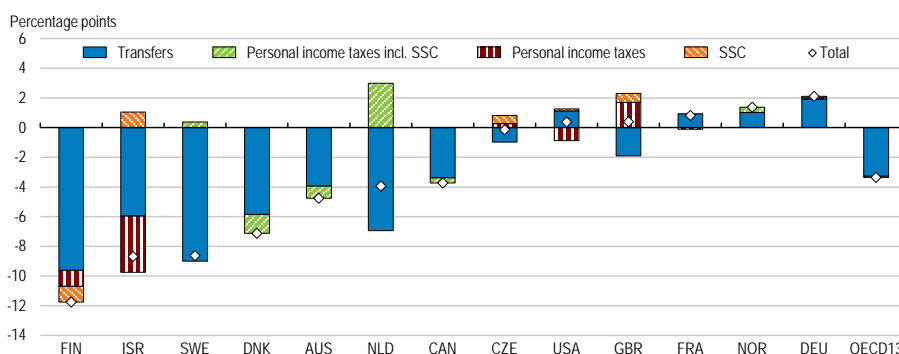
<sup>12</sup> Such assessment and comparison across countries should be taken with some caution due to the interaction of taxes and transfers. For instance, cash transfers are usually taxed at a relatively high rate in the Nordics. See Causa and Hermansen (2017) for further discussion and details on the computations.

<sup>13</sup> The decomposition in Figure 17 is based on computations from the Luxembourg Income Study. Unfortunately, data is only available for the period 1995-2005 for Sweden. Note also that the overall change in redistribution may differ slightly from the one reported in Figure 15 as a result of different data sources.



The reduction in redistribution through transfers is the outcome of changes to policy settings, economic conditions and a number of structural factors. While the empirical framework applied in Causa and Hermansen (2017) does not allow for isolating the precise contribution of discretionary policy changes, more direct policy indicators allow for tracking some important drivers of declining redistribution in the Nordics.

**Figure 17: The decline in redistribution is mainly driven by less redistributive cash transfers**  
Change in redistribution for the working-age population, mid-1990s to 2013 or latest available year



Note: Sweden only available for 1995–2005 and social security contributions not available for France. See Causa and Hermansen (forthcoming) for the approach to assess the redistributive impact of individual parts of the tax and transfer systems. The total change in redistribution may differ from the one reported in Figure 15 since different data sources have been applied. Data refer to 1993–2013 for the Netherlands; 1994–2010 for Canada and France; 1994–2013 for Germany, the United Kingdom and the United States; 1995–2005 for Sweden; 1995–2010 for Australia; 1995–2013 for Denmark, Finland and Norway; 1996–2013 for Czech Republic; and 1997–2012 for Israel.

Source: OECD staff calculations based on the Luxembourg Income Study.

Reforms to improve work incentives are reflected in markedly reduced generosity of unemployment insurance systems in most of the Nordic countries, but in different ways, and from very high initial levels. In Sweden, the net unemployment benefit replacement rate for a newly unemployed has dropped from around 65% in 2001 to close to 40% in 2015 for a worker with average earnings (Figure 18, Panel A). This reflects benefit cuts and unsystematic uprating of benefits relative to wages from the 1990s until now and the implementation of the earned income tax credit (OECD

2017f). The maximum duration of unemployment benefits has been reduced substantially in Denmark and Norway, which led to the average net replacement rate over five years of unemployment (for a worker with 67% of average earnings) dropping spectacularly (Figure 18, Panel B). Nevertheless, Denmark is still among the OECD countries with highest average net replacement rates over 5 years.

Even though the reforms described are likely to have contributed significantly to reduce redistribution, means-tested benefits have kept the ability of the social safety net to secure minimum living standards more or less intact, as can be seen from the corresponding net replacement rate including social assistance and housing allowances (Figure 18, Panel C). Less redistributive transfers are also likely to reflect significant tightening of sickness and disability schemes observed in many OECD countries, including the Nordics (OECD 2010).

Turning to income taxation, indicators demonstrate that the Nordics have implemented significant reforms over the past decades. The average rate of personal income tax and employee's social security contributions has declined by almost nine and six percentage points in Sweden and Denmark, respectively, from 2000 to 2016 (Figure 19, Panel A).<sup>14</sup> This reflects a series of reforms to strengthen work incentives, among others the introduction of earned income tax credits in Denmark and Sweden in the mid-2000s and more generally by shifting taxation away from labour income to other sources (Danish Ministry of Taxation 2017 and Swedish Ministry of Finance 2010).

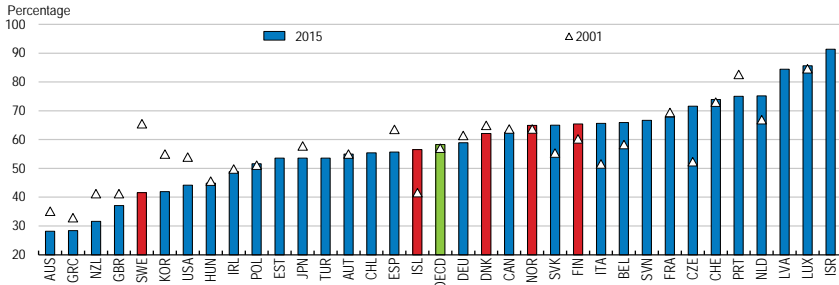
Such reductions in average tax rates reduce the redistributive effect of income taxation, but this may be counteracted by increasing the progressivity of the tax system. In Sweden, this seems to have been the case: the tax reduction is larger at 67% of average earnings than at 167% of average earnings (Figure 19, Panel B), at least partly as a consequence of the sizeable earned income tax credit implemented in 2006. By contrast, progressivity has declined in Denmark and Iceland according to this simple comparison. More comprehensive analysis of progressivity across the distribution points to a general rise in progressivity in the lower part of the income distribution and little or no change in the upper part on average across OECD countries (OECD 2014a). Reforms in this area include cuts to labour taxes and social security contributions targeted towards low-income workers, but also expansions of in-work benefits, tax credits and child-related tax reliefs.

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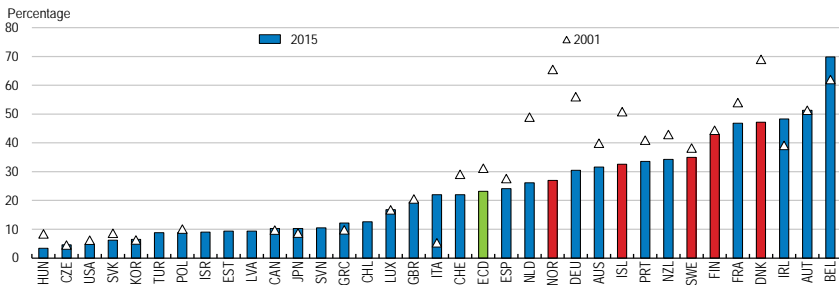
<sup>14</sup> Results are qualitatively unchanged for the average tax wedge, i.e. including all labour compensation costs.

**Figure 18: Unemployment insurance systems have become less generous in the Nordics**

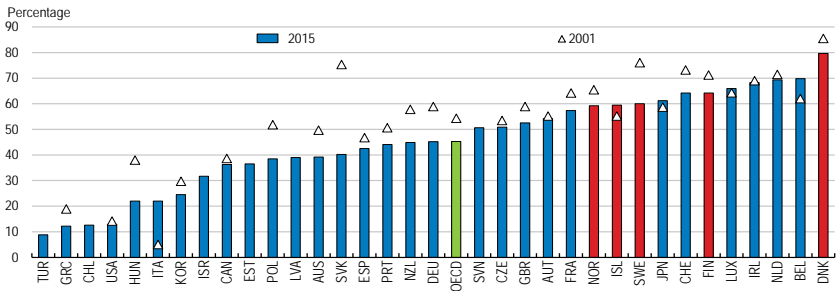
A. Initial net UI replacement rate



B. Average net UI replacement rate over five years



C. Average net UI replacement rate plus social assistance and housing allowances over five years

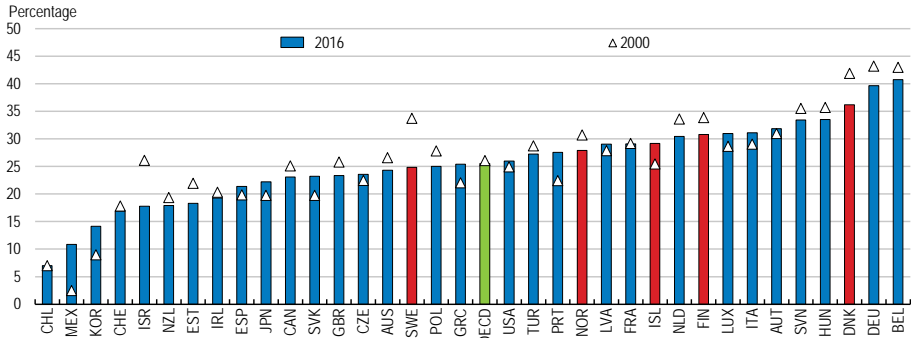


Note: Panel A: single, 100% of average earnings, no children. Panel B: single, 67% of average earnings, no children, assumed not to qualify for social assistance and housing allowances (no top-ups). Panel C: single, 67% of average earnings, no children, assumed to qualify for social assistance and housing allowances (top-ups). Reforms implemented after 2015, such as a raised unemployment insurance ceiling in Sweden, shortened unemployment insurance duration in Finland and extended unemployment benefit duration in Denmark are not included.

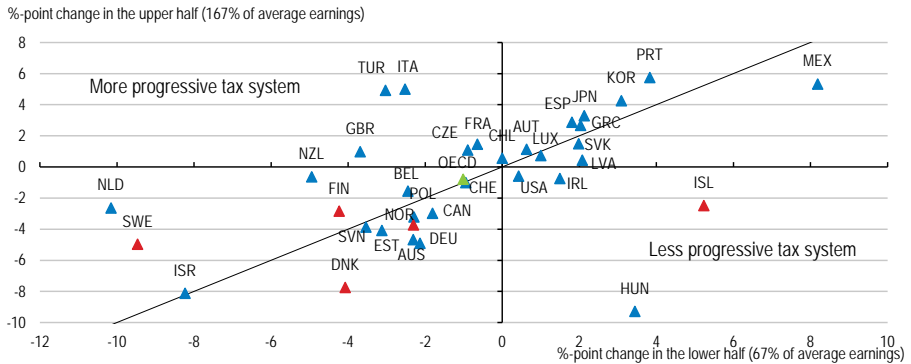
Source: OECD Tax-Benefit Models.

**Figure 19: Personal income taxation is high but has been reduced in the Nordics**

A. Average net income tax rate



B. Change in progressivity from 2000 to 2016: Tax rate in lower vs upper half of the earnings distribution



Note: Taxes include personal income taxes and employees' social security contributions. All series illustrated are for singles with no children. Panel A applies to average earnings.

Source: OECD Taxing Wages.

## Summary and challenges ahead

If anything, it may seem like a paradox that the Nordics, which are very open economies, heavily integrated in global value chains and frontrunners in the use of new technologies (OECD 2013, 2014b), have not seen even more widening distributions of market incomes. However, the extent to which skill-biased structural change and other forces widening the earnings distribution of workers will actually drive up inequality depends on a number of

factors, and key policies and institutions in the Nordics play a dampening role. First, institutions such as unions and collective bargaining, employment protection legislation and minimum wages dampen the direct effect of market trends on earnings. Second, higher demand for skills can be met by increasing the supply of skilled workers, thus holding back skills premiums. Third, increasing employment can mitigate the inequality-increasing effect from a widening earnings distribution among workers.

With a relatively modest impact of market forces, explanations for increasing inequality must be sought elsewhere. Demographics have been a relatively strong driver of inequality in the Nordics. Household structure, with more single-headed households has widened income dispersion in Denmark, Finland, Norway and Sweden. Ageing has increased inequality significantly in Finland, and a similar increase can be expected in Denmark, Norway and Sweden, as ageing intensifies going forward. Yet, indexation of the retirement age to life expectancy may dampen the inequality effects of ageing in the future. Redistribution has weakened significantly in Denmark, Finland and Sweden, notably with weaker insurance transfers only partially offset by means-tested transfers. Income tax rates have also been reduced, while progressivity increased in Sweden and decreased in Denmark and Iceland.

Technological and demographic pressures are set to continue going forward, and these challenges need to be embraced and met by continued flexibility and constructiveness of the social dialogue. Continued improvements to education are essential to seize opportunities from technological change and avoid a widening wage distribution. Making social insurance and welfare transfers more flexible and agile would improve workers' protection in a rapidly changing world of work. Removing incentive traps, notably in Denmark and Finland, and linking benefits to real-time income registries are important steps to this end (OECD 2018). Adequate incentives should always be weighed against the role redistribution has in sharing risk and compensating losers, a necessity to muster broad support in embracing technological change and globalisation.

The Nordics may have faced a binding equity-efficiency trade-off previously, but seen in the light of high employment, a long period of weakening redistribution and the central role of the social safety net in the overall functioning of the Nordic model, this is not necessarily the case anymore for all the Nordics. The uprating rules for social benefits play an important role in inequality development over the long term. Most benefits in Sweden are linked to the consumer price index or not indexed at all. Because of this system, redistribution is now at the OECD average level, after having weakened considerably since the 1990s (OECD 2017f).

This paper has focused on inequality in household disposable incomes, measured in a single year only, for which comparable cross-country data are relatively abundant. Yet, concerns about rising inequality usually reflect concerns for declining equality of opportunities. A thorough assessment of inequality trends should thus also focus on developments in lifetime incomes, intergenerational mobility and the distribution of wealth. The importance of wealth can be illustrated by the fact that national inequality data applying a broader capital income concept than the one applied by the OECD tend to show even stronger rises in income inequality in the Nordics than reported here (Danish Ministry of Economic Affairs and the Interior 2017, Swedish Ministry of Finance 2016 and Statistics Norway 2017).<sup>15</sup>

Policies to redistribute wealth have weakened considerably in the Nordics over the past few decades, partly as a response to globalisation, and encouraged by organised interests from the business community. The Nordic dual income tax reforms of the early 1990s led to lower ratios of statutory corporate to wage taxes than in most OECD countries, and lighter taxation of capital than labour. Statutory capital income tax rates have since been reduced further in the Nordics as part of a global trend. Top income earners in the Nordic countries mainly derive their income from capital. Wealth and inheritance taxation has also been reduced considerably, with Norway and Sweden abolishing inheritance taxes altogether (Schjelderup 2015). Lighter taxation of capital income, wealth and inheritance taken together raises concerns about intergenerational income mobility. As an example, in the top 0.1% of the Swedish income distribution fathers' relative incomes determine 90% of sons' incomes, largely because of capital income. Furthermore, mobility from the bottom 75% to the top 0.1% is close to non-existent (Björklund et al. 2012a and 2012b).

However, cross-country comparable data are much scarcer in the areas of capital income and wealth, and even though the Nordics tend to be among the frontrunners, more needs to be done to correctly measure, compare and understand the distribution of wealth. The role of taxation should also be reconsidered, notably inheritance and owner-occupied housing taxes, which in addition to redistribute wealth, are known to be among the most efficient ways to raise public revenue. Strengthening Nordic cooperation to avoid regional pressure towards ever lower capital income taxes could also be considered.

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<sup>15</sup> Foremost the inclusion of realised (windfall) capital incomes, which is usually not included in a standard household income concept (UNECE, 2011), but also the income value of owner-occupied housing services (imputed rents).

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## Comment on J.K Pareliussen, M. Hermansen, C. André and O. Causa: Income Inequality in the Nordic Countries from an OECD Perspective

Jørgen Elmeskov<sup>16</sup>

This is a very rich paper. It presents a lot of evidence on the development of income distribution and potential drivers thereof in an international, comparative setting. Many of the findings seem convincing. Against that background, these comments mainly go a bit beyond the analysis in the paper to consider, in turn, three different questions.

### *What aspects of income distribution should be the focus for analysis?*

The paper does not really address this issue. However, depending on the concern driving the interest in distribution, different aspects of income distribution are relevant. For example, an ethical concern with poverty, or a related Rawlsian approach to progress, might imply a focus on the bottom part of the income distribution. That could also be the case if the concern is with economic growth and the risk that poverty can sap human capital investment and, hence, the potential for intergenerational advance. In that case, however, focus might be to a large extent on absolute instead of relative levels of income at the bottom. The concern with the means to invest in childrens' education naturally leads to a focus on (equalised) family income, but there could be legitimate concerns also with individual income. This could be the case, for example, to the extent that status in society is associated with the ability to secure a certain level of income and the concern driving the analysis relates to individuals' sense of status and self-esteem.

The paper takes its point of departure in household income and, although indicators of poverty are shown and discussed, seems to put the main emphasis on the overall income distribution. This does not fit so well with the concerns discussed above but could reflect an interest for social cohesion. Arguably, tendencies for "decoupling" at

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<sup>16</sup> Statistics Denmark.

either end of the distribution could raise such concerns. But, then, if the concern is with the extremes, perhaps the Gini coefficient is not such an obvious indicator to study.

An aside in this context is that if the extremes are the main point of interest, then the level of aggregation may matter for the conclusions. Two papers in this volume present curves on income growth incidence for Denmark. Given the need to cover many countries, the present paper shows these by deciles, and although there is some tendency for income growth to be higher (lower) at the top (bottom) of the distribution, the difference does not look dramatic. By contrast, the paper by Søgaaard presents the curves by percentiles, which gives the impression of a much more substantial “decoupling” at the very top end (Søgaaard 2018).

All of this is a long song and dance to make the point, that the main concern motivating the analysis should also colour the choice of exactly what is studied. The present paper leaves the reader somewhat in the dark on that point even though the indicators studied in the paper implicitly must reflect some particular preoccupation.

### *What do the explanatory variables actually explain?*

It is in the nature of empirical economic and social indicators that few of them can be considered truly exogenous. This goes also for indicators describing aspects of policy to the extent political economy mechanisms are at work – which they obviously are. The authors are clearly aware of the problems associated with drawing causal inferences. They provide the example that, in an accounting sense, less progressive redistribution policies have led to a widening of income distribution, but they may also have sharpened incentives and led to better employment outcomes, possibly making for a less dispersed distribution of market income. Hence, focusing only on the redistribution part can be misleading.

One can think of a number of similar cases, which might have implications for some of the arguments in the paper. For example, a rise in the share of single-earner households may have contributed to a wider dispersion of disposable income in some of the Nordic countries, as argued in the paper. However, the rise in the share of single-earners may reflect increased affordability of living alone which in some sense may be seen as an equalising development.

A very similar argument is that if ageing has led to a widening of income distribution in some of the Nordic countries, this may reflect that retirement incomes at the bottom have become more generous and, hence, allowed retirement from

work. Again, a measure which seems equalising in nature gets recorded as a rise in inequality.

A number of arguments along these lines could be made. They do not question the empirical accuracy of the observations made in the paper. But they do suggest that sometimes causal links can be more complicated than it appears from bivariate comparisons of endogenous variables.

### *What additional explanatory factors could be considered?*

The paper is so rich in its coverage of potential explanatory factors, that it seems almost cruel to suggest further things to consider. Moreover, the authors deserve praise for their focus on factors that can be quantified empirically, whereas some of the suggestions below are hard to quantify. But, at least it may be useful to remind oneself about factors not covered in the paper.

Something which is almost impossible to quantify is the role of societal norms. They are likely to have substantial impacts perhaps particularly in those labour market segments that seem at some distance from the notion of a competitive market. This links to another factor which is the degree of competition and scope for rent sharing. The policy stance on competition and regulation in product and financial markets together with market developments in these areas are likely to have spillovers to income distribution.

Finally, the development of pension arrangements may have a significant impact. In Denmark, the build-up of funded occupational pensions has probably sapped recorded disposable income growth in the low and middle-income ranges, but it has also led to a build-up of assets that will generate retirement income (although for many this is subject to sizeable marginal effective tax rates). This points to a more general point, also touched on in the paper, which is the need to consider the intertemporal aspects of income distribution. For example, low incomes among students who can look forward to high incomes subsequent to graduation may not be as much of a concern as low income among people who remain at the bottom end of the distribution. There is also an intergenerational aspect to consider, with inheritance affecting the distribution of wealth and consumption possibilities.

Summing up, the present paper has provided a rich basis for discussion on income distribution and its drivers but has far from exhausted the topic.

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Søgaard, J.E. (2018), Top Incomes in Scandinavia: Recent Developments and the Role of Capital Income, this volume.

## Comment on J.K. Pareliussen, M. Hermansen, C. André and O. Causa: Income Inequality in the Nordic Countries from an OECD Perspective

*John Hassler*<sup>1</sup>

There has recently been an increase in the attention to developments of income inequality among researchers and policy makers. Of course, income inequality has always been at the center of the political discussion in the Nordic countries, but also here, I believe the consensus is strengthening that too much inequality may be detrimental to societal sustainability. In light of this, it is not surprising that the finding that Sweden has had the largest increase in the Gini coefficient of all OECD countries has gained a lot of attention. "Sweden, who would believe this about Sweden?" to paraphrase the current U.S. president.

However, income inequality is a multidimensional phenomenon that does not let itself be captured by a single statistic. A fruitful discussion about inequality must therefore dig much deeper than simply looking at the Gini. The paper by Pareliussen et al. is a very valuable contribution to such deep-digging.

A key conclusion in the paper is that the usual international suspect of increased inequality, globalization, is not very important in the Nordic countries. The authors note that it may even be "seen as a paradox" that the very open Nordic countries have not had much of a widening in market income distribution. The Nordics have been able to embrace openness that exploits the fruits of globalization without suffering from the negative consequences that in other countries are regarded as a threat to openness and even democracy. Writing down the formula for this achievement so it can be used elsewhere is a task of first-order importance for researchers in the field of inequality.

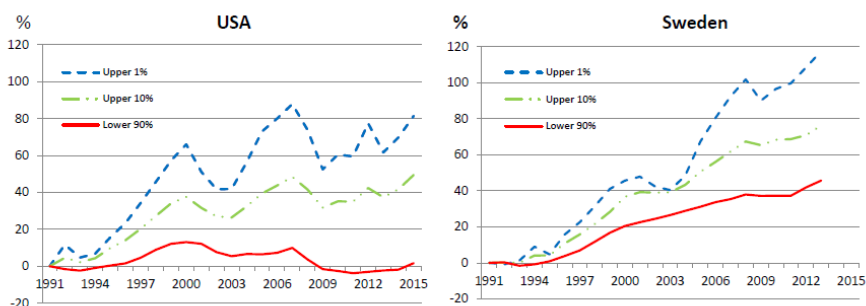
Openness and globalization have been central for the transformation of the Nordic countries from poor agrarian countries to rich welfare states. The Pareliussen et al. paper focuses on a relatively recent history from the early 1990s and onwards. It may also be important to adopt a longer time perspective, although data limitations

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can obviously be a problem. To illustrate this point, I use the World Wealth and Income Database that covers a time period starting in 1970. The database contains data for average taxable income before taxes and transfers for the top one and top ten percent as well as for the remaining 90 percent. Figure 1 shows the development of accumulated real income changes for these three groups in Sweden and the U.S. It can be seen that the incomes of the top groups have increased much faster than for the rest in both countries. In fact, the increases in top incomes are very similar in the two countries.

Figure 1: Accumulated real income changes in the U.S. and Sweden, 1991–2015

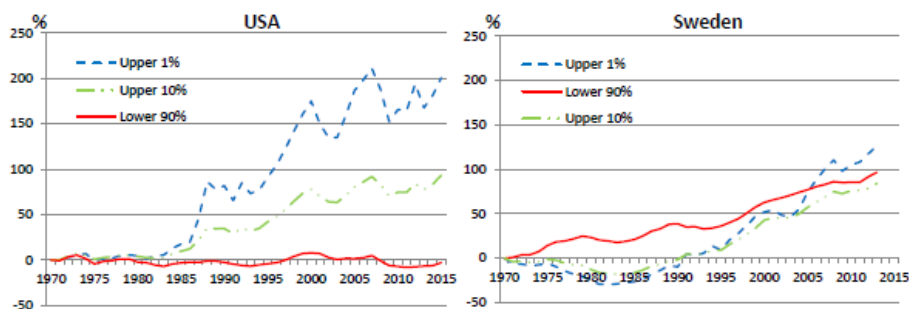


Source: The World Wealth and Income Database.

However, the picture looks very different if the sample period is extended backwards to 1970 as shown in Figure 2. Then the U.S. and Sweden look very different. Income inequality in the U.S. has increased continuously over the four and a half decades and the increase has been very large. In Sweden, the development has not been monotonic – the increase in inequality in the latter half of the period is largely balanced by a compression in the earlier. Interestingly, the compression coincides with a period of sluggish Swedish growth, while the increase occurred during a time period when Swedish growth came back to previous levels. This coincidence could be given at least two quite different interpretations. One is that the welfare state manages to distribute aggregate and long-term income risk to arguably more risk-tolerant high income-earners. The other, less beneficial, interpretation is that higher inequality *caused* higher growth, indicating perhaps that egalitarian policies went too far in Sweden during the 1970s and 1980s.



Figure 2: Accumulated real income changes in the U.S. and Sweden, 1970–2015



Source: The World Wealth and Income Database.

Another remarkable achievement of the Nordic countries is that they have achieved low levels of inequality *and* high levels of intergenerational mobility. The “American dream” is perhaps a dream in the U.S. but more real in the Nordic countries.

Previous work by Hassler, Rodríguez Mora and Zeira (2007) constructed a model showing that if cross-country differences in equality are driven by differences in the labor market, e.g., the intensity of skill-biased technical change, the cross-country correlation between inequality and intergenerational mobility should be positive. If, on the other hand, the correlation is negative, this points in the direction of differences in access to good education. At the time, we had little empirical evidence, but since then the evidence point to a largely negative correlation. The tendency of increasing educational segregation in Sweden, in particular, is worrisome in this perspective.

Lower intergenerational mobility is arguably bad in itself. Hassler and Rodríguez-Mora (2000) also argued that lower intergenerational mobility and lower growth interact in a detrimental feed-back loop. Low mobility leads to a less efficient allocation of innate talent. This in turn reduces growth and makes the society more static. In such a society, family background and social networks become relatively more important for job-opportunities, thus feeding back into lower mobility.

Pareliussen et al. provide new and interesting evidence on the development of inequality in the Nordic countries. A great additional value is that the paper should stimulate further work on these very important questions.

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# Top Incomes in Scandinavia – Recent Developments and the Role of Capital Income

*Jakob Egholt Søgaard*<sup>1</sup>

## Abstract

This paper deals with the development of top incomes in Scandinavia. I first explain why academia over the past two decades has focused on the income share of top groups, in particular the one percent of the population with the highest incomes. Furthermore, I examine some of the main drivers of inequality that have been considered in the literature and present new suggestive evidence on the role of capital income and, in particular, the shift from interest income to dividends that has occurred over the past decades.

Keywords: Scandinavia, income inequality, top incomes.

JEL classification: D31, D63, N34.

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<sup>1</sup> University of Copenhagen and the Center for Economic Behavior and Inequality (CEBI). I thank Lykke Styrbæk, Nicolai S. R. Møller and Michael Lund for helping with the data processing and for helpful discussions. I also thank Daniel Waldenström for helpful discussions and clarifications during the writing process and for sharing data as well as Rolf Aaberge and Marja Riihelä for sharing data. Finally, I would like to thank the editors and a referee for very constructive and thorough comments and suggestions. The funding provided by the Danish National Research Foundation to CEBI is gratefully acknowledged.

## Introduction

Over the past decades, we have witnessed a substantial increase in the focus on income inequality both among academics and in the public in general. Among academics, the focus has been particularly on top income shares starting with the papers by Piketty (2001) and Saez and Piketty (2003). They use tabulated data on the income distribution in France and the US to compute top income shares over the past century. Together with the studies that followed in the slipstream, these papers have been successful in “putting distribution back at the center of economics” (Piketty 2015).

Here I focus on the top income shares in the Scandinavian countries. They are known for their relatively low levels of income inequality and high social mobility, while at the same time being among the most prosperous nations in the world. In my analysis I stand on the shoulders of numerous scholars who have worked to create top income series for a large number of countries stretching back over the last century. I also stand on the shoulders of the many authors who survey the literature from an international perspective and, in particular, the surveys by Atkinson et al. (2011) and Roine and Waldenström (2015).

I furthermore contribute to the literature by more closely examining the relationship between changes in dividends paid to households and top income shares. Here I build on the original work by Piketty (2001) and the more recent work of Bengtsson and Waldenström (forthcoming), but probe into the effect of the composition of capital income instead of just considering the overall level of capital income. I find that changes in dividends relative to total household income correlate strongly with changes in top income shares in Finland and Norway, but less so in Denmark and Sweden.

However, at the same time I caution that any causal identification of underlying drivers of inequality has so far been limited by the fact that we measure inequality at the national level. This leaves us with a small number of observations that are hit by a myriad of different events over time, thus making it difficult to separate the effects of each individual event.

## Why top income shares?

The particular focus on top income shares might seem narrow. Why only focus on the top of the income distribution, when we have standard measures, such as the Gini coefficient, that capture changes in the entire income distribution? For many economists – not least in Scandinavia – the Gini coefficient has long been the inequality measure of choice.

There are at least a couple of reasons for the focus on top income shares. In the public debate one likely reason is that inequality driven by the top (and bottom) of the income distribution is a very salient form of inequality, which e.g. fosters public discussions of compensation of CEOs even if they constitute a relatively small number of individuals.

In the recent academic literature, the focus on top incomes stems from additional reasons which are discussed below (see also Atkinson, Piketty and Saez 2011).

### *Long run trends in income shares*

First, precise calculations of the Gini coefficient require information about the incomes of individuals or families in all parts of the income distribution. For most countries such detailed data have only become available in recent decades with the increased use of register data and – before that – household surveys. Calculations of the Gini coefficient are, therefore, typically infeasible or associated with large uncertainty going further back in time. In contrast, calculations of top income shares only require information about incomes in the top of the income distribution combined with information on total income in a given country and total population.

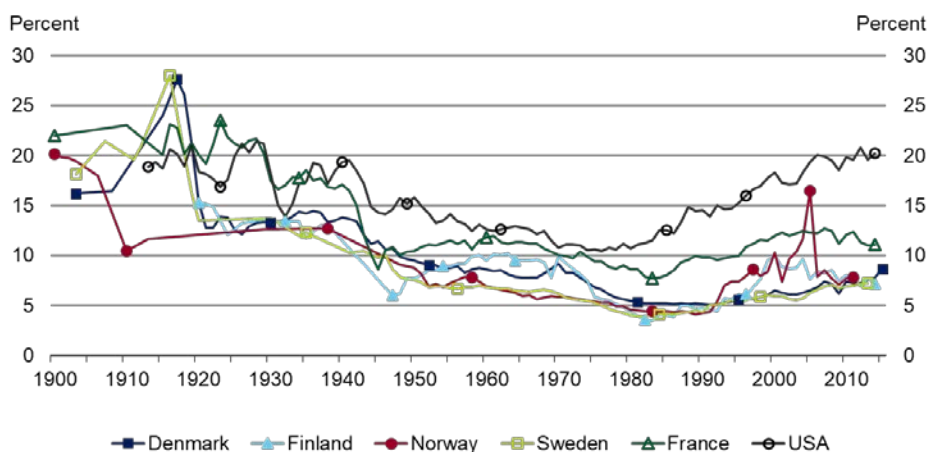
Information on top incomes became available in many countries with the introduction of modern income taxation in the beginning of the 20<sup>th</sup> century. The information typically came in the form of tabulations of the number of taxpayers by income bracket along with their average or total income. However, as the early income tax systems contained a relatively high personal allowance, only a minor portion of the population actually paid income tax and was included in the tabulations.

Regarding information on the total population and total income, two data sources are typically employed: contemporary population censuses and national accounts (and their predecessors). In both cases, a number of corrections are typically required, as described in the individual country studies underlying the available top income series.

The information discussed often stretch much further back in time than the (micro) data currently used to construct inequality measures. With top income shares, the data therefore allow for the construction of longer time series, often going back more than a century.

Figure 1 shows the shares of total income that accrue to the one percent of the population with the highest incomes, i.e. the top one percent income share in the Scandinavian countries, France, and in the USA. These reveal a marked change in inequality over the past century. In the 1900s–1920s the (unweighted) average top income share across these countries was just under 20 percent. Around 60 years later in the 1970s the average was more than halved to nine percent.

**Figure 1: Top one percent income share in the Scandinavian countries, USA and France 1900–2015**



Note: Top income shares are defined as the share of total income that accrues to the one percent of the populations with the highest income. Income is defined excluding capital gains. The top one percent income share for Denmark is computed as in Atkinson and Sogaard (2016) with the addition of dividends after 1990. This implies a slight increase in the shares in recent years. This might also result in a slight exaggeration of the increase in recent decades, as the reporting of dividends to the tax authorities has improved.

Source: The individual country series is based on separate studies. References are listed in the reference section. For Sweden, the data are drawn directly from the underlying (updated) source. For Denmark, the series have been updated and extended to 2015 by the author using register data from Statistics Denmark. For Finland, the series has been extended based on the (updated) gross income series from Jantti et al. (2010). For Norway, the series have been drawn from the World Income and Wealth Database.

Underlying this overall trend, we find differences across countries in both the level of inequality and in the year-to-year changes. For instance, Sweden and Denmark had a sharp increase in inequality around the First World War, when the top income shares averaged 28 percent, the highest income shares ever recorded for the six selected countries. Nevertheless, the overall trend of declining top income shares stands out.

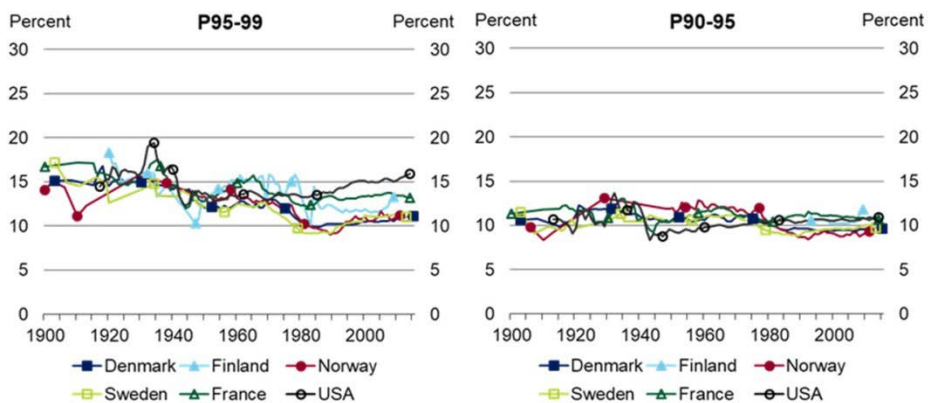
Since the 1970s we see a gradual reversal of the downward trend in inequality. The top income share first started to increase in the USA (along with other Anglo-Saxon countries). Ten years later, in the 1980s, the top income share started to increase in France, while the top income shares in the Scandinavian countries hovered at around five percent until they started increasing in the early 1990s.

Currently, the USA has more or less returned to the same high top income shares that they experienced at the beginning of the 20th century. The income shares for the Scandinavian countries are approaching ten percent from below, while France is approaching this level from above. Looking over the past 100 years or more, the top income shares appear to have followed a somewhat U-shaped path, especially for the USA.

The second reason for focusing on top income shares stems from the fact that changes in trends have been much stronger at the top of the income distribution than for the incomes just below. To see this, consider the two panels of Figure 2. They show the income shares of the population between the 95th and 99th as well as the 90th and 95th income percentiles. The contrast to the top one percent income share is striking. While the income shares of the population in the 95th–99th income percentiles exhibit some resemblance to the U-shape path of the top income shares, the income shares of the population in the 90th–95th income percentiles have been relatively flat over the past more than 100 years. This also implies that treating the top 10 percent earners as a homogenous group is potentially very misleading.

The fact that movements in the top one percent income shares are particularly strong is in itself a reason to focus on top incomes instead of just broad inequality measures such as the Gini coefficient. This holds true especially in countries that rely on household surveys, as household surveys often have difficulty capturing the top of the income distribution – either due to nonresponses among high-income earners or due to top coding. In this case, the effects of changes in top income shares are less likely to be captured by the Gini coefficient.

Figure 2: The income shares of P90–95 and P95–P99 in the Scandinavian countries, the USA and France 1900–2015



Note: Income shares of the population in the 90th–95th and the 95th–99th income percentiles. Income is defined excluding capital gains.

Source: See Figure 1.

At first glance, this is less of an issue in the Scandinavian countries where the income statistics have long been based on information from the tax authorities. That said, it was not until 2016 that the Gini coefficient for Sweden was based entirely on register data (Statistics Sweden 2016). In Norway the changeover was completed in 2005. In Denmark register-based Gini coefficients appeared in the mid-1990s.

### *Income and population definitions*

In the literature on top income shares it has been an explicit goal to produce top income series that are as comparable over time and across countries as possible (Atkinson 2007 and Piketty 2007).

The Gini coefficient is typically calculated for equivalised disposable income for the entire population. This measure ideally incorporates all sources of income – both positive and negative (such as interest expenditure) and whether the income is monetary or in kind (such as the rental value of owner-occupied housing). This post-transfer, post-tax income is added up for the whole household and divided by an equivalence scale. The equivalence scale is a function of the number of people in the



household that takes into account economics of scale, i.e. that the marginal “need” for certain goods (such as housing space, electricity etc.) is decreasing in household size. Equivalised disposable income thus aims at measuring the real consumption possibilities per person (for unchanged net worth).

In contrast to the Gini coefficient, top income shares (in particular for earlier time periods) start from the data available in the historical tabulation of taxpayers and their income. This income information was collected for tax purposes and the precise definition is therefore often determined by the legal definition of taxable income.

There is some evidence that the Western countries drew inspiration from each other when drafting their original tax laws at the beginning of the 20th century. The taxable income definition that forms the basis for the computation of top income shares is therefore in most cases a comprehensive income concept, which includes both labour income and net capital income.<sup>2</sup>

The use of taxable income as the primary income definition does, however, create some differences across countries. One example is the inclusion of social security and transfers, where tax treatment differs from country to country. In some countries, some or all transfers are tax exempt and thus not included in taxable income, while the opposite is the case in other countries.

For the Scandinavian countries, the large transfer programmes (such as public pensions and unemployment-related benefits) are, in general, included in the income definition. Only minor transfers, such as housing and heating subsidies etc., are typically exempt. In some cases, transfers were originally tax exempt, but made taxable at a later stage. In this case, the data breaks have typically been corrected for. The income definition used for the top income shares in the Scandinavian countries is, therefore, close to non-equivalised post-transfer, pre-tax income.

Ideally, capital gains should be included in the income definition if we wish to measure income in a theoretically (Haig-Simons) consistent manner, where an individual’s income is given by the highest possible consumption expenditure that leaves the individual’s net worth unchanged. For tax purposes, the inclusion of capital gains is, however, less consistent. First of all, capital gains are typically only taxed when they are realized. This means that the capital gains that show up in the income

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<sup>2</sup> The original Danish tax law of 1903 was inspired by the Prussian income tax law from 1891 (see Johansen 2007).

statistics often are accumulated over a number of years and attributing the entire amount to a single year therefore overestimates the income in that year.

There is perhaps an even bigger problem in the case of capital losses. Studies show that capital gains only constitute a significant income component at the top of the income distribution (see e.g. Roine and Waldenström 2010). However, if an individual who typically lies in the top one percent of the income distribution experiences a large capital loss in a single year, he is likely to fall out of the top one percent in that year. Hence, capital gains are likely to be attributed to the top of the income distribution, while capital losses are not, even if it is the same individuals who experience the gains and losses.<sup>3</sup>

Also, not all capital gains are taxable. In many countries capital gains on owner occupied houses are not taxed, which may also be the case for other assets. In Denmark for example, capital gains on stocks owned for more than three years were, in many cases, tax exempt prior to 2005.

Finally, there may be larger reporting problems for capital gains. They are calculated as the difference between the sale and the purchase price of a given asset. It may be particularly difficult for the tax authorities to check the capital gains reported by tax payers without third-party information on both purchases and sales. Taken together, this implies, that capital gains on smaller portfolios are likely to be underestimated in data.

For the above reasons the top income series in this paper are measured excluding capital gains. This is, however, a choice that has been discussed considerably in the top income literature (see, for example, Piketty and Saez 2003).

The legal unit in the tax law typically also determines the population that is included in the calculations of the top income shares. Denmark and Sweden initially had joint taxation of married couples. Therefore, the top income shares earlier reflected the inequality among households. Joint taxation was maintained in Sweden and Denmark until the start of the 1970s, when individual taxation was introduced. After these points in time, the top income shares instead measure inequality among individuals.

In Finland, the change from joint to individual taxation happened already in 1935, only to be reversed in 1943. Individual taxation was restored in 1975. In Norway,

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<sup>3</sup> There is also a more general discussion about measures of inequality within a single year or over longer periods (inequality in lifetime income). This discussion is outside the scope of the paper, but the inclusion of capital gains is likely to be particularly problematic for single year measures of inequality.

individuals could for a long period choose between joint and individual taxation and the changeover therefore came gradually over the 20th century.

The fact that we are historically bound to the definition of taxable income when computing top income shares is somewhat problematic. In particular, we need to be aware that (minor) year-to-year changes can be due to changes in the definition of taxable income and/or the population included in the calculations.

Furthermore, it is not clear that we should be interested in the development of non-equivalised post-transfer, pre-tax income (Burkhauser and Larrimore 2014). We are usually interested in either inequality of consumption possibilities, in which case we would prefer equivalised post-transfer, post-tax income, or inequality of market outcomes, in which case we would use non-equivalised pre-transfer, pre-tax income for the part of the population active in the labour market.

When we use the non-equivalised post-transfer, pre-tax top income shares, we are stuck in the middle. This means that, in general, we would prefer to use other more well-defined measures of income when they are available and when they cover the entire income distribution, including the top and the bottom. This is likely the case in all Scandinavia countries today.

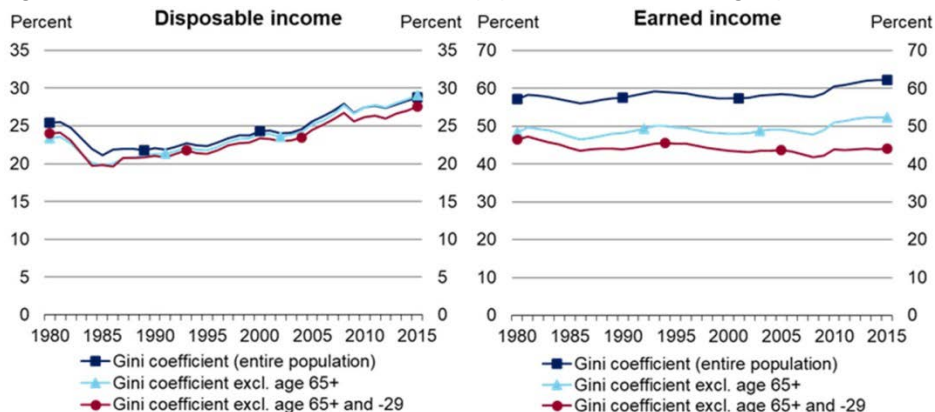
At the same time it is important to recognize that any inequality measure has strengths and drawbacks. For example, while equivalised post-transfer, post-tax income might be a good measure of inequality of consumption possibilities, it is also a highly complex measure that depends both on the relative size of different income sources and on the composition of the population.

With this measure, inequality is not only affected by the wage dispersion, but also by changes in the interest rate level – which affects interest expenditure and the imputed rental value of owner-occupied housing through changes in house prices – and changes in the family structures, where, e.g., more single households and higher life expectancy might increase inequality. It can, therefore, be very difficult to identify the underlying causes of an observed change in inequality (in particular, with respect to compositional changes).

Moving to a simpler income measure such as, e.g., earned income, we avoid some of the difficulties in attributing changes in inequality to changes in different income sources. However, we instead risk even larger compositional effects, as single sources of income might be limited to specific parts of the population.

To see these trade-offs, consider Figure 3 showing the Gini coefficients in Denmark for disposable and earned income for the entire population and for selected subgroups.

Figure 3: Gini coefficients in Denmark for the entire population and selected subgroups



Note: Disposable income corresponds to the definition of equivalised disposable income (post-transfer, post-taxes) computed by Statistics Denmark. These numbers differ to a small extent from the official Gini coefficient from the Danish Ministry of Economic Affairs and the Interior. Earned income includes wages and business income.

Source: Author's calculations based on Statistics Denmark's register data.

For the Gini coefficients of disposable income, the three groups broadly follow the same trend over the period 1980–2015. First, a drop of around four percentage points from 1980 to 1985 and subsequently an increase of around eight percentage points until 2015.

Initially, the Gini coefficient for the entire population is two percentage points higher than for the two subgroups, but over the period the Gini coefficient for the population excluding individuals above age 65 increased slightly faster, so that it now is at the same level as the Gini coefficient for the entire population.

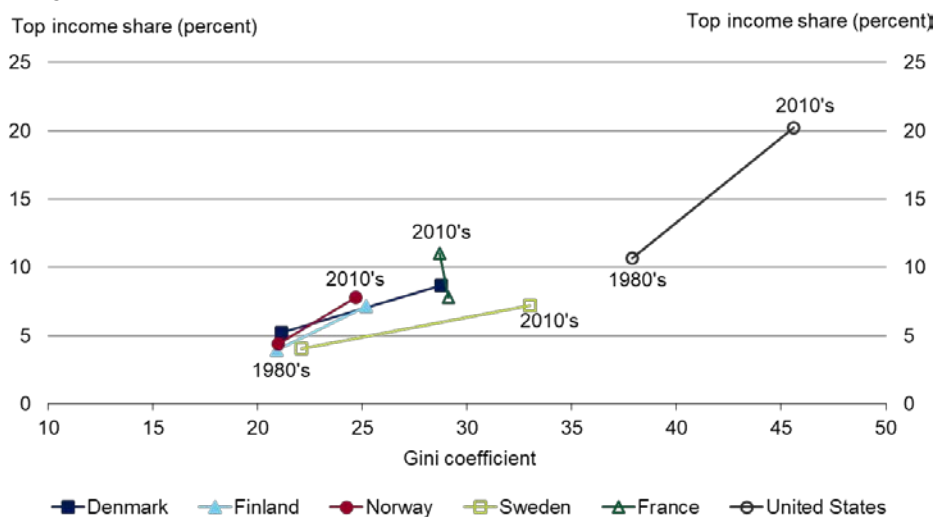
When we instead consider the Gini coefficients of earned income, the use of different subgroups significantly affects both the level – and most importantly – the trend over the period 1980–2015. The Gini coefficient for the population excluding individuals above age 65 is around eight percentage points lower than for the entire population, but follows the same upward trend over the period. Excluding also the age groups below age 30, the initial level of the Gini coefficient is (slightly) lower, but here the Gini coefficient has been on a downward trend over the period.

### Comparison of top income shares and overall measures of inequality

Even though it is not a law of nature, evidence points to a relatively stable historical correlation between top income shares and overall inequality (see also Roine and Waldenström 2015). Bearing in mind the differences in income definitions discussed above, this is, e.g., visible in Figure 4 showing the changes in the top income shares along with the changes in the Gini coefficients from the mid-1980s to the mid-2010s.

In five out of six countries the change in the top income share is also reflected in the change in the Gini coefficient. The only exception is France, where the change in the Gini coefficient has been out of sync with the top income share. Atkinson and Sørensen (2016) show that the correlation is also stable in Denmark when considering inequality trends back to the beginning of the 20<sup>th</sup> century.

**Figure 4: Changes in top one percent income shares versus changes in the Gini coefficients from the mid-1980s to the mid-2010s**



Source: Top one percent income shares are from the same sources as in Figure 1. The Gini coefficients are from Atkinson et al. (2017). The underlying sources are typically national statistical bureaus. For Denmark the Gini coefficient is defined as in Figure 3.

The mechanical effect of a change in the top income share on the overall inequality measured by the Gini coefficient can be assessed by the following approximation (see for example Alvaredo 2011). Assuming that  $S$  is the income share of the very top of the income distribution (a very small proportion of the population), the Gini coefficient ( $G$ ) can be approximated as:

$$G \approx S + (1 - S)G_{99} = G_{99} + (1 - G_{99})S, \quad (1)$$

where  $G_{99}$  is the Gini coefficient measured among the rest of the population (i.e. the bottom 99 percent) and  $S$  is the top income share. Using this formula, the mechanical contribution of a one percentage point increase in the top income share to the Gini coefficient is given by  $(1 - G_{99})$ .

From this we see that the increase in the top income share in the USA can explain 6.6 out of a 7.7 percentage point increase in the Gini coefficient (see also Atkinson et al. 2011). At face value, the increase in inequality in the USA over the past 30 years thus appears to be largely driven by the top of the income distribution, which motivates the focus on top income shares.<sup>4</sup>

**Table 1: Mechanical contribution to the Gini coefficient of the change in the top one percent income share**

Country	Period	Change in top income share	Contribution to the Gini	Actual change in the Gini
Denmark	1985–2015	3.4	2.9	7.6
Finland	1981–2014	3.2	2.6	4.3
France	1984–2014	3.2	2.5	-0.4
Norway	1986–2011	3.4	2.8	3.7
Sweden	1980–2013	3.2	2.6	10.9
USA	1980–2014	9.5	6.6	7.7

Note: The contribution to the Gini coefficient ( $G$ ) of the change in the top one percent income share is calculated using the approximation  $G = S + (1-S)G_{99}$ , where  $S$  is the top income share and  $G_{99}$  is the Gini coefficient excluding the top one percent.  $G_{99}$  is computed by inverting the formula in the base year.

Source: See Figure 4.

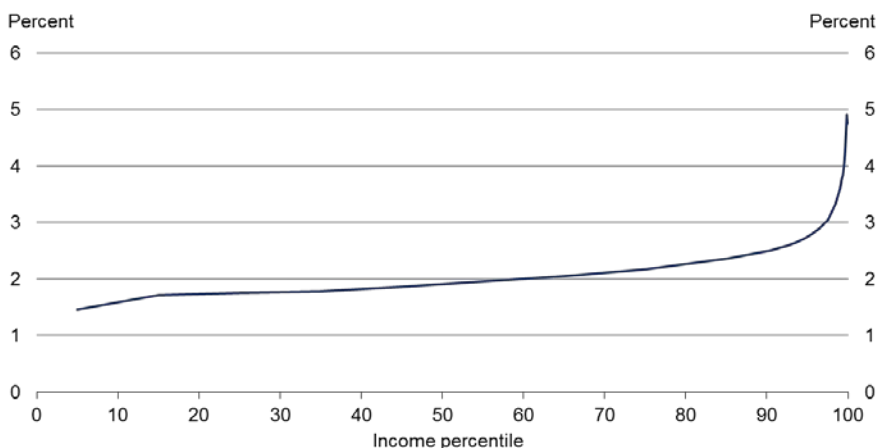
<sup>4</sup> The extent to which the Gini coefficients for France and the USA are affected by top coding issues is uncertain.

In Sweden and Denmark, the Gini coefficients increased to the same extent (more in the case of Sweden) as in the USA, while the contributions from increasing top income shares are around two fifths of that in the USA. As a result, the increases in top income shares explain a much smaller portion of the overall increases in inequality in Sweden and Denmark.

In Norway and Finland, the increases in the Gini coefficients since the mid-1980s have been smaller than in Sweden and Denmark, while the increases in the top income shares are relatively similar. Thus, the latter mechanically explain a larger portion of the increases in overall inequality for Norway and Finland.

Another way to illustrate that there is more going on in the income distributions than just changes in the top is to look at the so-called growth incidence curve. This curve shows the income growth in different parts of the income distribution over a given time period. The growth incidence curve for Denmark for 1985–2015 is shown in Figure 5. The income developments of the top income earners stand out compared to the rest of the income distribution. The average real income grew considerably faster at the very top of the income distribution (almost five percent per year) than for, e.g., the 50th income percentile (around two percent per year). The faster income growth at the top implies that it has contributed to the increase in the Gini coefficient.

**Figure 5: Growth incidence curve for Denmark, 1985–2015**



Note: The growth incidence curve for Denmark shows the average yearly growth in real equivalised disposable income across income percentiles.

Source: Author’s calculations based on Statistics Denmark’s register data.

The diagram also shows that changes in the income distribution below the top one percent also contributed to the increase in the Gini coefficient as the curve is increasing monotonically. This implies that the higher income percentiles had a higher average growth rate in real income.

## Explaining the changes in top income shares

I now turn to some of the potential drivers of top income shares. Of these, three stand out in the literature: effects of geopolitical crises (most notably the two world wars), taxation and the role of capital and labour shares.

Clear identification of the effect of any one driver of top incomes shares is difficult. This is because we are restricted to cross-country analyses. As a result we only have a very limited number of observations that over time are hit by a myriad of shocks. It is therefore difficult to isolate the effect of each individual one with the exception of the most salient shocks (Atkinson et al. 2011).

Some of the most salient shocks are major financial or geopolitical crises. One example is the effect of wars, which has been considered an important cause of the decrease in inequality in the past (see e.g. Piketty 2003). Wars may affect inequality by changing the concentration of capital, either directly, because of physical damage from war actions, or (more often) indirectly through high inflation or bankruptcies due to dramatic changes in demand and/or the availability of foreign imports.

However, the effect of wars is not universal, since it is likely to depend on the institutions in the different countries. An example is the evolution of top income shares in Denmark and Sweden around World Wars I and II. Both countries were largely unaffected by direct war actions, although Denmark was occupied during World War II, but in terms of income inequality the experiences are very different. During World War II, the top income shares in both countries decreased as in most other Western countries. In contrast, the top income shares of Denmark and Sweden spiked to record levels during World War I (Atkinson and Sogaard 2016).<sup>5</sup>

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<sup>5</sup> See also Piketty and Zucman (2014) for a more comprehensive analysis of the development in capital stock over the 20th century.



## *The role of taxation*

From the beginning of the top income literature, the role of taxation has also been considered a driver of the changes in inequality observed over the past century.<sup>6</sup>

It is easy to see why taxation appears to be a driver of top income shares by comparing Figures 1 and 6. The top marginal tax rates for the Scandinavian countries increased dramatically from the beginning of the 20th century and first reached a peak for Denmark and Sweden in the 1980s. For Norway and Finland a peak was reached a few decades earlier (disregarding the spike in marginal tax rates in Finland following the World War II). After these peaks, top marginal tax rates were gradually lowered, thus creating a hump-shaped pattern that mirrors the shape of the top income shares over the past century.

Figure 6 may even underestimate the reduction in top marginal tax rates in the Scandinavian countries after the 1980s since all four countries implemented a dual tax system between 1987 and 1993. In a dual tax system, capital income is typically taxed at a lower and often flat rate, thus potentially creating a gap in the marginal tax rates between labour and capital income (Pirttilä and Selin 2011). As top income earners often earn a significant portion of their income from capital, their effective marginal tax is likely to have decreased more than shown in Figure 6.

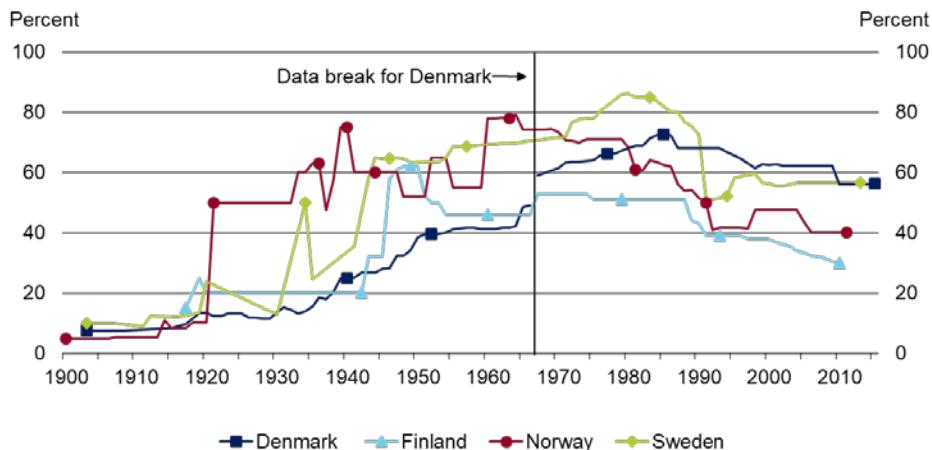
The relationship between top marginal tax rates and top income shares is formally analysed by Rubolino and Waldenström (2017). They regress the (log) top income share on (log) one minus the top marginal tax rate for different sub-samples of countries and time periods. According to the study there are significant differences in top income elasticities over time and across countries. The baseline elasticity estimates range from 0.1 to 0.3.

One interpretation of these elasticities is that the changes in top income shares are the result of labour supply responses to changes in marginal tax rates. However, there are certain caveats to this interpretation.

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<sup>6</sup> See e.g. Piketty (2003) regarding the French experience, Piketty and Saez (2003) regarding the USA experience and Saez and Veall (2005) regarding the Canadian experience. Likewise most of the individual country studies for the Scandinavian countries examine the role of taxation in driving the development of the top income shares over the 20<sup>th</sup> century.

Figure 6: Marginal tax rates on labour income for the top one percent



Note: The data break for Denmark refers to the removal of the deductibility of paid personal taxes in 1967. Prior to this year taxes paid in one year were deducted from the tax base of the following year, which created an effective tax rate that was lower than the statutory one. The actual difference depended on each tax payer's income path, but under the assumption of a constant income, the effective tax rate is given by  $t/(1+t)$ , where  $t$  is the statutory tax rate.

Source: Data series for Finland, Norway and Sweden are from Rubolino and Waldenström (2017). The series for Denmark is from Atkinson and Sogaard (2016) extended to 2015.

Most importantly, marginal tax rates not only increased for the top one percent of income earners, but also for the rest of the population over the last century. Labour supply effects should, therefore, not be restricted to the top income earners. However considering, e.g., the 90th–95th percentile group, we see that their income share remained almost flat over the past century, even though marginal tax rates also increased substantially for this group.

Using the above insight, Atkinson and Sogaard (2016) argue that, if the changes in top income shares (in Denmark) are interpreted as being driven by labour supply responses, one must either assume that labour supply elasticities are increasing rapidly from the 90th–95th percentile group to the top one percent, or that there are

very high overall elasticities. This makes it unlikely that labour supply responses are the (entire) explanation of the changes in top income shares.<sup>7</sup>

Another taxation-based explanation, which has not received much attention in the Scandinavian country studies, goes back to the study of top income shares in France by Piketty (2003). He argues that the historical effect of taxes primarily worked through their effect on the ability of high-income families to accumulate wealth. In this argument, the *average* tax rate is more important than the *marginal* tax rate, as the average rate determines the level of after-tax income available for consumption or saving.

It is also more likely that there are larger differences in average tax rates across income groups than in marginal tax rates, as the average tax rate for, e.g., the 90th–95th percentile group is kept down by the lower tax rates in a progressive income tax system. For the top income groups, on the other hand, a larger share of their income is taxed at the high marginal tax rate, which pulls up the average tax rate.

### *The role of capital income*

Capital income can both be considered an independent driver of inequality and an intermediate factor that transmits fundamental changes to top income shares or inequality measured more broadly.

As mentioned above, the erosion of capital following World Wars I and II likely contributed to the historical decline in top income shares. In support of this point, Piketty (2003) and Piketty and Saez (2003) show that top incomes in France and the USA at the beginning of the century primarily consisted of capital income, and that the decline in this income category explains the decline in top income shares in the middle of the last century.

In the recent decades, the role of capital income appears less clear. In the USA, wage income appears to be an important driver of the large increases in the top income share, which has motivated the conclusion that the “working rich have replaced the rentiers at the top of the income distribution” (Piketty and Saez 2003). However, Piketty et al. (2018) find that capital income plays an increasingly important role for income inequality.

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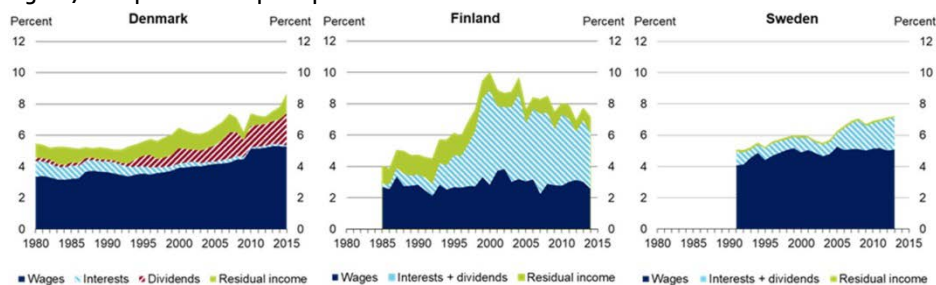
<sup>7</sup> Rubolino and Waldenström (2017) also reach this conclusion.

In the case of Denmark, the largest income category is wages, and this category has more or less constantly made up 60 percent of total top incomes since 1980, as shown in Figure 7. The same was the case for Finland in the late 1980s, but since then the share of capital income (dividends + interest income) has grown considerably, so that the wage share in Finland in 2015 had dropped to around 35 percent. In Finland, capital income has therefore been the main driver of the increasing top income share.

Sweden started the 1990s with wages constituting 80 percent of total top income compared to 70 percent in the 2010s. In Sweden capital income has therefore been a driver of the increasing top income share, but not to the same extent as in Finland.

A comparable decomposition of the top income share for Norway is currently not available, but Aaberge et al. (forthcoming) provide some information. They show that the probability that top wage earners also are among the top half of capital income earners has increased since 1995, while the probability that they are among the top one percent of capital income earners has decreased. This evidence thus points to a minor decrease in the importance of capital income in the top income share in Norway. However, the conclusion is sensitive to the development of the aggregated share of capital income. If this has increased, capital income may still have contributed to the increase in the top income share in Norway over the last two or three decades.

**Figure 7: Composition of top one percent income share in Scandinavian countries**

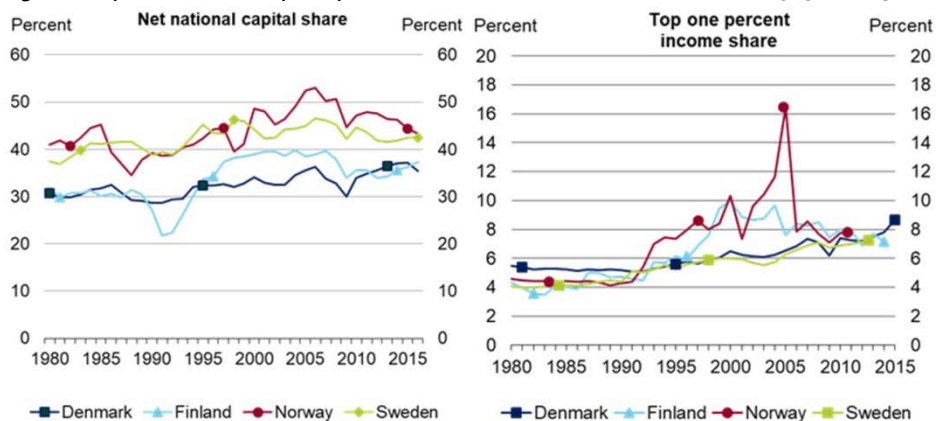


Note: Income definitions vary slightly across countries. Residual income includes business income and (taxable) transfers for Denmark and Finland. For Sweden residual income only includes business income and transfers are instead included in wage income. For Finland and Sweden, interest income is net (interest income received minus interest expenditure paid). For Denmark, interest income is gross, while paid interest is included in the residual. Net interest income for Denmark has been between -0.25 and 0 percentage points over the period.

Source: The data for Finland are from Riihelä et al. (2015). For Denmark, the data are constructed from Statistics Denmark's register data by the author. For Sweden, the data are provided by Roine and Waldenström (2008, 2010).

At a more general level, the correlation between top income shares and capital income has been studied by Bengtsson and Waldenström (forthcoming). In their baseline setting, they regress the (log) top income share on the (log) capital share over various time periods and country groups. Overall, they find a positive link between capital shares and the top income share, but with heterogeneity across time and countries. Consistent with Bengtsson and Waldenström we see this result for the period 1980–2015 in Scandinavia by comparing the capital share in the total economy to the top income series in Figure 8. For Sweden, the capital share has been falling since the late 1990s despite a rising top income share, but for Denmark, Finland and Norway, the correlation is positive. For Denmark both the capital share and the top income share increased gradually over the period, while for Finland and Norway we first see a simultaneous increase in the capital share and the top income share around 2000 and then a subsequent drop.

**Figure 8: Capital shares and top one percent income shares in Scandinavian countries, 1980–2015**



Note: The graph to the left shows the net capital share in the total economy defined as capital income after consumption of fixed capital ( $K_1MS_1$ ) relative to net national income ( $B_5\_NS_1$ ). Mixed income ( $B_3$ ) has been split between capital and labour income with  $1/3$  to capital and  $2/3$  to labour. For the years when mixed income is not reported in the National Accounts, the share of mixed income out of operating surplus and mixed income is kept constant from the nearest year.

Source: National Accounts (OECD Database).

Building on the analysis of Bengtsson and Waldenström (2017) I examine how changes in the composition of capital income are likely to affect the top income share. I already hinted at this effect by splitting the capital income for the top one percent income

earners in Denmark into interest income and dividends in Figure 7. This revealed a marked shift away from interest income and towards dividends.

To more closely examine the role of different types of capital income I shift focus from the entire economy to the household sector, which creates a better match between the national accounts data and the inequality data used.<sup>8</sup>

Capital income in a given sector comes from two sources: capital employed in that sector (net of depreciation) and income received from capital owned by the sector, but employed in other domestic sectors or abroad, minus capital income paid to other sectors. Capital in the household sector mainly consists of housing capital and – to a smaller degree – the capital employed by self-employed individuals. I therefore focus on the household capital income generated from capital employed in other sectors, which typically comes in the form of interest payments and dividends.

Figure 9 shows the share of positive and negative capital income in the household sector for the Scandinavian countries over recent decades. The top of the dark (blue) area shows the amount of negative capital income (primarily interest paid by households) and the top of the light (blue) area the amount of positive capital income. The difference between the two surfaces (the visible light blue area) is therefore the net capital income of the household sector. For Denmark, Sweden and Norway net capital income as a share of total household income has increased by four to five percentage points over the available data period and in Finland the increase is just below one percentage point.

In general the changes are not the result of an increase in positive capital income. Disregarding the year-to-year volatility, the share of positive capital income has fallen in Denmark, Finland and Norway. Instead, the increase in net capital income is primarily due to a fall in negative capital income driven by the reduction in the interest rates to historically low levels over the recent decades.

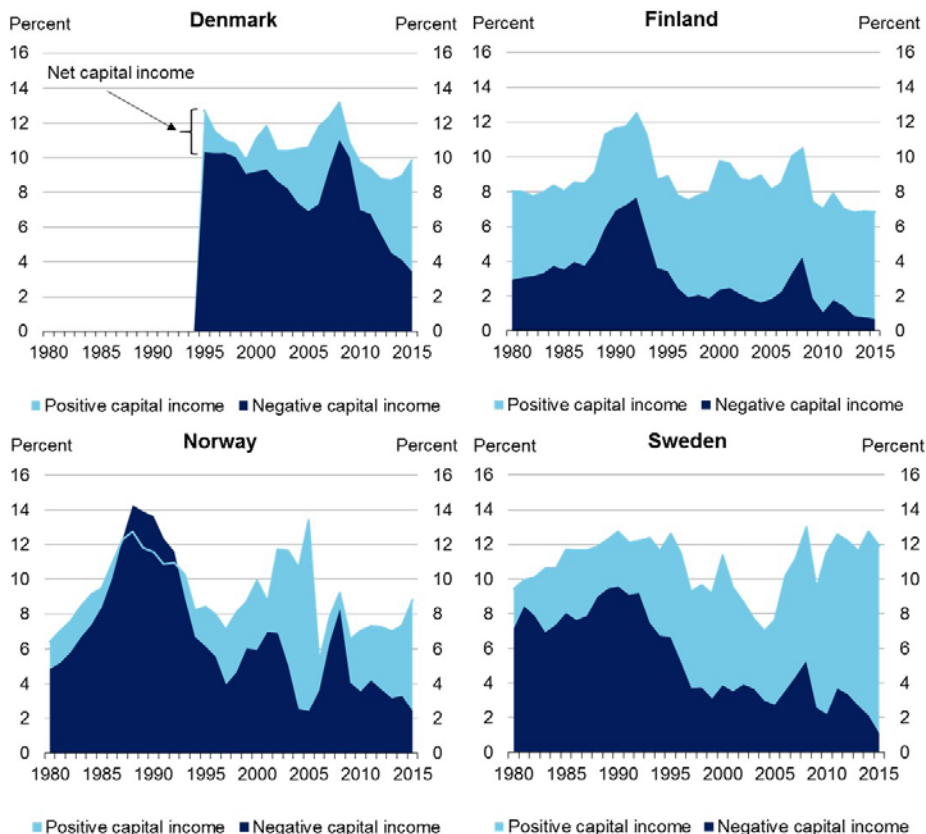
Looking at the composition of positive capital income in Figure 10, we see a marked shift away from interest income – which again might be driven by the reduction in the interest rate level – and towards dividends. The diagrams show the stacked shares of dividends and positive interest income relative to total positive capital income. The missing contributions (up to 100 percent) are mainly made up of

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<sup>8</sup> Ideally, one should adjust the inequality data to the income definitions that are consistent with national accounts as in Piketty et al. (2018). One advantage of their method is that retained earnings in companies are attributed to the owners of the companies. The effect of company earnings on top income shares in Norway is analysed by Alstadsæter et al. (2016).

the national account category “property income attributed to insurance policy holders”, which represents the capital income of pension and insurance companies that (eventually) is paid out to households. The trends observed in the figures do not change if the dividend and interest contents of this category are imputed and added to the household data.

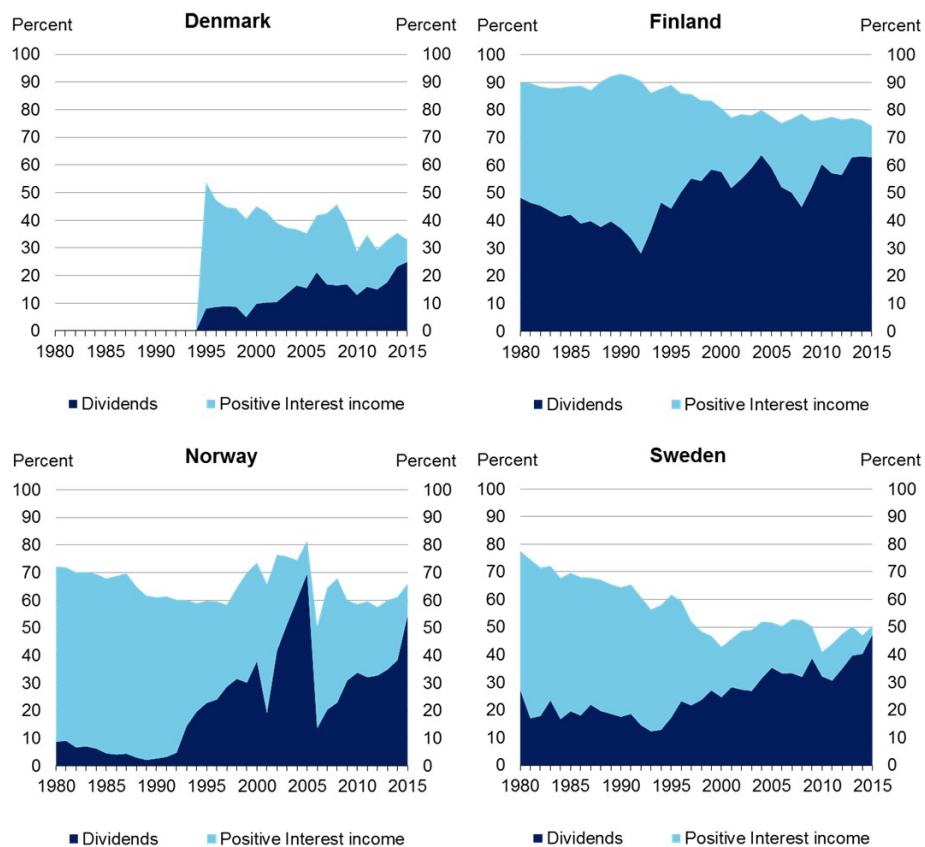
Figure 9: Capital income in the household sector



Note: The graphs show positive (SD<sub>4R</sub>) and negative (SD<sub>4P</sub>) property income relative to household income defined as the sum of gross operating surplus and gross mixed income (SB<sub>2G\_B3G</sub>), compensation to employees (D<sub>1</sub>) and net property income for the household sector.

Source: National Accounts (OECD Database) and Statistics Sweden.

**Figure 10: Composition of positive capital income in the household sector**



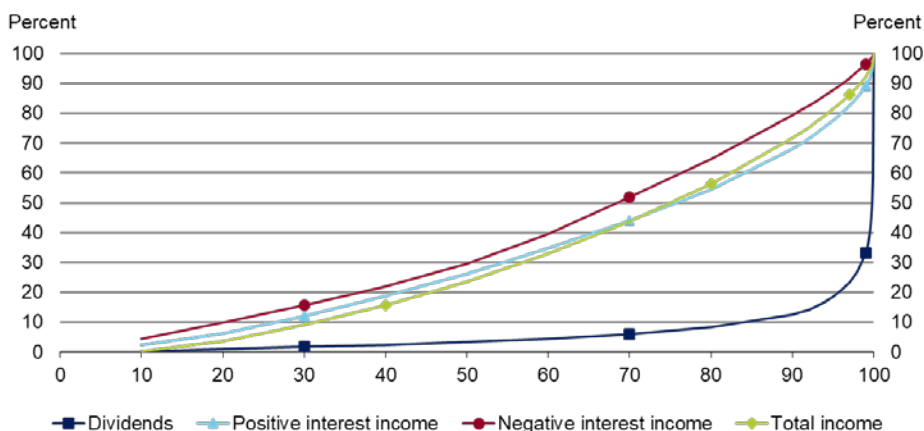
Note: The graphs show the share of positive capital income (NFD<sub>4R</sub>) coming from dividends (distributed income of corporations, NFD<sub>42R</sub>) and interest income (NFD<sub>41R</sub>). The missing contributions (up to 100 percent) are mainly made up of the national accounts category “property income attributed to insurance policy holders”, which represents the capital income in pension and insurance companies paid out to households. The trends observed in the figures do not change if the dividend and interest contents of this category are imputed and added to the household data.

Source: National Accounts (OECD Database) and Statistics Sweden.



How should we expect this shift from interest income to dividends to affect overall inequality? One way to examine this is to consider how interest income and dividends are distributed across the income distribution. I show this for Denmark in Figure 11, which reveals a striking difference between the distribution of interest income and dividends. While ten percent of all interest income goes to the top one percent of the population (only slightly more than their overall income share), the same is true for 2/3 of all dividends. A shift from interest income to dividends would, therefore, mechanically increase inequality even if the overall level of capital income was unchanged.

**Figure 11: Cumulative share of interest income and dividends in Denmark, average 2010–2015**

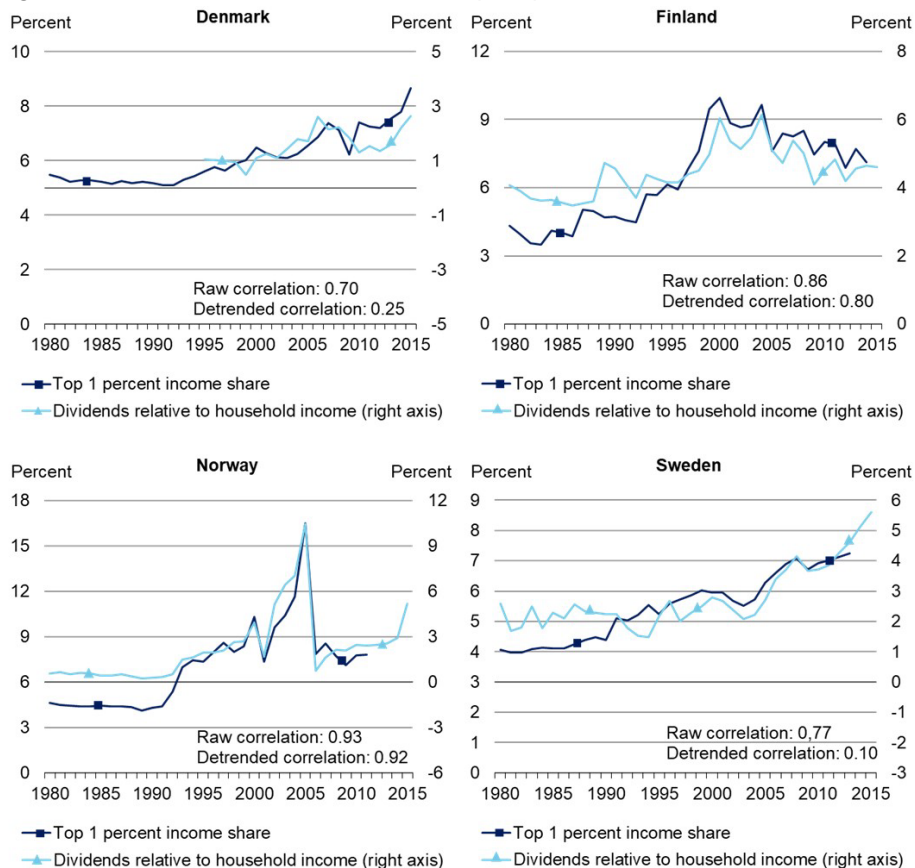


Note: Over the period 2010–2015 positive interest income, dividends, and negative interest income amount to 1.1, 2.3 and 6.7 percent of total income, respectively.

Source: Author’s calculations based on Statistics Denmark’s register data.

Another piece of evidence, which points to the importance of dividends for the top income shares, is the correlation between top income shares and the share of dividends in the total income of the household sector shown in Figure 12. A proper time series analysis of these correlations is outside the scope of this paper, but a simple correlation calculated on the de-trended time series gives a coefficient of 0.8 for Finland and 0.9 for Norway. However, the correlations for Denmark and Sweden are considerably lower at 0.25 and 0.10, respectively. For Sweden, the low de-trended correlation is driven by the beginning of the period. Starting in 1995, the de-trended correlation for Sweden is 0.82.

**Figure 12: Correlation between dividends and the top one percent income share**



Note: The graphs show the top one percent income share excluding capital gains as defined in the individual country studies (as in Figure 1) and the share of dividends in household net income as defined in Figures 9 and 10. The spike in the dividends in Norway in 2005 can be attributed to a reaction to the 2006 tax reform that raised taxes on dividends and capital gains.

Source: National Accounts (OECD Database) and WID data with additional sources (see Figure 1)

My results are only simple correlations. They do not necessarily imply that dividends cause the changes in top income shares. Instead, it might be that changes in dividends correlate with other structural or business cycle related effects on top income shares.

Indeed, we saw in Figure 7 that wages also contributed to the increase in the top income shares in Denmark and Sweden.

We also need to keep in mind the complexity of the changes in capital income that have occurred over the last 30 years. As mentioned, the reduction in interest rate levels has also reduced interest expenditure. This has an effect on the income distribution as well. Figure 11 showed that interest expenditure is slightly more equally distributed than total income. A reduction in overall interest expenditure would therefore mechanically reduce overall income inequality slightly.

## Conclusions

This paper has highlighted a number of reasons for the apparently narrow focus on top income shares. A key reason is the ability to create long-run income inequality time series. This does not, however, mean that top income shares are irrelevant when we are interested in the more recent developments in income equality. Even today, changes in income shares appear to be particularly strong at the top of the income distribution and trends in the top income shares are important for the trend in overall inequality.

Looking at the development in income shares instead of just broad measures of income inequality is important for at least two reasons. First, some overall inequality measures, such as the Gini coefficient, are notoriously difficult to decompose, and income shares are, therefore, useful when assessing which part of the income distribution is driving a change in the overall inequality.

Second, changes in overall inequality might be more worrisome if they are driven by income changes in some part of the income distribution instead of others. A given increase in the Gini coefficient might be more problematic if it is caused by lower incomes in the bottom of the income distribution than by relative changes in incomes between groups in the middle of the distribution. Furthermore, some developments, such as so called “superstar effects” from globalization and technological change, or (as shown in this paper) the development of dividend income, may have large effects on a small fraction of top earners. To be able to assess such effects, it is important to track not just overall inequality but also what happens to incomes of small but potentially very important top groups.

Taken together, changes in income shares, and especially top income shares, are likely to contain important information when designing appropriate policy responses.

At the same time, it might not be optimal to simply use the existing series on top income shares to analyse recent changes in inequality – particularly in Scandinavia. There are a number of issues with respect to the income definition and the population included in the calculation of the top income shares. Existing top income series typically measure inequality among the legal tax units: either the adult population (with individual taxation) or families (with joint taxation). The income definition is likewise based on the legal definition of taxable income. However, using modern register data we are able to compute income shares using more well-defined measures of income.

Turning to the drivers of inequality, I have in this paper shed light on how changes in the composition of capital income are likely to affect income inequality. In the household sector there has been a marked shift from interest income to dividends, which might be driven by the reduction of the interest rate level over the past decades. Mechanically we should expect this shift to increase top income shares as ownership of stocks and hence dividend payments are much more concentrated in the top of the income distribution than interest income. Indeed, I find that the top one percent of the population in Denmark receives 2/3 of all dividend payments as opposed to ten percent of all interest income.

Following this line of thought, I find strong correlations between changes in dividends as a share of total household income and changes in the top income share – especially in Finland and Norway (and in Sweden after 1995). If this correlation has a causal interpretation, then we need to better understand the observed increases in dividends in order to understand the increases in top income shares. We might also expect a reduction in inequality if and when interest rates return to higher levels.

At the same time it should, however, be noted that clear identification of the effect of any one driver of inequality is difficult due to the fact that we are restricted to cross-country analyses. Each country is likely to be hit by a myriad of different shocks. It is therefore difficult to isolate the effect of each individual shock with the exception of the most salient ones.

As a consequence, it is also difficult to provide clear policy recommendations to governments that wish to combat the relatively large increases in top incomes. Education is often highlighted as a means of reducing income inequality, but it seems unlikely that higher levels of education would be enough to reduce the differences in income growth between the top one percent and, e.g., the part of the population in the 90th–95th income percentiles.

Strengthening redistribution policies by increasing top marginal tax rates has a direct effect on the distribution of disposable income. Redistribution policies would therefore be a natural place to start given a political motive to reduce inequality. When designing redistribution policies targeting the top of the income distribution, it is also very important to take into account that top income earners earn a significant portion of their income from capital. This means that (marginal) tax rates on capital income are as important as the (marginal) tax rates on labour income.

Policy makers should in particular be aware of this point, when pursuing a policy of lowering corporate tax rates, as the total tax on capital income is made up by both the corporate tax and the tax on dividends (and capital gains). Lowering the corporate tax rate without an offsetting increase in the dividend tax rate is therefore likely to implicitly reduce the progressivity of the tax system.<sup>9</sup>

There are some evidence that point to an effect of progressive taxes on also the distribution of market income. However the extent to which increasing top marginal tax rates actually increases earnings of individuals further down the income distribution is still open for discussion. Standard economics explanations, such as labour supply effects, would say that higher top marginal tax rates only reduce inequality of market income by lowering the income of top income earners without affecting the income of lower income individuals. However such a link can exist in a situation, where top income earners has bargaining power over their own income (see Piketty et al. 2014).

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<sup>9</sup> Whether or not a reduction in the corporate tax rate actually benefits capital owners depends on the incidence of the corporate tax. In most standard economic models, the incidence falls entirely on labour in the long run, while the incidence primary falls on capital owners in the short run. Self-employed individuals, who have the possibility to shift income between labour and capital income will benefit from a reduction in the corporate tax rate both in the short and the long run.

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## Comment on J. Søgaard: Top Incomes in Scandinavia – Recent Developments and the Role of Capital Income

*David Domeij*<sup>2</sup>

The paper provides a very interesting overview of the top income literature, discussing why the literature has focused on top-income shares and the main factors explaining their evolution. Søgaard also presents new evidence on the role of capital income in explaining the rise in top-income shares in the Scandinavian countries since the late 1980s. In particular, Søgaard documents a marked shift from interest income to dividend income. Since dividend income is more unequally distributed, this shift mechanically increases inequality.

I will briefly discuss three issues raised in the paper. First, does the choice of income measure matter? Second, does income mobility matter? Third, what is the role of taxes?

### *Choice of income measure*

The top-income literature typically focuses on taxable income (labor and capital income and taxable transfers), where the accounting unit is determined by the tax law. As Søgaard points out, for many questions this is not the measure of interest. Instead, we are usually interested in a measure of market outcomes (pre-tax labor income or pre-tax labor and capital income) or a measure of consumption opportunities (equivalized disposable income). If these measures move in tandem, this is of course not an issue. However, in a recent working paper, Domeij and Roine (2017) show that the choice of income measure matter for the interpretation of the evolution of top-income shares.

Specifically, using Swedish register data for the period 1990–2012, Domeij and Roine classify individuals as belonging to the top-one percentile in terms of either (i) labor income, (ii) labor and capital income or (iii) equivalized disposable income. They then show that top-one-percentile individuals in terms of labor income have almost no capital income and that their labor (and capital) income share increased

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by about one percentage point over this period. For top-one-percentile individuals in terms of labor and capital income together, on the other hand, the labor and capital income share increased by more (two percentage points) and this increase is primarily driven by an increase in capital income. For both these classification of top-one-percentile individuals, the tax and transfer system mitigates the increase; their disposable income share is about half that of their labor and capital income share throughout the period. Finally, for top-one-percentile individuals in terms of equivalized disposable income, the labor and capital income share increased by even more (two and a half percentage points) and this increase is entirely driven by capital income. Furthermore, for this group the tax-transfer system had no mitigating effect. In fact, their disposable income share is essentially the same as their labor and capital income share.

### *Income mobility*

The top-income literature typically focuses on an accounting period of one year. Inequality of single-year income may be of special interest, in particular if future income is highly uncertain and it is costly to transfer income across periods. However, if income mobility is high the documented increases in top-income shares may be less cause for concern. The Scandinavian countries are known for their relative high social mobility. Domeij and Roine (2017) show that indeed there is income mobility at the very top but that again the choice of income measure matters. In particular, they show that out of all top-one-percentile individuals in terms of single-year labor income during 1990–2012, 35 percent are top-one-percentile individuals only one year. Moreover, about three percent of all individuals are top-one-percentile individuals at least once. Considering labor and capital income or equivalized disposable income, there is even more turnover; 55 and 62 percent of top-one-percentile individuals, respectively, are in the top-one percentile only once, and 4 and 6 percent of individuals, respectively, are top-one-percentile individuals at least once.

If top-one-percentile individuals remain in the top of the distribution also when they are not in the top percentile, then high turnover does not change the picture from single-year observations much. Domeij and Roine show, however, that while top-one-percentile individuals spend most years in the top-end of the distribution, they also have many single-year observations at the bottom end. This is in particularly true when considering disposable income. For this income measure,

top-one-percentile individuals spent approximately one third of their time in top-five percentiles, 40 percent of the time in the three middle quintiles and close to ten percent of their time in the bottom quintile. Moreover, Domeij and Roine also show that persistence at the top has decreased during the period examined.

The two above points suggest that the focus on pre-tax, post-transfer non-equivalized income in the top-income literature gives an incomplete picture of changes in inequality, even at the top.

### *The role of taxation*

As Søgaard notes, the marginal tax rate on labor income is usually the same in the entire top decile and therefore changes in marginal tax rates on labor income is probably not a key factor in explaining changes in top income shares. Changes in the effective marginal tax rate on labor and capital taxes jointly is, on the other hand, probably a more important factor. All four Scandinavian countries implemented dual tax systems around the time top-income shares started increasing, with progressive labor income taxation and a flat tax on capital income. This creates strong incentives to reclassify labor income as capital income in the form of dividends. The extent to which reclassification is possible varies across countries, but it usually requires running a small business. This involves fixed costs, which makes it a more attractive option at the top of the distribution. The quantitative importance of this channel remains an open question but work by Pirttilä and Selin (2011) and Alstadsæter and Jacob (2016) suggests a fair amount of income shifting. Moreover, the increase in dividend income since the mid-1990s documented by Søgaard is striking.

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## Comment on J. Søgaaard: Top Incomes in Scandinavia – Recent Developments and the Role of Capital Income

Niels Ploug<sup>1</sup>

Jacob Søgaaard has written yet another excellent analysis on income inequality, this time with a focus on the developments in the Scandinavian countries. The paper gives very good insight into what is going on in the odd cases that the Scandinavian countries often are when it comes to income distribution as well as social and economic mobility.

Søgaaard shows that the increasing income differentials seen at the global level are also seen in “the egalitarian Scandinavian countries”, as Thomas Piketty repeatedly refers to in his international bestseller (Piketty 2014), but to a lesser degree.

The critical comments to Søgaaard’s paper are therefore very few. They might not even be seen as critical taking into consideration that there are always limits to what can be treated in the limited space of a paper. I have two comments: a specific one and a more general one.

The specific comment relates to the discussion on the measurement of inequality using either the Gini-coefficient or “the top one percent”. In the discussion on the Gini many things should be taken into account. And many of those are mentioned by Søgaaard. But it is worth underlining that also that the Gini is very sensitive to demographic developments. Therefore, an increased Gini might not imply that increased income inequality is a social problem.

For example, an increase in the share of the population on old-age pensions will increase inequality measured by the Gini. But such an increase is not necessarily a social problem. Most old-age pensioners in the Scandinavian countries have quite good incomes even though they are lower than the ones they had when they were working. This is pointed out by Aaberge et al. (2018), which is another contribution to this volume.

A related issue concerns young people who take an education. If their share in the population increases – as it has done at least in Denmark – the Gini will also increase.

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<sup>1</sup> Statistics Denmark.

This is because the incomes of a student are usually smaller than the incomes from paid work or social benefits. But having a low income as a student is not a poverty problem. It is part of an “investment” plan which will ultimately lead to higher lifetime income. So when we are looking at Ginis for the Scandinavian countries, one should be aware that substantial parts of recent increases can be explained by demographic developments that are not social problems, as explained by Pareliussen and Robling (2018) in their n

The more general comment – which might be both unfair and difficult to deal with – is the relation between the title “Top incomes in Scandinavia” and some of what is actually going on in the paper. It is to some degree more a comparison between, on the one hand, the Scandinavian countries and, on the other hand, the US and France. Especially the comparison with France does not contribute that much to the understanding of what is going on, as the French case seems to be somewhat odd compared to the other countries included in the analysis.

Also, after having read the paper, one remains quite curious about what is actually going on in Scandinavia. Is it still fair to call them “the egalitarian Scandinavian countries”, as Piketty does, or are these countries truly moving in a non-egalitarian direction? And are the driving forces the same as elsewhere? These are the kinds of questions one is left with after reading Søggaard’s paper. Hopefully he will take on answering them in future analysis.

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# Gendered Trends in Income Inequality<sup>1</sup>

*Anne Boschini<sup>2</sup> and Kristin Gunnarsson<sup>3</sup>*

## Abstract

This paper investigates the gender dimension of income inequality in the Nordic countries. While income inequality is commonly studied at the household level, we examine individual-level inequality in order to measure differences between genders and within genders. We estimate Gini coefficients for men's and women's disposable and labour incomes separately, and study the trends in gender gaps at different percentile levels. Our results emphasize that important gender differences in inequality are not captured by the commonly used household inequality measures, but need to be assessed employing individual-level inequality measures.

Keywords: income inequality, gender, households, disposable income, labour income, Gini coefficients.

JEL classification: D63, J16, J31, O15.

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<sup>1</sup> We thank Anna Sandberg Trolle-Lindgren, Karin Hederos, Lars Haagen Petersen, two anonymous referees and the editors for their excellent comments.

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## Introduction

The Nordic countries are internationally known for their high levels of gender equality. They stand out consistently in rankings such as the World Economic Forum's annual Global Gender Gap Report.<sup>4</sup> They also share a common history of being progressive in removing the obstacles that hold women back. Finland was the first country to grant women the right to vote in 1906, followed by Norway in 1913, Denmark and Iceland in 1915, and Sweden in 1919. Female labour force participation has been high in all Nordic countries for decades and the education gap in tertiary education has also been reversed to women's advantage for quite some time by now. How do these achievements in gender equality translate into overall income equality in these countries? More precisely, what is the impact of gender inequality on overall income inequality? Thinking about these questions turns out to have many facets.

A first, overarching issue, is the relation between gender differences and the unit of analysis in income inequality studies. For many issues, the natural focus is on the household and on (yearly) disposable income per person in a household. This approach assumes that household members divide their total incomes equally (after taxes and transfers) regardless of who earns them. Doing so has several appealing features: for example, the full population, including children and pensioners, is included, and the adjusted household income comes close(st) to measuring money available for consumption and therefore to individual utility. However, this approach has drawbacks when analysing the gender dimension of inequality. It may well be that many households do share incomes in the way assumed when calculating disposable income, but it is far from obvious. A large literature has studied how outcomes of within-household bargaining depend on who earned the income in the first place and found that such a connection is typically present.<sup>5</sup> Also, there are long-run consequences of differences in market earnings, for example for future pensions. This means that policies that affect life-cycle decisions may have inequality effects that only appear much later.<sup>6</sup>

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<sup>4</sup> In the most recent report from 2016 the top four countries are Iceland, Finland, Norway and Sweden, with only Denmark lagging behind in place 19.

<sup>5</sup> Several alternatives to the unitary model of the family (typically associated with Gary Becker (1965, 1981) have been proposed. See Agrawal (1997) for an early overview. Chiappori and Meghir (2015) contain a more recent survey over this literature.

<sup>6</sup> Ongoing work by Chiappori, Costa-Dias and Meghir (2016) develops a framework to address lifetime consequences of educational choices and of labour market and marriage market outcomes.

An alternative is to start the analysis at the other extreme: to treat each individual as a separate unit, ignoring whatever connections in terms of resources and responsibilities that individuals may have. This is relatively close to how individuals typically are studied when looking at labour market outcomes and how individuals in the Nordic countries today are treated in terms of taxation.<sup>7</sup> With this approach, it also becomes more meaningful to study gender differences since men and women are now observed as individuals rather than as members of a household. This, in turn, can be done in terms of total incomes from all sources or based on labour earnings. Alternatively, one can study actual incomes or full-time equivalents. One can also analyse the outcomes before or after taxes and transfers.

Of course, one can also think about alternatives in-between such as keeping individual incomes from work separate but dividing some incomes received by the household equally. However, the main reason for why it is not obvious how to move from the distribution across individuals to the distribution across households is that the latter depends on which individuals form households. In principle, an increase in inequality between individuals can either be magnified, if high-income individuals increasingly form couples (so called assortative mating), or countered if such a tendency becomes less pronounced.

As is evident from the above, there are many ways in which the gender dimension of inequality can be studied. Recent work of special relevance for our paper include, for instance, Gottschalk and Danzinger (2005), who compare hourly individual wage rates, annual individual earnings, annual family earnings and annual family-adjusted total incomes in U.S. data, making important observations about the need to look at outcomes at different levels (households and individuals, by income source as well as before or after taxes and transfers). One finding is that analysing inequality at the household level moderates growing earnings inequality in the labour market.

Salverda and Haas (2014) show that labour earnings are crucial in determining income inequality in a European setting. Moreover, they study the relative importance of hours worked, hourly wage rates and part-time work in exacerbating or mitigating income inequality. Most recently, OECD (2015) provides an in-depth analysis of how men's and women's hours worked, employment and earnings impact aggregate

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<sup>7</sup> The individual treatment of citizens with respect to taxation has varied between countries and over time. The Nordic countries historically taxed married couples as one unit and this is still the case in many other countries (e.g. in France and the U.S.).

inequality both at the individual and the household level for a number of OECD countries. Overall, women's increasing presence in the labour market (in terms of labour force participation and hours worked) tends to decrease individual earnings inequality, while increased wage dispersion tends to augment it. The effects of changing labour market characteristics for men and women have varying effects on household income depending on the specific country analysed. A policy conclusion in the OECD study is that one way of decreasing household income inequality is to enhance the share of households with women in paid work.

Here, we limit ourselves to the gender dimension of a few issues regarding income inequality. We base our choice on what we see as issues relating to current debates about rising inequality in the Nordic countries. After mapping existing gender differences in family policies and in the labour market in the Nordics, we describe our data and the inequality measures used. We proceed to analyse the implications for overall inequality (in Gini coefficient terms), when transiting from measuring inequality at the household level to measuring it at the individual level. It is shown that individual disposable income inequality is considerably higher than household level inequality, regardless of inequality being calculated in terms of equivalent or non-equivalent disposable income.

Remaining in the realm of individual inequality, we then study the within-gender trends in inequality both in terms of disposable income and labour income to understand how women's and men's income distributions have changed over time. Have the income differences across men and women, respectively, developed in similar ways, or have they grown more among women than among men (or vice versa)? We then analyse the differences between men and women's labour income and disposable income distributions. Is it the case that a woman at the median of the female distribution has a similar income level as a man at the median of the male distribution? Is the ratio between men's and women's incomes different in different parts of the distribution? Gender gaps in incomes at four different percentile levels are reported. They suggest that the levels and trends in between-genders differences in inequality depend on the income measure used. We also turn to an aspect of inequality that has received a lot of attention in recent years, but where the gender aspect has largely been neglected, that of the developments in the top of the distribution.

Lastly, we discuss the insights from decomposing inequality within gender and between genders. Using a Theil decomposition, we show that the changes in the



shapes of men's and women's respective income distributions have affected overall inequality more than changes in men's and women's average incomes. This suggests that changes in incomes in the top and bottom of each gender's separate distribution have occurred, thus contributing to overall inequality in a way that would not be captured by simply looking at inequality measures at the household level. Therefore, it is important to consider not only household level inequality but also individual level inequality when assessing men's and women's economic standards.

## Gender gaps in the Nordic countries

From an international perspective, the Nordic countries are not only positioned high in all rankings of gender equality, but are also considered very similar in terms of generous parental leave systems and high-quality childcare. These family policies, in turn, are often put forward as key reasons enabling women to participate in the labour market. This section reviews key measures of gender equality in Denmark, Finland, Norway and Sweden and show that, despite many similarities, important differences exist. Analysing these differences can guide our understanding of how gender differences might influence overall inequality.

### *Labour force participation and education levels*

In an international (gender) context, the Nordics stand out because labour force participation has been almost as high for women as for men for decades. In Finland this was the case already during World War II as women filled jobs left vacant by men at war. In Denmark and Sweden, it was not until the 1960s that female labour force participation among women with children started to rise sharply. It happened somewhat later in Norway. At the beginning of the 1990s, the employment gender gap was around ten percentage points in Finland and Norway and below five percentage points in Denmark and Sweden. Today all four countries have employment gender gaps below five percentage points (OECD 2015).<sup>8</sup>

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<sup>8</sup> The employment gender gap is defined as the difference in percentage points between male and female employment rates for persons aged 15-64.

Another important feature is that of education. Already in 1990 more women than men were university students in the Nordics (see e.g. Pekkarinen 2012) and the trend of women investing more in education has continued since then. Today 57 per cent in Denmark and Finland, 60 per cent in Norway, and 62 per cent in Sweden among first-time tertiary graduates are women (OECD 2017).

### *Wage gaps and glass ceilings*

Despite men's and women's almost equally high labour force participation and women's, on average, higher education levels, the median gender wage gap among full-time employed has changed only marginally since 1991 in all four countries. It was 7.8 per cent in Denmark (2012), 18.7 per cent in Finland (2012), 7.0 per cent in Norway (2013) and 15.1 per cent in Sweden (2012) according to OECD (2015).

Furthermore, it has been shown that the gender wage gap is not constant over the wage distribution, but rather increases with higher wages. Albrecht et al. (2003) and Albrecht et al. (2015) find evidence of a glass ceiling in Sweden. There have been similar findings for Denmark and Finland (see e.g. Arulampalam et al. 2007 and Datta Gupta et al. 2006). According to Arulampalam et al. (2007), there is no evidence of the gender wage gap increasing towards the lower end of the wage distribution, which would point to the absence of so called sticky floors (i.e. limited possibilities to rise above the lowest wage levels). For Sweden, Boye et al. (2017) find that the gender wage gap has decreased significantly in less qualified occupations since the 1970s, while remaining virtually constant in more qualified occupations.

The share of women employed as managers is still low in the Nordic countries. Less than 40 per cent of all employed as managers are women, ranging from 29 per cent in Denmark to 35 per cent in Sweden in 2013. The corresponding EU average is 33 per cent, suggesting that this is a dimension of gender equality where the Nordic countries do not excel.

Research, e.g. Johnsen and Løken (2016), has suggested that the generous family policies characterizing the Nordic countries might be favourable for enhancing female labour force participation, but may impede women from investing enough time in career development. In the following we review parental leave entitlements, cash for care, and child care services in the Nordics.

## *Parental leave and childcare*

The Nordic countries all have total fertility rates above the EU average, but parental leave systems and childcare provision vary across the four countries. According to Grönlund et al. (2017) each parent is entitled to the following parental leave with income-based benefits: 48 weeks in Denmark, 44 weeks in Finland, 49 weeks in Norway and 47 weeks in Sweden.<sup>9</sup> Moreover, while fathers and mothers have the same rights to parental leave in Norway and Sweden, in Denmark and Finland the parental leave schemes are biased towards the mothers by reserving more parental leave days for mothers than fathers.

In Denmark and Sweden parental leave can be extended by 14 and 13 weeks, respectively, (beyond the leave days with income-related compensation) by using leave days with low compensation levels. In Finland and Norway additional leave takes the form of cash-for-care schemes, which provide parents with a flat-rate compensation until the child is three years old in Finland and two years old in Norway. While in Norway the cash-for-care scheme has been less and less used over time, it is still popular among parents (mostly among mothers) in Finland. This is probably the main reason why Finland has the lowest enrolment rate in childcare among children below three years of age.

While the right to maternity leave and job protection during parental leave are essential in enhancing women's labour force participation, long parental leave can theoretically have negative effects on female labour supply. Johnsen and Løken (2016) show, however, that there are no negative effects if mothers already are in the labour force, probably because the uptake of maternal leave is close to complete in the Nordic countries. Cash-for-care policies on the other hand may – because of their lower uptake - delay re-entry into the labour force.

Summing up, although there are only minor differences in parental leave schemes among the Nordic countries when children are below the age of one, Finland's, and to a lesser extent Norway's, generous cash-for-care scheme can have negative consequences for mothers' re-entry into the labour force.

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<sup>9</sup> This is under the assumption that fathers take out only the parental leave reserved for them.

## *Childcare*

Subsidized, publicly provided, high-quality childcare is available in all the Nordic countries. It has been considered an essential component in allowing mothers to return to paid work after parental leave. At the same time, its relative inflexibility in terms of opening hours has been suggested as contributing to women working less hours – both less overtime and a more part-time work – than men in the Nordics (see Plantega and Remery 2010). In the early 1990s, Finland and Norway only had 17.5 per cent and 21.6 per cent, respectively, of children aged 0–3 years enrolled in day care, while corresponding figures for Denmark and Sweden were 48.8 and 35.9 per cent, respectively. Two decades later, Norway has more than caught up with Denmark and Sweden in terms of children 0–3 years old enrolled in day care (54.7, 65.2 and 46.9 per cent, respectively), but Finland lags behind with only 27.9 per cent. This pattern continues to older pre-school children, where only 73.8 per cent of children in the age span 3–5 years are enrolled in childcare in Finland as opposed to around 95 per cent in Denmark, Norway and Sweden in 2014.

The extent to which women work part-time in the Nordics mirrors childcare policies. In Denmark, Norway and Sweden, with a high share of enrolled children in childcare, women work more part-time than in Finland, but over time the trends are slightly converging. More specifically, in Finland the share of employed women working part-time increased from 15 per cent in 1995 to 19 per cent 2013. In Denmark, the share stayed constant over the time period at about 35 per cent of women, in Norway and Sweden the share decreased, from about 48 and 42 per cent, respectively, in 1995 to 41 and 38 per cent, respectively, in 2013 according to Nordic Co-operation (2015).

## **Data and measures of income and inequality**

### *The LIS dataset*

Our main source of data is the Luxembourg Income Study Database (LIS). This database contains harmonized income micro data from many countries over a long time frame, which makes it attractive for cross-country comparisons. Data are provided both at household and individual levels and contain income variables such as

labour income, capital income, transfers and taxes. LIS also includes demographic variables and information on employment and consumption. We compare incomes from Denmark, Finland, Norway and Sweden. Iceland has been excluded from our analysis due to data limitations for individual incomes.

Data in LIS are provided by each country's national statistical offices and have then been harmonized.<sup>10</sup> In Finland, Norway<sup>11</sup> and Sweden the data come from household surveys, whereas the Danish data are from their so called "Law Model", which is a comprehensive individual-level database used by the Ministry of Finance. The sampling size differs among the countries and over the years. The size for Denmark is around 180,000 observations, whereas it is around 10,000 for Finland. The sampling size for Norway ranges between 8,000 and 200,000, and in Sweden the number is around 16,000.<sup>12</sup> We restrict our time scope to starting in 1990 until the most recent year of observations.

Data in LIS are provided in different waves produced in 1991/92, 1995, 2000, 2004, 2007, 2010 and 2013. The Swedish data are only available until 2005 in LIS. Our analysis focuses on working-age individuals, 20–64 years old, in order to enable a cleaner comparison between individuals' labour market incomes and their disposable incomes, largely avoiding effects from pension reforms and cohort sizes.

The variable coverage is not complete and makes the comparison difficult in the early waves. In particular, capital income is not available at the individual level before the 2007 wave. Since capital income in the Nordics contributes only marginally to individuals' incomes as long as they do not belong to the top one per cent of the income distribution, we consistently exclude capital income when using LIS data.

It should be noted that LIS data are not primarily supplied for time series comparisons, but more for cross-section comparisons between countries. Changes in the data supplied by the countries may affect the results: e.g. for Norway the sample sizes increased markedly from 2004 to 2007. Moreover, Finland and to some extent Sweden report fairly small sample sizes leading to sensitivity in the results when studying only parts of the income distribution. When we perform comparisons on

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<sup>10</sup> In Denmark, both the Danish National Centre for Social Research and Statistics Denmark were responsible for data in 1991 and 1995. From 2000 both the Ministry of Finance and Statistics Denmark were responsible for data.

<sup>11</sup> From 2007 and onwards the data are from Household Income Statistics, which is a census-like register data source.

<sup>12</sup> From 2007, when data started to come from the Household Income Statistics, LIS received a 10% extraction of the total population, which considerably increased the sample size.

incomes around P20 in the lower end of the distribution, the variation in types and levels of incomes are large. Therefore, the results have to be interpreted with caution.

### *Income measures*

We use disposable income and labour income when measuring inequality. Disposable income is usually defined as the sum of labour income, capital income and transfer income less taxes. As capital income data are not available for individuals before 2007 in LIS, and as it is of minor economic significance for most of the population, we exclude capital income in our definition of disposable income so as to have a consistent data series over time.

Labour income in LIS includes such incomes of both employed and self-employed. Labour income is income received by an individual before taxes and social security contributions and will hence not capture any redistribution effects of tax systems.

### *Inequality measures*

We use two types of inequality measures: the Gini coefficient and percentile ratios between different parts of the distribution (see Björklund and Jäntti 2011 for a thorough description of the measures). Measuring inequality in incomes involves many difficulties. For example, one must decide how to treat observations of negative values, and also the typically large number of individuals recorded as having zero income. We follow the literature and include all individuals with positive disposable income and positive labour income, respectively, when calculating inequality measures. Employing equivalence scales to adjust for household circumstances is standard in the economic inequality literature, while in the labour economics literature it is not. There, instead, the focus is typically on wages (per hour or in full-time equivalents) or individual income from work. We will use the latter, i.e. individual labour income. With respect to gender differences this means our measure incorporates differences coming both from differences in wages and hours worked.

For the disposable income measures we follow the standard procedure (as in the LIS data) and calculate individual equivalent income as the total household income divided by the square root of the number of household members. But we also calculate an alternative at the individual level where, instead of dividing adjusted income equally in the household, we allocate it based on the individual contribution to

the household total. This gives a measure where the benefits of sharing costs within the household are taken into account, but the individual disposable income reflects differences in incomes within the household.<sup>13</sup> Below, we report both individual-level inequality with equivalent income and unadjusted individual income.

## From household- to individual-level inequality

Income inequality is typically measured at the household level using equivalent (disposable) income. As suggested in Lise and Seitz (2011) and Chiappori (2016), focusing on household level inequality leads to overlooking trends in inequality within households. Underlying the analysis of household inequality is the assumption that household resources are split equally between family members and hence between partners. However, research has shown that resource allocation within households is likely to be correlated with own earnings capacity (see Bennett 2013 for an overview of research on intra-household income distribution).

To capture the difference in income inequality between genders, we therefore focus on individual income inequality. But, to illustrate the relative importance of the household size adjustment and the assumption that incomes are split equally within the household, we calculate the individual-level Gini using disposable incomes both in equivalent (i.e., household-size adjusted individual income, but keeping the within-household distribution equal to the individual distribution) and without adjustments. The household-level measures use the standard procedure of splitting incomes equally within the household.<sup>14</sup> The household Gini (in equivalent incomes) will, by definition, always be smaller than the individual Gini (in equivalent incomes) unless there is perfect assortative mating. However, it remains an *à priori* open question how

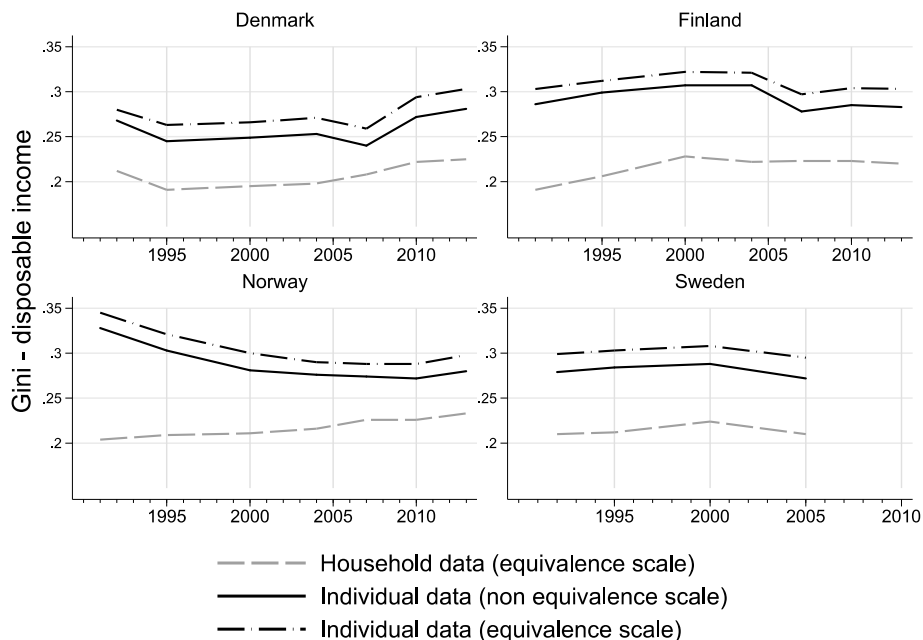
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<sup>13</sup> This is not a standard approach and should be seen as a way of illustrating the relative impact of the two respective steps involved in moving from individual income to the household-based measure, namely (1) adjusting income for household size and (2) dividing all incomes equally within the household. What we label individual-level income (equivalence scale) only takes the household size into account, but does not divide incomes equally. Instead adjusted incomes are divided in proportion to how much each individual contributes to the household total. This is not the same as looking at the individual distribution since household sizes are different.

<sup>14</sup> We use the LIS approach here: equivalent income is calculated as the individual income divided by the square root of the number of household members.

much taking household size into account matters compared to the assumption of splitting incomes equally in the household.

**Figure 1: Gini coefficients in disposable income at the individual and household level by country and gender**



Source: Own calculations from LIS data.

Figure 1 presents Gini coefficients of disposable income inequality (in both equivalent and non-equivalent terms) at the individual and at the household level for each of the Nordic countries. The diagram shows that the household-level Gini (in equivalent incomes) is smaller than the individual-level Gini (in equivalent incomes), indicating that there is not perfect assortative mating.<sup>15</sup> Less assortative mating over time would result in a larger difference between the household Gini and the individual Gini. Since

<sup>15</sup> For an analysis of how to study trends in assortative mating, see Greenwood et al. (2014) and Hryshko et al. (2017).



1990, we see a trend consistent with less assortative mating in Finland and in Norway, but other changes could also account for this pattern. Demographic changes such as in the fraction of singles, as well as income variation over time among singles, influence the Gini levels regardless of whether they are measured at the individual or the household level. Measuring income inequality at the individual level leads to an increase of about 0.07–0.08 (that is 7–8 percentage points) in the Gini coefficient compared to the household Gini coefficient in 2013.

Finally, Figure 1 also shows that the differences between the individual Gini coefficient in equivalent disposable income and the individual Gini coefficient in non-equivalent disposable income are minor. This means that, in practice, when moving from inequality in household incomes to inequality in individual incomes it is the difference between household and individual, rather than the difference between equalized and non-equalized incomes, that matters the most. Therefore, we will only use inequality measures in non-equivalent incomes below. This also makes comparisons with previous research on gender differences easier as they typically are measured in non-equivalent income.

According to Robling and Pareliussen (2018), the joint impact of demographic changes (including not only changes in population structure but also changes in household structure and in assortative mating) has led to an increase of 1–2 Gini percentage points in household disposable income inequality in the Nordics during the last decades. Even if individual income inequality measures do not incorporate all the above-mentioned demographic drivers of inequality, they avoid lumping together partnered men's and women's incomes, and enable gender-specific analyses.

## Within-gender inequality

After having assessed how the Gini coefficient at the individual level differs from that at the household level, we now focus on how income inequality has developed over time in the Nordics for men and women, respectively. We study inequality in both disposable incomes and labour incomes. While disposable incomes are usually studied in inequality research, gender research tends to focus on differences in labour market and wage outcomes.

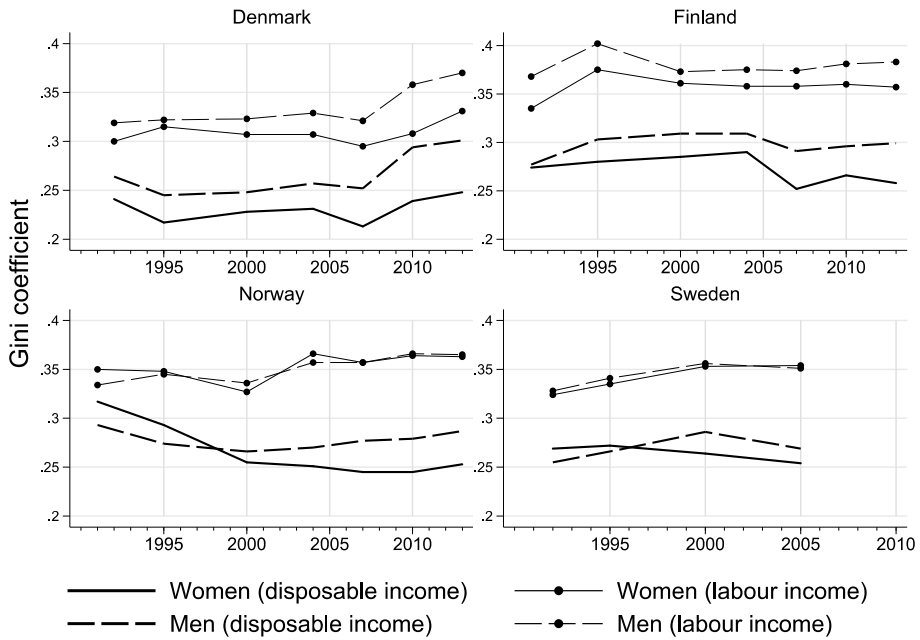
The labour income distribution is the result not only of the distribution of wages, but also of the distribution of hours worked. Since women on average not only earn

lower wages than men, but also work fewer hours, the gender differences are more accentuated in the labour income distribution than in the wage distribution (when wages are measured per hour or as full-time equivalent wages). From an inequality perspective, it is sensible to focus on the labour income distribution rather than the wage distribution if the concern is the individuals' economic standards.

Figure 2 presents the trends in Gini coefficients in disposable and labour incomes between men and women separately. The Gini coefficient for labour income is consistently higher than the Gini coefficient for disposable income in all the Nordic countries and has slightly increased over the time period. Considering the within-effect and comparing the development between the genders we see that in Denmark and Finland inequality between men has been larger than between women throughout the period, whereas in Norway and Sweden the data show no differences in the labour income Gini and only a slightly more unequal disposable income distribution between men since around year 2000. Denmark stands out in the sense that within-inequality has increased more for both women and men in recent years compared to the other countries, but starting from low levels.

The recent increased divergence in levels of within-gender disposable income inequality is worth noting given the redistributive ambitions of the Nordic welfare states. Women's within-inequality in disposable income is lower than men's within-inequality in all the Nordic countries after 2000. The mechanisms explaining these trends are beyond the scope of this paper, but warrants further research. As mentioned before, the results must be interpreted with caution, especially for Norway until 2000 but also for Finland and Sweden. As described, the small sample sizes risk affecting the results.

Figure 2: Gini coefficients for disposable income and labour income by country and by gender



Source: Own calculations from LIS data.

## Between-genders inequality

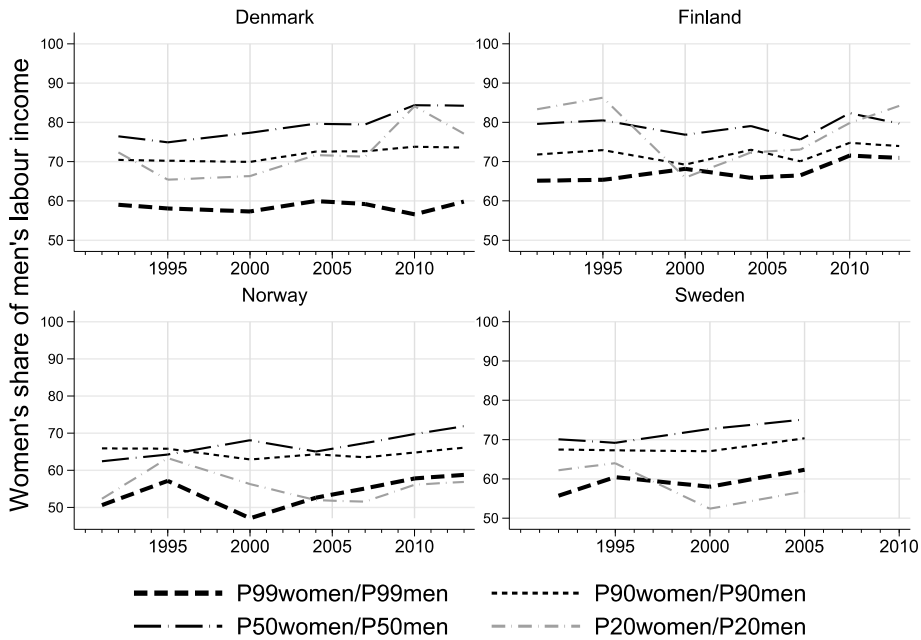
After analysing within-gender inequality, we now turn to the differences in inequality between genders in the distributions of labour income and disposable income, respectively. To do so, we calculate women's incomes in per cent of men's incomes at four percentile levels in their respective distributions: P20, P50, P90 and P99. The levels are chosen to give information on the differences at the lower end of the distribution, the median and the upper part of the distribution. From the recent top-income literature, we know that there are important differences in trends as well as income composition within the upper end of the distribution and we have therefore chosen to include the top P99 as well (see e.g. Roine and Waldenström 2015).

### *Between-genders inequality in labour income*

Figure 3 presents the trends in women's labour income in per cent of men's labour income at different percentile levels. As expected, women earn consistently less than men. The trends are rather stable or slightly positive, indicating that women are slowly catching up with men in terms of labour incomes. The smallest between-genders income difference, when comparing the four chosen percentile levels, is at median income where women earn around 70–80 per cent of men's labour incomes in each of the Nordics.

The gender difference in labour incomes typically increases both towards the bottom of the distribution (P20) and towards the higher end of the distribution (P99). Women's labour incomes are about 50–60 per cent of men's incomes at percentile P99 in Denmark, Norway and Sweden (while about 60–70 per cent in Finland). Over time there seems to be a slight decrease in this difference, as shown by the positively sloping lines in all countries except Denmark (where the difference at P99 has been stable). Overall, the well-documented existence of a glass ceiling in wages for women in the Nordics is likely to be one important explanation of the between-gender gaps at the top of the wage distribution.

Figure 3: Women's labour income in per cent of men's labour income by percentile level and country



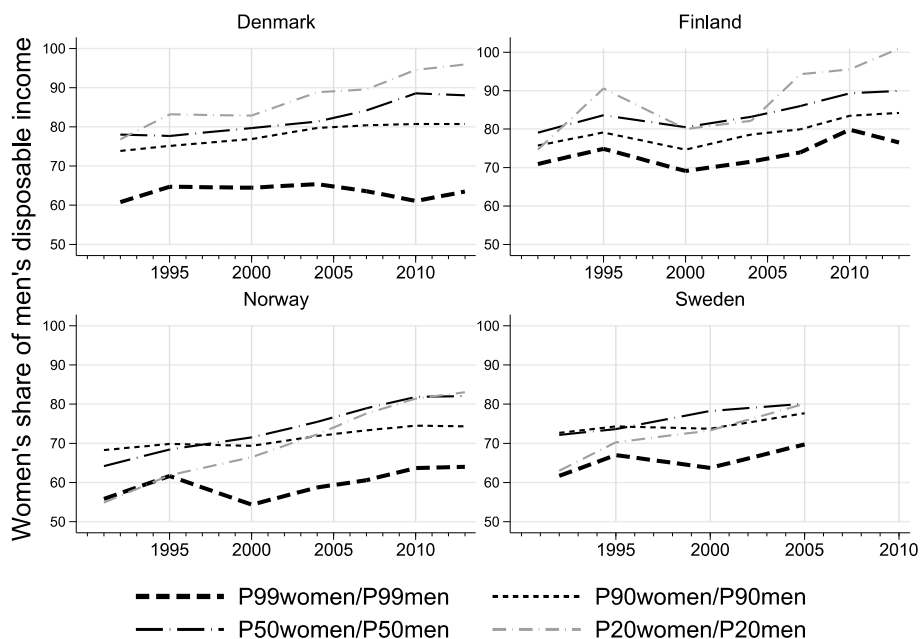
Source: Own calculations from LIS data.

At P20, it is more difficult to explain the income gaps. However, at P20, the differences fluctuate more than at the other percentiles. This may be because of small sample sizes. At P20, the character of the incomes exhibits large variability. In fact, the lower end includes part-time workers like students and women with a high degree of unpaid domestic work (allowing little time for paid work), but also individuals dependent on social security contributions. Because of small sample sizes, frequent changes in the composition of individuals with those kinds of incomes in the data, may result in a volatile shape of the gender income gaps at the P20 level.

### Between-genders inequality in disposable income

We now turn to the between-genders differences in disposable income. Figure 4 presents the trends in women's disposable incomes in per cent of men's disposable incomes at P20, P50, P90 and P99.

Figure 4: Women's disposable income as per cent of men's disposable income, by percentile level and country



Source: Own calculations from LIS data.

While these gender ratios in disposable income are similar to those in labour income in the sense that women have lower incomes than men at all the studied percentiles, the between-genders gaps in disposable incomes are consistently smaller. In addition, the between-genders disposable income inequality increases towards the top of the distribution, rendering the gender gap at P20 the smallest. The Nordic welfare states thus successfully redistribute resources at the lower end

of the income distribution. At P90 however women only earn 75–80 per cent of men’s disposable income, and even less at P99.

### *Representation of women in top-income shares*

Another way of studying if gender differences increase when moving towards the upper end of the income distribution is by turning to the top-income literature and the recent studies on women’s representation in the top. When studying the top, men’s and women’s incomes are combined into a single distribution for all individuals, thus obtaining common income thresholds for women and men. This enables analysis of how the share of women has evolved at the top of the joint income distribution. In the top-income literature, total income (that is the taxable income from all sources) is the measure used. Including all incomes is especially important for this group since capital is an important income source for top earners. Over the recent decades the share of women in both the top ten per cent and top one per cent of the income distribution have increased in Sweden (Boschini et al. 2017) as well as in Denmark and Norway (Atkinson et al. 2016). A recent paper on Finnish data shows that the share of women in the top has increased in both the top-ten and top-one-per-cent groups over the years 1995–2012, but that the increase has been somewhat slower than in the other Nordic countries.<sup>16</sup>

Summarizing the results from the recent studies on women in the top for the Nordic countries, we see that around 2013, the share of women in the top-ten group in Denmark was about 31 per cent, 28 per cent in Finland, 27 per cent in Sweden and 22 per cent in Norway.<sup>17</sup> In the top one per cent, Finland had the highest share with about 19 per cent, whereas Sweden had 18, Denmark 16 and Norway close to 14 per cent.<sup>18</sup> According to Boschini et al. (2017), while the capital share of income has been larger for women, the recent trend of capital income becoming a more important income source, has led to men in the upper income brackets now having almost as large shares of capital incomes as women in the top.

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<sup>16</sup> See Ravaska (2017) for preliminary evidence.

<sup>17</sup> The figure for Finland stems from Ravaska (2017), for Norway and Denmark from Atkinson et al (2016), and for Sweden from Boschini et al (2017).

<sup>18</sup> The figure for Finland stems from Ravaska (2017), for Norway and Denmark from Atkinson et al (2016), and for Sweden from Boschini et al (2017).

The results from the top income studies on women show a clear increase in women's representation in the top, especially in the top one per cent. However, the share of men is still 80 per cent or more in the top one per cent and about 70 per cent or more in the top ten per cent. Again, it should be noted that the income measure is total income from all sources. The differences might be larger if only labour incomes would be studied, since capital income has been more important for women than for men in the top-income shares.

## The contribution of gender gaps to overall inequality

From the analysis of trends within-gender and between-genders in income inequality, we learned that there is a tendency towards decreasing differences between the genders at the same time as dispersion is increasing within men's and women's income distributions, respectively. To measure and quantify these changes, we use the Theil index which enables us to decompose the total change in inequality into a between- and a within-genders part. Such a decomposition is not possible with the Gini coefficient. The Theil index takes on a positive value, with zero being the lower bound of complete equality and higher numbers indicate more inequality. Unlike the Gini coefficient, the Theil index is usually not normalized to being between zero and one. The Appendix gives more details about the Theil index.

Table 1 presents the total change in the Theil index (referred to as Total in the table) as well as the changes in the between- and in the within-genders labour-income differences. The results are consistent across the Nordic countries and show that the income difference between men's and women's labour incomes has decreased, whereas the dispersion *within* each distribution has increased. It is also clear that the within-effect is noticeably larger than the between-effect (as seen by an increasing Theil index). This is in line with the results from previous sections, where we could see decreasing differences in percentile levels between women and men's labour incomes, but increasing Gini coefficients for both women and men taken separately.



**Table 1: Changes in the Theil index for labour income decomposed into changes in between- and within-genders distributions, 1991–2013**

	Between	Within	Total
Denmark	-0.005	0.067	0.063
Finland	-0.001	0.020	0.019
Norway	-0.008	0.029	0.022
Sweden	-0.004	0.042	0.038

Note: Data refer to 1992–2013 for Finland and 1991–2005 for Sweden.

Source: Own calculations from LIS data.

When decomposing overall inequality in individual disposable income into between- and within- gender changes, the dominating effect is not as clear. Table 2 presents the Theil index and its additive components for disposable income. The change in the Theil index varies over the time period and across the Nordic countries in line with the results in Figure 1 on the Gini coefficient in disposable income. During the time period the Theil index has decreased in Finland and Norway and increased in Denmark and (slightly) in Sweden.

**Table 2: Changes in the Theil index for disposable income decomposed into changes in between- and within-genders distributions, 1991–2013**

	Between	Within	Total
Denmark	-0.007	0.021	0,014
Finland	-0.007	0.001	-0,006
Norway	-0.017	-0.034	-0,052
Sweden	-0.008	0.009	0,001

Note: See Table 1.

Source: Own calculations from LIS data.

In all countries, the inequality *between* the genders' distributions has decreased. In Denmark, the overall Theil index increased because the increase in the within-component was larger than the decrease in the between-part. In Finland, the decrease in the between-part outweighed the small increase in within-inequality and resulted in a total decrease in the Theil index. The largest decrease in the index

happened in Norway where the decrease in within-gender distributions was even larger than the between-component decrease.<sup>19</sup> In Sweden, the two effects almost balanced out (until 2005). Although the changes in the Theil index vary, we consistently observe a decrease in the between-component and an increase in the within-component, except for Norway.

What reasons may explain the trends in increasing dispersion within the gender-specific labour income distributions and the decreasing differences in the between-components? In countries with low female labour force participation, women have faced a high dispersion in incomes as they slowly have entered the labour force. In the Nordic countries, where this shift mainly happened before the 1990s, the dispersion among women is comparatively low. As the fraction of women working full time increased and the fraction of highly educated women slowly increased their incomes, the result has been higher income dispersion among women. Regarding men, who already had a strong position in the labour market, the increasing dispersion may spring from an increasing share of men working part-time (true for all Nordics but this effect is relatively small in Sweden), more unskilled men with lower labour-force attachment, and high-skilled men experiencing sizeable wage increases due to skilled-biased technological change.<sup>20</sup> According to OECD (2015), the increase in the Theil index in Finland mainly springs from increasing differences within the male distribution and from more men working part-time. The increasing share of students taking on part-time jobs, but also young individuals taking on low-paid jobs affect the income dispersion for both women and men.

The trend of slowly decreasing income differences between women and men seems to follow from the same reasons as above. Since the increasing inequality mainly appears to come from increasing dispersion within both women and men's labour income distributions, more research should focus on the mechanisms behind these trends. The redistributions systems seem only partially to mitigate this development.

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<sup>19</sup> Note that this result is driven by the development in the 1990s, when the sample size for Norway in LIS was very small.

<sup>20</sup> See Autor and Wasserman (2013) and Autor (2014) for corresponding US trends.

## Conclusions

Although the Nordic countries are similar in many respects, of which a high degree of gender equality is one of the more prominent, the results in this paper suggest that when it comes to income inequality not only are there still significant differences within-gender and between-genders in the respective countries, but also that these differences vary across the Nordics.

We show that the Gini coefficient for disposable income at the household level is significantly lower than the Gini coefficient at the individual level (in the Nordic countries. This opens up for research on the exact mechanisms behind the changes in the relation between these two measures. If inequality at the household level increases more than at the individual level, this could be due to rising assortative mating for instance (see Robling and Pareliussen 2018 for an account of demographic drivers in the Nordics.) This warrants further research.

Turning to within-gender income inequality, men's income distribution is generally more unequal than women's. Moreover, income inequality has – especially when measured in terms of disposable income – increased more for men than women during the last decade in Denmark, Finland and Norway. (For Sweden, LIS does not provide data after 2005.) This implies that disregarding within-gender inequalities blurs our understanding of overall inequality and makes it harder to formulate efficient policies to reduce it.

Between-genders differences depend on the income measure used. While the between-genders inequality in labour income is U-shaped over the income distribution (i.e. differences between women and men are largest at the bottom and at the top of the distribution), the between-genders disposable income inequality increases with income. Inequality in disposable income between genders is smaller than in labour income due to redistribution, especially at the lower end and at median incomes. At the higher end however, the redistribution is less pronounced and women earned about 75–80 per cent or less of men's disposable income in 2013. Out of our four countries, Finland stands out in terms of women having a higher labour income in the 99th percentile in relation to men at the same percentile (about 70 per cent of men's labour income in 2013) compared to the other three countries (where women earn about 50–60 per cent of men's labour income).

Finland also has a higher share of women in the top of the income distribution compared to Denmark, Norway and Sweden. This might seem counterintuitive as Finland has an extensive cash-for-care child policy that does not incentivize mothers

with small children to work (whereas the other Nordics have mothers back in the labour market earlier). This suggests that the impact of family policies on women's career patterns might be complex: a cash-for-care policy appears to lead mothers at the lower end of the income distribution to stay home longer with their children, while the effect seems to be smaller for high-income women. Exactly how countries' different family and social insurance policies affect within-gender and between-genders inequality, as well as overall inequality, needs further research.

The gender differences illustrated in this paper are outcomes of both the high rates of female labour force participation in the Nordics and the presence of generous welfare states. For instance, OECD (2015) suggests that in countries with a relatively low level of female labour force participation, within-women inequality is likely to increase when more women enter the formal labour market. It would, therefore, be most interesting to extend our analysis to countries outside the Nordic region.

Most importantly, we show that the standard way of analysing inequality at the household level fails to address the importance of both within-gender and between-genders differences in inequality. Within-gender differences in inequality appear to be increasing, while between-genders inequality is slowly decreasing. Improved gender equality in one dimension does not imply that overall inequality has to decrease. It may even be that gender inequality in different dimensions move in opposite directions. The same can be said for gender inequality at different points of the income distribution. Differences between women and men may, for example, shrink at the median but increase at the tails of the distribution. These insights illustrate why it does not suffice to measure gender inequality in one dimension. The interaction of within-gender and between-genders inequality, as well as differences across the distribution, is essential to understand developments of gender inequality and overall inequality.

Exactly how to assess the impact of gender inequality on overall inequality remains an open question. One way forward would be to provide counterfactual analysis, as in OECD (2015), estimating the level of overall inequality if there would be no between-genders inequality, or the same within-gender inequality. Another way would be to further decompose changes in overall inequality in changes due to gender differences within and between income quintiles, as suggested in Liao (2016).

Our main message is that household level trends in inequality need to be complemented with analysis at the individual level to capture gendered trends and mechanisms. Otherwise we will continue to miss out on important driving forces of overall income inequality, and in particular on important parts of the gender dimension.

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## Appendix

The Theil index is a commonly used measure of inequality and belongs to the family of inequality measures called the Generalized Entropy (GE) measures. The measure ranges between zero and infinity, where zero indicates perfect equality and values above zero indicate higher levels of inequality. An appealing feature of the index is that it can be decomposed into population subgroups or income sources, which distinguishes it from the more popular and more intuitively appealing Gini coefficient (UN 2015). More precisely, the Theil index is always the (weighted) sum of inequality within each subgroup considered plus the inequality between these groups. In the case considered here, a change in inequality can be decomposed into a change within the groups of women and men, respectively, plus the change in inequality between women and men.

More formally, the Theil index, first proposed by Theil (1967), is used in this study to decompose gender income differences into a between-group and within-group part. Following Liao's (2016) theoretical presentation the total amount of inequality measured by the Theil measure can be described as follows:

$$T = \frac{1}{N} \sum_{i=1}^N \frac{x_i}{\bar{x}} \ln \frac{x_i}{\bar{x}}, \quad (1)$$

where  $x_i$  is income of individual  $i$ ,  $\bar{x}$  the overall mean income, and  $N$  the sample size. The between-group component can be described by the following equation:

$$T_b = \sum_{k=1}^K y_k \ln \frac{\bar{x}_k}{\bar{x}}, \quad (2)$$

where  $y_k$  is the  $k$ th group's income share (i.e. group  $k$  income in relation to the population total income), and  $\bar{x}_k$  is the mean income of group  $k$ . Hence, the between-component measures the differences between the mean incomes of the subgroups studied. The within-group component can be described by the following equation:

$$T_w = \sum_{k=1}^K y_k \sum_{i=1}^{n_k} y_{ik} \ln \frac{x_{ik}}{\bar{x}_k}, \quad (3)$$

where  $y_{ik}$  is the  $i$ th individual's income share within the  $k$ th group, and  $x_{ik}$  is the  $i$ th individual's income within group  $k$ . It measures the weighted sum of all the subgroups inequality measures (measured by the Theil index of group  $k$ ).

The between and within components add up to the total Theil index in equation (1). The changes over years in the aggregate Theil can be expressed as (see OECD 2015):

$$\Delta T = \sum_k \Delta T_w^k + \sum_k \Delta T_b^k \quad (4)$$



## Comment on A. Boschini and K. Gunnarsson: Gendered Trends in Income Inequality<sup>1</sup>

*Karin Hederos<sup>2</sup> and Anna Sandberg<sup>3</sup>*

This paper investigates gendered trends in income inequality in Denmark, Finland, Norway and Sweden, posing questions such as: Is the income dispersion higher or lower among men than among women? How do gender gaps in labor income and disposable income vary across time, countries and the income distribution? How do gender-specific aspects of income inequality contribute to the overall income inequality in a society?

The questions examined are interesting and relevant. The results suggest that there are substantial differences both between and within genders. If we do not take these differences into account, we miss an important part of the picture. The paper also complements the prior literature on gender gaps which mainly concerns gender differences in hourly wages rather than income. We will divide our comments into two parts. The first part brings up a few measurement issues, and the second part discusses avenues for future research.

### *Measurement issues*

We will first raise two issues that are particularly important when studying the gender aspect of income inequality: the choice of income measure and the role of hours worked. Then, we will briefly discuss the importance of estimating gender gaps over the entire distribution of incomes.

The choice of income measure has been widely discussed in the literature on income inequality. In the context of this paper, one of the key questions is whether gender differences in income dispersion and gender income gaps should be measured using individual income or household income. The answer is not obvious, as both measures have appealing features. For example, although household income comes

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<sup>1</sup> We thank Anders Björklund for useful comments.

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closer to measuring living standards and consumption levels, we need to turn to measures of individual income to capture within-household bargaining power, labor market discrimination and inequality in future pensions.

While the authors discuss this issue to some extent in the introduction, it would have been useful with even more guidance on the pros and cons of the different income measures and when to turn to which measure. Since individual income and household income capture different aspects of inequality, they could be seen as complementary. Thus, it would have been informative to estimate all income dispersions and gender gaps using both income measures. There is a risk that the current focus on individual income may conceal important aspects of gender inequality, such as the situation of lone mothers. Compared to women, men are significantly less likely to live alone with children, and, as illustrated by e.g. Björklund and Jäntti (2011), lone mothers face a higher than average risk of poverty. Household income, adjusted for household size, may come closer to capturing the difference in living standards between, for example, lone mothers and mothers living together with a partner.

A second important issue when studying the gender dimension of inequality is the prevalence of part-time work. The gender difference in labor income consists of two parts: (i) gender differences in hourly wages and (ii) gender differences in hours worked. Since men are substantially more likely than women to work full-time, considering hours worked is fundamental to explain the gender income gaps.

The authors acknowledge that the gender gap in hours worked is likely to be an important mechanism behind many findings in the paper. However, it would have been useful to see an approximation of *how* important hours worked are compared to hourly wages. For example, Figure 2 shows that the Gini coefficient of labor income is similar for men and women in Norway and Sweden, but higher for men than for women in Denmark and Finland. Is this pattern primarily driven by variations in hours worked, variations in hourly wages, or both?

Another example is Figure 3, illustrating the gender gap in labor income at different percentiles in the income distribution. Previous studies from the Nordic countries show that the gender wage gap is largest at the top of the distribution (see e.g. Albrecht et al. 2003, Datta Gupta et al. 2006 and Arulampalam et al. 2007). In contrast, Figure 3 suggests that the gender gap in labor income is relatively high *both* at the top (the 99th percentile) *and* at the bottom (the 20th percentile) of the income distribution. Why do we see this relatively large gender gap at the bottom of the

distribution for labor income, but not for wages? Is the explanation that the gender wage gap is relatively low at the bottom of the distribution, while the gender gap in part-time work is high?

Relatedly, while the results of the paper suggest that gender gaps in labor income and disposable income vary across the distribution of incomes, these gender gaps are only estimated at four different percentiles (P20, P50, P90 and P99). While this gives us some idea of how the gender income gaps vary across the distribution, it would have been even more informative to plot the gender income gaps across the *entire* distribution (i.e. at all percentiles). This exercise would have facilitated a more direct comparison between the findings of this paper and the literature on the glass ceiling. Moreover, showing the gender gaps across the entire distribution for several years might increase our understanding of the mechanisms behind observed time trends in the average gender income gap.

### *Looking ahead*

The authors mention that it would be interesting to extend the analysis to countries outside the Nordic region. When comparing the gender gap in labor income across countries, it will be important to take differences in female labor force participation into account. While the gender employment gap is below five percentage points in the Nordic countries, it is considerably higher elsewhere and the selection of women into the labor force is non-random. Olivetti and Petrongolo (2008) show that in countries where fewer women work, e.g. in Southern Europe, the gender wage gap is often relatively low due to the positive selection of women into the labor force. Thus, international comparisons of the gender wage gap that do not adjust for differences in female labor force participation may provide a misleading picture of the level of gender equality across countries. Albrecht et al. (2009) propose a way to address selection issues in analyses of the gender wage gap and illustrate their approach using data from the Netherlands. One interesting avenue for future research would be to further investigate how the selection of women into work is related to differences across countries in the overall level of income inequality, the glass ceiling and the occupational segregation by gender.

The paper highlights the importance of quantifying how income inequalities within and between genders vary across time and countries. In the Nordic countries, female labor force participation has been relatively high for several decades. As time

passes, this feature of our labor markets provides us with increasing opportunities to include women also in studies of intergenerational mobility. Including mothers in these analyses is key since intergenerational associations may to some extent be gender-specific. For instance, children are more prone to inherit the occupation of the same-gender rather than the opposite-gender parent (see e.g. Stevens 1986). In addition, the association between the outcomes of children and both their parents may be larger than that between children and only their father. Thus, including only the father we risk to underestimate the degree of intergenerational persistence.

Relatedly, when studying socioeconomic mobility, economists often use proxies for individuals' lifetime income (Jäntti and Jenkins 2009). Finding good proxies for women's lifetime income has proven to be difficult since income is often observed at a point in life when many women are on parental leave or work part-time. The income differences in these years are not necessarily the same as differences in lifetime income, giving rise to so-called life-cycle bias. While this source of bias is present for men as well, it is considerably larger for women (Böhlmark and Lindquist 2006).

Learning more about how to best approximate women's lifetime income is an important task for future research. One way to address the measurement issues raised by parental leave and part-time work may be to combine multiple proxy measures for socioeconomic status. In a recent paper, Vosters and Nybom (2017) find that combining income, education and occupation substantially improves the measure of socioeconomic status for women, but not for men. This approach thus proves highly useful when estimating associations between mothers and their children. Finding ways to incorporate women's socioeconomic status in studies of intergenerational mobility appears particularly important when examining trends. As the role of mothers may have changed over time, omitting mothers from these analyses may provide us with a biased picture of the evolution of intergenerational mobility.

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## Comment on A. Boschini and K. Gunnarsson: Gendered Trends in Income Inequality

Lars Haagen Petersen<sup>1</sup>

The paper contains a number of interesting considerations on the calculation of income differences within and between genders. Two different approaches on measuring differences in income are compared. One is the traditional approach, where the *household* disposable income is used, while the other introduces a new measure of income: the *individual* labor income.

### *A new income measure*

It is relevant to supplement the traditional approach, where the household disposable income is used, with other approaches. However, it is not given that the supplemental approaches are more accurate than the traditional approaches. It depends on the objective. For example, in the estimates of differences in consumption opportunities, as the traditional distribution analyses aims at measuring, it is not important who in the family earns the income as long as the consumption decision is shared.

When analyzing equal pay, it is important to consider individual income. However, such analyses should include a number of other parameters in order to be accurate since income differences measured by individual income may partly reflect individual choices. For example, the household may have chosen that one member works part-time and the other full-time, or that the woman takes most of the maternity leave and to a larger extent than the man takes a day off when the children are sick. Kleven et al. (2015) show that a large fraction of the observed differences in income between genders can be explained by differences in behavior with respect to children.

Another reason for supplementing the traditional approach may be to get a better understanding of the underlying causes and developments in the overall income inequality measured the traditional way. In this regard the analysis provides an interesting contribution.

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<sup>1</sup> Danish Ministry of Finance.

It appears from the article that income inequality is greater when it is measured using individual labor incomes than when household disposable income is used. To address this further, it could be interesting to expand the analysis to see whether the differences in income inequality using these two approaches are due to differences in men's and women's education, age, spouse's age, maternity leave, other family relationships, employment relationships, working hours, job function, sector association etc.

### *Differences in income between and within genders and the consequences for overall inequality*

It appears from the article that women in general earn less than men, though there is a slight tendency towards women catching up. This is in line with the traditional indicators for income inequality between men and women, such as can be found on the Nordic Council of Ministers website.

It is mentioned that differences in income between genders may be due to the fact that a larger fraction of women work part-time relative to men, and that women to a larger extent than men are employed in the public sector, where wages in general are lower and more homogeneous than in the private sector.

Another result appearing in the article is that differences in income (measured by both individual income and household disposable income) *within* genders have contributed to increasing income inequality measured by the Theil index in the period from 1991 to 2013 for most countries. On the other hand, income differences *between* genders have lowered income inequality.

The article does not contain an actual analysis of the reasons for this development. Among possible reasons, it is emphasized that more women may have moved from part-time jobs to full-time jobs, and that an increasing level of education among women will be reflected in higher wages. For men, the increased income differences can stem from a higher proportion of men working part-time, and that there are more men without an education and more with a high level of education in the labour force. In addition, it is mentioned that an increasing proportion of students can be a possible reason for the increased differences in income for both men and women.

The development in income inequality must be seen in conjunction with the *causes* of the development. Higher income inequality cannot in advance be expressed

as a negative development. For example, it is positive for society when more young people take an education, even though it contributes to a larger income gap when income inequality is measured at a given point of time.

Therefore, it is also important to get a deeper understanding of the underlying causes of income inequality developments. Only thereby it can be determined to what extent it constitutes a societal problem. The article delivers a contribution in that direction, but it would be desirable to take it a step further and investigate what drives the differences in income within the genders.

Finally, it should be mentioned that the level of income must be seen in the context of the scope of public services. It applies to cross-country analysis where the size of the public sector varies, but also across groups within the country, as public services may be more targeted to some groups than others.

### *Reference*

Kleven, H.J., Landais, C. and Sogaard, J.E. (2015), *Parenthood and the Gender Gap: Evidence from Denmark*, University of Copenhagen.



# Demographic Change and Inequality Trends in the Nordic Countries<sup>1</sup>

*Jon Kristian Pareliussen<sup>2</sup> and Per Olof Robling<sup>3</sup>*

## Abstract

We compare how ageing, assortative mating, an increasing share of students, a shift towards more single and childless couple households, and immigrant inflows have influenced inequality in the Nordics from 1995 to 2013 by re-weighting subgroups of the population by their population shares in 1995 to construct counterfactual income distributions. We find that these factors combined have increased disposable income inequality in all the Nordic countries, but to a different extent and through different mechanisms. The strength and direction of demographic change, within- and between-group inequality and the responsiveness of redistribution all play a role.

Keywords: Inequality, demographic trends, redistribution.

JEL classification: J10, D63, 015.

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<sup>1</sup> The authors are grateful for valuable comments from the editors, Christophe André, Anna Sandberg, Tobias Andersen, Thorvaldur Gylfason, Arent Skjæveland, two anonymous referees and participants at the 2017 NEPR conference in Copenhagen. This article builds on previous OECD work by Robling and Pareliussen (2017).

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## Introduction

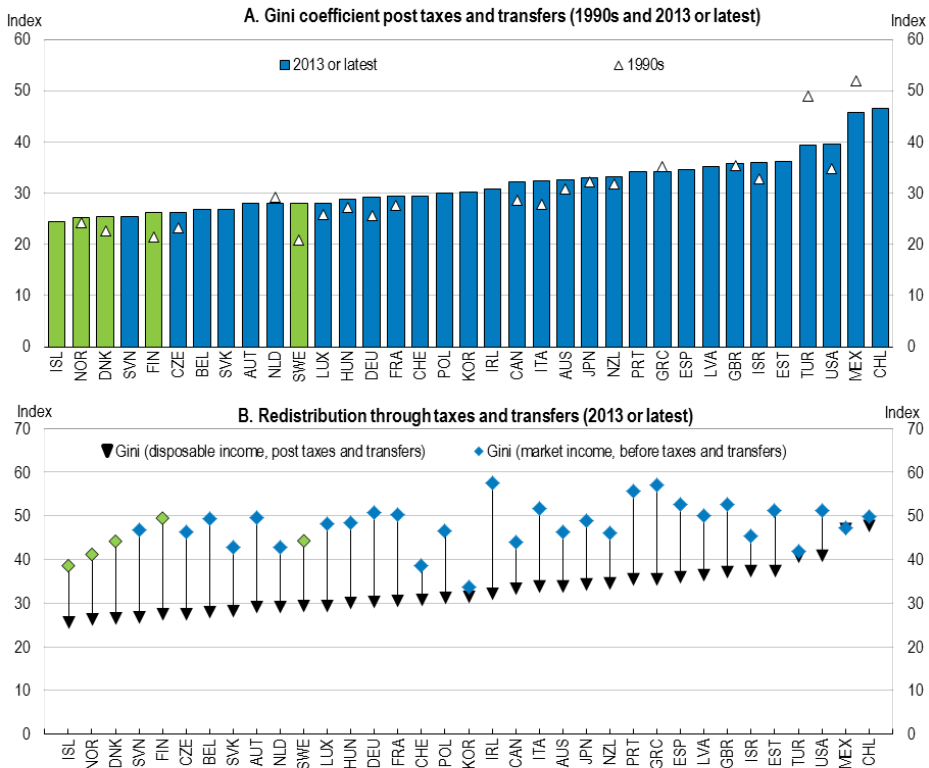
Rising disposable income inequality over the past few decades (OECD 2015) has been more pronounced in the Nordic countries than in the OECD on average, but with substantial differences between the countries. The largest increase in inequality was observed in Sweden, where the Gini coefficient increased by seven percentage points between 1995 and 2013, followed by Finland and Denmark, where the coefficient increased by four and three points respectively. By contrast, in Norway the Gini coefficient ended up only one point higher, after a temporary increase in the mid-2000s.<sup>4</sup> However, the Nordic countries all started from low inequality levels, and remain among the most equal OECD countries measured by the Gini coefficient of disposable income (Figure 1, Panel A). This outcome reflects both low market income inequality and strong redistribution (Panel B).

The distribution of income at a given point in time is a complex outcome formed by the interaction of markets, policies and demography (Pareliussen et al. 2018). Market trends, such as skill-biased technological change, globalisation and capital accumulation influence the distribution of wages and capital income (Förster and Tóth 2015, and Piketty 2014). Redistribution through taxes and transfers, on the other hand, directly alters the distribution of disposable income, but may have secondary effects on peoples' choices, and hence affect market incomes (Andersen and Maibom 2016). Finally, demographic trends, such as the age structure of the population, immigration, educational attainment, assortative mating and household structure, can significantly impact inequality. As an example, the level and variation of earnings increase over the working age, while pensions generally are lower than earnings. Moreover, immigrants tend to have lower and more unequal incomes than natives, and increasing immigration will hence tend to increase inequality. All of these factors have been found to affect inequality, also in the Nordics (Robling and Pareliussen 2017, Danish Economic Council 2016, NOU 2009, Eika et. al. 2017 and OECD 2011).

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<sup>4</sup> The temporary spike of the Gini coefficient in Norway in 2004 and 2005 is to a large extent reflecting extraordinary high dividends following the announcement of a major capital taxation reform taking effect in 2006 (NOU 2009). The development for Norway should be taken as a rough indication given the limited number of observations prior to 2008. National sources report an increase of around four Gini points from 1990 to 2014 (Statistics Norway), but the applied household income definition is not fully comparable with the one used for OECD figures (see Causa et al. 2016 for a comparison of inequality figures between different sources in the case of Denmark).

**Figure 1: Inequality has been widening, but remains low in the Nordics**



Note: The Gini index measures the extent to which the distribution of income deviates from a perfectly equal distribution. A Gini index of zero represents perfect equality and 100 represents perfect inequality. The income measures are constructed as follows: incomes from work and capital are summed within the household to obtain household market income. Public transfers are added and taxes deducted to obtain household disposable income. The household market and disposable incomes are respectively divided by the square root of the number of household members (the equivalence scale) to obtain the equivalised disposable and market income, which is in turn assigned to each member of the household.

Source: OECD Income Distribution and Poverty Database.

The aim of this analysis is to isolate and quantify the importance of demography by holding policy and market forces constant in a decomposition exercise. Such decompositions are often conducted to answer research questions applied to specific trends in a one-country setting, and they usually find a significant demographic impact on inequality (Robling and Pareliussen 2017, Danish Economic Council 2016, NOU 2009 and OECD 2011). However, these studies are usually not comparable between countries because of the context-specific choice of factors, different methodological approaches and the need for rich micro data, which are usually found only in national sources.<sup>5</sup> To address this shortfall for the Nordics, we analyse the inequality impact from ageing, changing household structure, assortative mating, immigration and a changing number of students from 1995 to 2013 in Denmark, Finland, Norway and Sweden, using harmonised data from the Luxembourg Income Study (LIS) Database and the Swedish Survey of Household Finances (HEK). We have chosen a broad set of factors representing demographic trends shown previously to affect inequality considerably. This should allow us to capture a large part of the variation in inequality due to demographics, and thus provide comparable estimates of the inequality effect not only of the individual factors, but also an approximation of the combined inequality effect of demographics.<sup>6</sup>

We measure the influence of demographic trends on the Gini coefficient, relative poverty and the top ten percent income share. We find a pronounced effect in all the countries. However, the strength and main mechanisms behind demographic contributions to increasing disposable income inequality differ considerably between the countries. Household structure has increased inequality in all countries, but most so in Norway. Stronger ageing trends in Finland than in the other countries result in a large share of increasing inequality coming from the population getting older. An increasing student population has impacted inequality Denmark in particular, while having only limited effects in Norway and Sweden. Assortative mating has limited effects but has decreased inequality somewhat in Finland and Norway. Overall,

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<sup>5</sup> OECD (2011) provides cross-country evidence, but results are displayed for market income for some countries (including the Nordics) and disposable income for others. The results are sensitive to the ordering of factors. Eika et al. (2017) look at several countries, but only analyse the impact of assortative mating.

<sup>6</sup> The full variation due to demographics will however not be captured, as our data are not detailed enough, and our methodology sets some limitations as explained for the case of immigration later in the article.

demographics have affected market income inequality considerably, increasing inequality in Denmark, Finland and Norway, while reducing it in Sweden.

We decompose redistribution into demography-related and residual market-related redistribution and find that redistribution has been quite responsive to demographic trends in all the countries, notably ageing, and especially in Denmark and Finland. Redistribution responding to non-demographic forces, on the other hand, weakened in all the countries except Norway. Immigration has increased inequality, particularly in Norway, but also in Sweden and Denmark. However, we show that our main decomposition only partially captures the contribution of immigration to inequality. The contribution from immigration, taking into account not only the increasing foreign-born population share, but also the changing composition and characteristics of new immigrants may be between two (Denmark) and three (Sweden) times higher than our main results.

The rest of the article is structured as follows: The second section contains a description of the data. The third section describes the methodology. Demographic trends are presented and discussed in the fourth section. Results are presented in the fifth section. The final section summarises and concludes.

## Data

Quantifying the contributions of demographic trends to increasing inequality in the Nordics requires high quality data. In order to correctly assess trends in the most commonly used inequality measures, we need a representative sample of micro data with comparable definitions of incomes, households, transfers and taxes, consistent over time and harmonised between countries. Such data are not abundant, even at the national level. The natural starting point is the LIS Database, which contains harmonized micro data from about 50 countries. The data originate from national surveys and registries, and are provided by national sources, typically ministries and statistics agencies. Data availability and detail, as well as the original source, vary depending on country and time period (Table 1).

**Table 1: Data availability for the Nordic countries in the LIS database**

Country	First year available in LIS	Latest year available in LIS	Data provider	Name of national survey/source
Denmark	1987	2013	Ministry of Economic Affairs and the Interior, Statistics Denmark and Ministry of Taxation	Law Model (register based)
Finland	1987	2013	Statistics Finland	Income Distribution Survey (IDS) / Survey on Income and Living Conditions (SILC)
Norway	1979	2013	Statistics Norway	Income Distribution Survey, 1979–2004 Household Income Statistics (register based) 2005-
Sweden	1967	2005	Statistics Sweden	Level of Living Survey (1967), Survey of Households' Finances (HINK/HEK) 1975 – 2005

### *Income measure*

The purpose of LIS is to provide comparable income data for as many countries as possible. For this reason, great effort is put in harmonizing income concepts. The main income concept used is equivalised disposable income, which is constructed by summing incomes from work, capital and public transfers and deducting taxes. Importantly, the LIS definition of disposable income does not include realised capital gains from sales of assets such as stocks and real estate or other income which can be classified as windfalls, such as severance pay, inheritance, lottery winnings and insurance compensations. Conversely, current income from capital, such as interests and dividends, is included. Individual incomes are summed within the household to form household disposable income. To allow for economies of scale, the household disposable income is divided by the square root of the number of household members (the equivalence scale)<sup>7</sup> making it possible to compare the economic positions of households of different sizes. This equivalised disposable income is then assigned to

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<sup>7</sup> See Robling and Pareliussen (2017) for an example of the use of different equivalence scales in demographic decompositions of inequality.

each member of the household. Market income is constructed in the same way, but without including public transfers and taxes.

### *Data choices*

Data for Iceland are only available for a short, recent time period (2004–2010), and Iceland is therefore excluded from the analysis. Based on data availability for the remaining countries, we use data from 1987 (1986 for Norway) to 2013. We check the robustness of the data by comparing it with the OECD Income Distribution and Poverty Database (IDD) in Figure 2. This comparison reveals a number of issues. For Denmark, the inequality levels in 1986 and 1992 are much higher than in IDD and all other sources. We suspect that this is at least partly due to a time-inconsistent household definition in early vintages of the LIS data. This problem is likely present in the Swedish data as well.<sup>8</sup> An additional issue regarding Sweden is that the latest observation in LIS is 2005. To analyse the Sweden-specific issues, we use data directly from the Survey of Households' Finances, the source of this country's LIS data from 1975 to 2005, available from Statistics Sweden up until 2013. We harmonise the data according to LIS harmonisation guidelines.<sup>9</sup> The LIS and IDD series match much more closely for Finland and Norway, even though there is a difference in 1986 in the case of Norway. Some differences are also observed for Denmark in observations from 1995 to 2013. Such differences do not necessarily matter for inference as long as key definitions are applied relatively consistently over time.

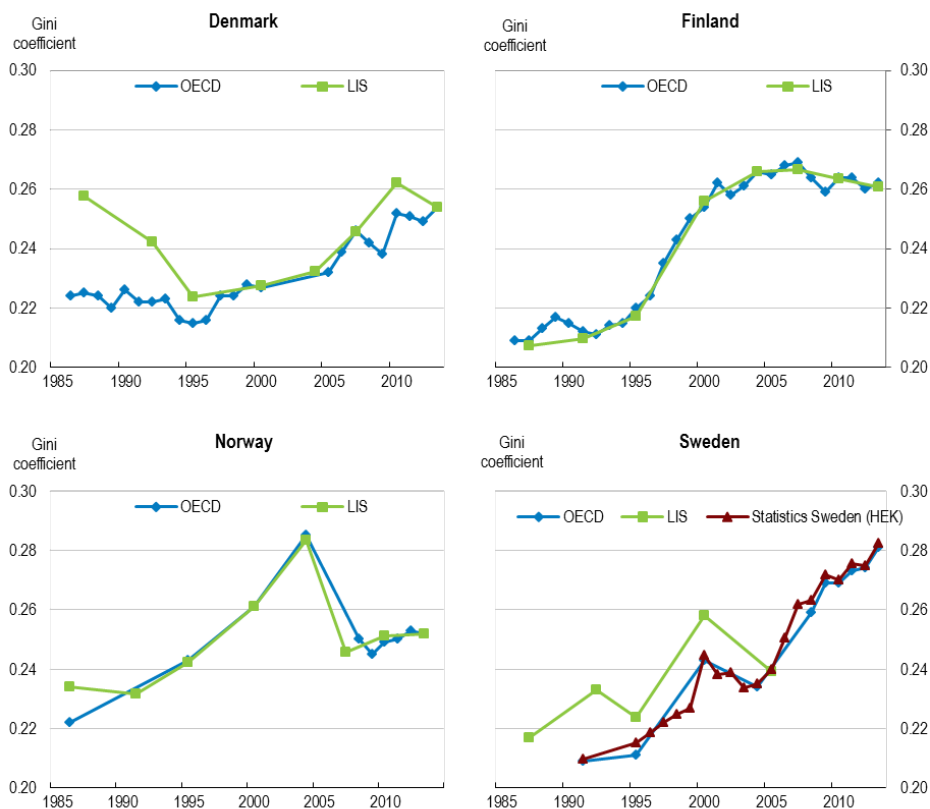
To minimise these data issues, we choose 1995 as the start year for our main analysis. Another advantage of this choice is that all the Nordics lowered tax rates and broadened tax bases in the early 1990s in sweeping tax reforms implementing dual income-tax systems. The broadening of the tax base implies a change in the income definition that mechanically increases measured inequality. As an example, this new income definition increased the Gini coefficient by about two points in Sweden (Björklund et al. 1995). Choosing 1995 as the base year avoids this issue and allows including immigration and an indicator for the relative size of the student population in the analysis, variables not available in early LIS vintages. Except for Norway, Figure 2 shows that most of the inequality increase took place after 1995.

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<sup>8</sup> This is, however, not clear from the LIS documentation.

<sup>9</sup> <http://www.lisdatacenter.org/wp-content/uploads/our-lis-documentation-harmonisation-guidelines.pdf>

**Figure 2: Income inequality in different data sources**



Source: OECD Income Distribution and Poverty Database (IDD), Luxembourg Income Study (LIS) Database and the Survey of Households' Finances (HEK, Statistics Sweden).

### *Variable definitions*

We consider five factors that could have contributed to inequality trends between 1995 and 2013. These factors are measured using the variables and definitions shown in Table 2.



**Table 2: Variable definitions**

Variable name	Definition
Age	Individuals are categorised into the following five age groups: 0–17, 18–34, 35–49, 50–64, and 65+.
Household types	Individuals are grouped in five household types: singles with and without children, couples with and without children and an “other” group for households that do not fit any of the other categories.
Assortative mating	Assortative mating is measured based on earnings. Adults aged 20–64 in couple households are ranked according to their quintile in the gender specific distribution of individual earnings. Couple households are then grouped in five groups depending on the within-household difference in partners’ earnings quintiles. This is similar to the treatment of assortative mating in OECD (2011).
Student households	There is no individual level information on enrolment or participation in higher education available for the countries and time period in question. Instead we make use of information about student aid transfers to the household. The student aid variable in LIS is the sum of student aid paid to the household for participation in higher education (beyond high school). For the purpose of our study, this means that all members of the household are classified as students if the household receives student aid. We restrict the age of the oldest household member to at most 55.
Immigrants	In our main analysis an immigrant is defined as being foreign-born, and we use these two terms interchangeably throughout the article. Information on country of birth is available from 1995 for Denmark and Sweden, and from 2000 for Norway. We account for immigration by a simple dummy for being foreign born in our main analysis because this is the only variable available for all three countries. However, information about country of birth is available for Norway and Sweden and the year of immigration is available for Denmark and Sweden. We use this extra detail in alternative specifications. For Finland there is no information on immigrant status.

## Methodology

### *Decomposition by re-weighting*

We follow the methodology outlined in Robling and Pareliussen (2017) to estimate the static contribution of the demographic factors described above to changes in the Gini coefficient, relative poverty (the share of the population with equivalised disposable income below 60 percent of the median), and the share of total income of the top ten percent of the income distribution.

The traditional method for exploring how compositional changes in a society contribute to changes in income inequality is to apply additively decomposable inequality indices (Mookherjee and Shorrocks 1982 and Foster et al. 1984). The

drawbacks of this approach are that they confine research to only a few inequality measures and that the analysis becomes difficult when the number of combinations of population characteristics is large (Jenkins and Van Kerm 2009).

DiNardo et al. (1996) propose a more general method in which an observation, or a group of observations, is re-weighted according to whether it is under- or over-represented in a counterfactual scenario. This allows the use of any summary measure of the income distribution and facilitates the analysis of multiple population characteristics.

The methodology is well-suited to answer questions such as “What would the distribution of income in the Nordic countries look like if the household structure had been the same as it was in 1995, but everything else was as in 2013?”. Notice that “everything else” implies that relative incomes as well as the distribution of income within each household type is fixed to its 2013 level and changes in the relative population size is the only effect that is captured in the decomposition. We estimate the contribution to inequality for our selection of demographic factors by using income data for the Nordic countries in 2013 and then re-weighting the sample for each factor to match the distribution of that factor in 1995. Summary measures for this counterfactual income distribution are then calculated using standard methods.<sup>10</sup> The contribution of a single factor is the difference between the inequality calculated with the original 2013 distribution of income and inequality calculated with the counterfactual income distribution adjusted for this one factor (see Annex 1 for details).

The factors we consider are interdependent. For example, household type depends on age. As a consequence, it is not possible to consider one variable at a time and add the resulting individual contributions to inequality up to an aggregate contribution. Such an approach would count any interaction effect between variables twice. To resolve this issue, we apply the Shapley algorithm, where factors are included in sequence and the marginal contribution of the individual factor, conditional on all the other factors, is its mean contribution from all possible sequences (Shorrocks 2013).

The decomposition rests on the assumption that the distribution of the factor in question is independent of the distribution of income conditional on the factor. This assumption is not likely to hold exactly. First, if the within-group composition changes

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<sup>10</sup> See Fortin et al. (2011) for a more complete discussion.

as a direct consequence of the demographic trend, we will only capture partially the inequality change associated with this trend. This caveat may have particular importance with regards to immigration, as discussed below. Second, changes in population characteristics would entail dynamic effects. Ageing can, for example, induce changes to the retirement age and pension levels, and immigration can change the relative supply of skills in the labour market and therefore affect natives' wages. These limitations are not unique to this specific decomposition technique, but for these reasons our results should, as other decompositions, be interpreted as correlations, indicating directions for further research, rather than causal effects.

### *Quantifying redistribution*

Our decomposition allows us to measure the strength of redistribution associated with demographic trends. The redistributive effect of personal income taxes and social cash transfers is often quantified as the difference between the inequality of household market incomes (i.e. inequality before taxes and transfers) and the inequality of disposable incomes (i.e. inequality after taxes and transfers) and expressed in percent of market income inequality (Reynolds and Smolensky 1977). Changes in the strength of redistribution are quantified by comparing how market and disposable income inequality change over time. The demographic part of the change in redistribution can be obtained by subtracting the demographic part of market income inequality change from the demographic part of disposable income inequality change. The part of redistribution change associated with the non-demographic residual is obtained in the same way, by subtracting the residual part of market income inequality change from the residual part of disposable income inequality change (see Annex 2 for details).

The residual part of market income inequality change will reflect changes to the earnings and capital income distributions over the 1995 to 2013 period, adjusted for demographic change. It will also include any demographic factors not explicitly accounted for in our analysis.

### *Quantifying the contribution of immigration*

As mentioned above, inequality within and between population subgroups are assumed to be independent of the demographic trends we study, and thus held fixed to their 2013 level in the decomposition. This assumption may be problematic when it comes to analysing immigration, since the effect of immigration is not limited to increasing the size of the foreign-born population. New immigrants have different characteristics from existing ones, and directly alter the composition of the foreign-born population and thus also its distribution of income. To address this issue, we complement the decomposition analysis with a simulation approach in the spirit of Burtless (2009). The idea is to use the information on immigration year in the 2013 data and exclude immigrants arriving after a given base year (e.g. 1995). We construct new sample weights equal to one minus the fraction of adults in the household having immigrated post 1995. In a household where 100 percent of the adults are post-1995 immigrants all individuals are given zero weight (excluded from the inequality estimations), individuals in households where 50 percent of the adults are post-1995 immigrants are given weight 0.5, etc. Inequality calculated with these new weights can then be compared to the baseline inequality level in 2013 in order to assess the contribution of immigration 1995–2013. For the rest of the article we refer to this approach as “simulation”.

### **Demographic trends**

Population shares for the different population sub-groups and their changes over time are presented in Table 3. All countries have experienced ageing, but to different degrees. In Finland, population shares of all age groups below 50 have declined, while age groups 50+ have increased substantially. A somewhat similar, but less pronounced, picture emerges in Denmark. Here the largest decline is for the 18–34 age group. Ageing has been more benign in Norway and Sweden. In the former country shares have fallen for cohorts below 35 and above 64, whereas there has been a strong increase in the age group 50–64. In Sweden there have been rather limited changes across all age groups.

Household structure also mostly follows similar patterns in the Nordic countries, with increasing shares of single person households and couples without children, and decreasing shares of couples with children. Again, these developments are much

more pronounced in Finland than in Norway and Denmark. Sweden differs from the others with falling shares of singles and couples without children, a pattern which is likely related to a benign ageing trend.

Assortative mating, with more couples within the same earnings quintile, has increased in Denmark, Norway and Sweden. Finland, on the other hand, has seen the share of couples with earnings in the same quintile decreasing. All countries except Sweden have seen a pronounced decline in the share of couples with one earner in the top quintile and one in the bottom.

The share of student households has increased in Denmark, Norway and Sweden, while it has fallen somewhat in Finland. Denmark, Norway and Sweden have all seen a strong increase in the foreign-born share of the population.

**Table 3 Demographic trends – Population shares 1995 and changes until 2013**

	Denmark		Finland		Norway		Sweden	
	1995	Change 1995–2013	1995	Change 1995–2013	1995	Change 1995–2013	1995	Change 1995–2013
Age 0–17	22.2	-0.1	24.4	-3.2	24.5	-0.9	22.9	-1.0
Age 18–34	25.2	-4.9	22.8	-1.6	25.3	-2.8	21.1	-0.4
Age 35–49	22.1	-0.9	24.2	-5.3	21.4	0.1	20.9	-0.9
Age 50–64	16.3	3.0	15.5	5.4	13.8	4.2	17.4	1.4
Age 65+	14.2	2.9	13.0	4.7	15.0	-0.7	17.7	0.9
One person households	17.2	1.6	16.7	3.3	18.0	0.8	38.9	-0.3
Couples without children	24.5	0.9	23.4	6.7	20.1	0.9	26.8	-2.0
Couples with children	42.7	-3.3	47.8	-7.0	50.2	-4.8	7.3	0.0
Single parents	6.7	1.5	6.7	-0.5	8.9	-0.5	25.4	0.1
Other	9.0	-0.6	5.4	-2.4	2.9	3.5	1.5	2.3
Same earnings quintile	28.2	2.1	30.3	-2.1	25.8	1.8	31.1	0.5
One quintile difference	35.3	1.3	32.9	1.0	35.2	-0.1	32.7	2.0
Two quintiles difference	21.5	-1.7	20.0	1.5	20.6	1.0	21.9	-2.3
Three quintiles difference	10.7	-1.0	10.9	0.9	12.5	-1.5	10.2	0.3
Four quintiles difference	4.3	-0.7	6.0	-1.3	5.9	-1.2	4.1	-0.4
No student aid	91.1	-6.6	85.1	2.3	87.5	-4.9	82.3	-1.7
Receiving student aid	8.9	6.6	14.9	-2.3	12.5	4.9	17.7	1.7
Natives	94.8	-5.0	n.a.	n.a.	93.5 <sup>1</sup>	-5.5	89.5	-3.4
Immigrants	5.2	5.0	n.a.	n.a.	6.5 <sup>1</sup>	5.5	10.5	3.4

Note: Population shares in 1995 are expressed in percent of total population. Population changes from 1995 to 2013 are expressed in percentage points. All variables are measured at the household level except age and immigration status which are measured at the individual level. 1. Start year 2000.

## *Results*

This section presents decomposition results for changes in inequality of disposable income from 1995 to 2013. We discuss some mechanisms behind the results, including changes in characteristics of population sub-groups, decompositions of changes in market income and the responsiveness of redistribution to demographic change. We discuss contributions from immigration in a separate sub-section.

### *Inequality of disposable income*

Results for the decomposition of changes in disposable income inequality are presented in Table 4. The top three rows in both panels contain the baseline inequality estimates as well as the absolute change in inequality for each country and inequality measure. The fourth row show the total contribution of all the included factors in percentage (Gini) points as well as the total contribution as a percentage of total inequality change from 1995 to 2013 for reference. The subsequent rows present the individual contributions of each factor.

Demographic trends have caused significant inequality increases in all countries, but the trends have affected the countries differently. Ageing has increased the Gini coefficient and the top income share in Finland substantially, as should be expected given the strong ageing trend. It has also had an impact in Norway. Ageing has had small effects on Gini inequality in Sweden and Denmark but has reduced relative poverty in Denmark and increased it in Sweden. The latter result is contrary to Robling and Pareliussen (2017), likely a result of different time periods. These authors study the time period 1987–2013: Sweden experienced significant ageing up until the early 1990s, while ageing has not been pronounced since 1995.

**Table 4: Decomposition results (1995–2013)**

Inequality measure	Gini	Relative poverty (60% of median)	Top ten percent share
<b>Finland</b>			
2013	26.09	13.99	21.48
1995	21.74	9.14	19.17
Change:	4.36	4.86	2.31
of which demographic	0.85	0.35	0.60
	(19.42)	(7.31)	(26.12)
Ageing	0.44	-0.01	0.35
	(10.00)	(-0.23)	(15.33)
Household structure	0.65	0.62	0.32
	(14.81)	(12.73)	(13.89)
Assortative mating	-0.17	-0.21	-0.09
	(-3.89)	(-4.26)	(-3.73)
Student households	-0.07	-0.05	0.01
	(-1.50)	(-0.94)	(0.62)
<b>Norway</b>			
2013	25.19	13.59	20.63
1995	24.23	13.29	20.28
Change:	0.96	0.30	0.35
of which demographic	1.42	2.40	0.32
	(147.60)	(788.96)	(89.24)
Ageing	0.15	0.10	0.06
	(15.23)	(33.80)	(18.26)
Household structure	1.36	2.14	0.39
	(142.07)	(705.29)	(109.56)
Assortative mating	-0.14	0.04	-0.14
	(-14.09)	(13.33)	(-38.95)
Student households	0.04	0.11	0.00
	(4.39)	(36.54)	(0.37)
<b>Denmark</b>			
2013	25.39	12.40	20.86
1995	22.38	12.02	18.90
Change:	3.01	0.38	1.96
of which demographic	1.09	0.50	0.50
	(36.28)	(132.71)	(25.41)
Ageing	0.09	-0.44	0.15
	(3.01)	(-114.8)	(7.85)
Household structure	0.26	-0.11	0.12
	(8.59)	(-28.50)	(6.36)
Assortative mating	0.06	0.01	0.01
	(1.83)	(3.79)	(0.42)
Student households	0.32	0.71	0.06
	(10.73)	(185.79)	(3.14)
Immigration	0.37	0.33	0.15
	(12.12)	(86.43)	(7.64)

Inequality measure	Gini	Relative poverty (60% of median)	Top ten percent share
<b>Sweden</b>			
2013	28.23	16.44	22.67
1995	21.50	8.32	18.70
Change:	6.72	8.32	3.98
of which demographic	0.62	1.22	0.06
	(9.27)	(14.70)	(1.57)
Ageing	0.01	0.46	-0.02
	(0.21)	(5.48)	(-0.61)
Household structure	0.41	0.56	0.07
	(6.09)	(6.69)	(1.79)
Assortative mating	0.03	0.04	0.01
	(0.41)	(0.46)	(0.19)
Student households	0.00	0.13	-0.06
	(-0.02)	(1.59)	(-1.51)
Immigration	0.21	0.35	0.07
	(3.12)	(4.15)	(1.76)

Note: Contributions to inequality increase are Shapley values expressed in percentage (Gini) points. Percent of 1995–2013 inequality change in parenthesis for reference.

Changes in household structure have increased the Gini coefficient and the top income share in all countries. These changes have increased poverty in Finland, Norway and Sweden, but reduced it in Denmark. Assortative mating has had an equalising effect in Finland and Norway and a close to neutral effect in Denmark and Sweden.

The student share has strongly increased inequality in Denmark and has had particularly large effects on relative poverty. The increasing share of foreign-born individuals has increased inequality by one fifth of a Gini point in Sweden and one third of a Gini point in Denmark. It has increased the poverty rate by one third of a percentage point in both countries.

To better understand through which channels the demographic trends affect the Gini coefficient, and also why some qualitatively similar trends lead to different outcomes between the countries, it is useful to reason in terms of income differences between population sub-groups and inequality within these sub-groups. Changes in population shares as well as between- and within-group inequality are displayed in Table 9 in Annex 3.<sup>11</sup>

<sup>11</sup> It is possible to decompose the change in some inequality indicators into changes in inequality within and between sub-groups and changes in population shares. However, this is not case for the Gini coefficient. Furthermore, such



Changing population shares affect overall inequality by changing the weights given to the different sub-groups. Generally, if the size of a population sub-group increases strongly, the income within this group differs from the population average, and the within-group Gini coefficient is higher than in the overall population, this demographic change will widen inequality. Such population change will not affect inequality if both the sub-group income level and inequality are close to the population average income level and inequality. In some cases, the within-group inequality and the sub-group income level can pull in opposite directions. In the 65+ age group for example, incomes are low but the Gini coefficient for this group is also low. Hence the total effect of an increase in this group's population share is an empirical question.

Ageing has had a strong inequality-increasing effect in Finland, but only relatively subdued effects in the other countries. Comparing the age group 18–34 in Finland and Norway can illustrate why this is the case. The population share of this group has declined in both countries. However, the relative income in this age group is far from the population average and the within-group Gini coefficient is high in Norway, while income is closer to average and the Gini coefficient is slightly below the population average in Finland. The declining population share of the 18–34 age group thus had a clear-cut equalising effect in Norway, while the similar decline in Finland had a limited effect. The absence of this equalising effect in Finland contributed to a larger age contribution to inequality than in Norway.

The share of students is another interesting case. Despite a strong increase in the student population share in Norway and Denmark, a neutral effect in Norway contrasts a pronounced inequality-increasing effect in Denmark. Within-group income is somewhat below the population average in both countries (somewhat closer to average in Norway), but the within-group Gini is significantly higher in Denmark.

Household composition has changed in a qualitatively similar way in all the countries except Sweden. However, the scale of the change differs, with notably large shifts towards childless singles with low incomes and childless couples with high incomes in Finland. Shifts in household structure have a marked effect on all three inequality measures in Finland, but the effect on the Gini coefficient and relative poverty are nonetheless more pronounced in Norway despite smaller shifts in the

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decompositions assume a linear relationship between changes in population shares and change in inequality (Peichl et. al. 2012).

household structure. A partial explanation may be that changes in household structure are driven to a greater extent by ageing in Finland: the inequality effect may thus be partially captured by the change in the age structure.

## Market income, demographics and redistribution

Quantifying demographic contributions to market income inequality, and how these trends have been countered by redistribution, is a further key to understanding why demographics result in different disposable income inequality trajectories in the various Nordic countries.

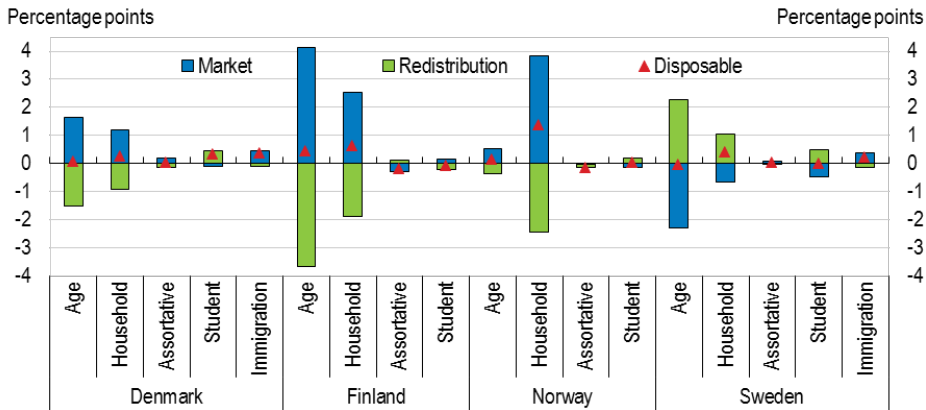
As shown in Table 5, demographic factors were the main contributors to widening market income inequality in Denmark, Finland and Norway. However, cash transfer systems have been responsive to changes in demography. Therefore, the increased market income inequality is only reflected in increasing disposable income inequality to a very limited extent. Sweden differs from the other countries, as demographic factors reduced market income inequality over the period.<sup>12</sup> Demographic redistribution therefore weakened.

Looking at the individual factors, as shown in Figure 3, it is clear that ageing has affected the distribution of market income strongly in all the countries, but redistribution has also been particularly responsive to ageing. Hence, the contribution to disposable income inequality growth is only minor except in Finland (see also Annex 3, Table 10).

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<sup>12</sup> Robling and Pareliussen (2017) found that market income inequality increased strongly from 1987 to 2013, and that demographic trends were behind about two thirds of this increase. The difference to the current study can be traced to the fact that market income inequality increased strongly between 1987 and 1995 in Sweden. The overall market income inequality increase was hence positive from 1987 to 2013, while it was slightly negative from 1995 to 2013.

Figure 3: Redistribution associated with individual demographic trends (1995–2013)



Note: Contributions to inequality are shown in Gini points. Positive values imply increasing inequality.

Table 5 shows that the non-demographic residual factors, largely representing market forces, reduced market income inequality strongly in Finland and Norway, but cash transfers connected to these factors weakened in Finland, thus increasing disposable income inequality. These factors increased inequality in Sweden, a development which was accentuated by weakening associated redistribution. This finding is consistent with OECD (2017), which points to slow up-rating of working age benefits as a main culprit. A market-driven increase in the poverty rate in Denmark was fully offset by redistribution, while an increase of top share of market incomes was amplified by weaker redistribution at the top, which accentuated an overall increase in the market income Gini coefficient.

Since the non-demographic residual largely represents market forces, it will be strongly affected by the economic cycle, as higher employment and lower unemployment reduce market inequality and therefore also redistribution. The strong inequality-increasing effect of residual redistribution should therefore be seen in the context of strong employment gains from 1995 to 2013 in Finland (9.7 percentage points) and, to a lesser extent, in Norway (4.4) and Sweden (4.3). Employment in Denmark only increased by 0.2 percentage points, since employment losses during the 1990s crisis were relatively moderate compared to the other Nordics and employment losses following the 2008 financial crisis were large.

**Table 5: Demographic and residual (market) redistribution**

Change 1995-2013	Gini	Relative poverty	Top ten percent share
<b>Denmark</b>			
<i>Total</i>			
Market income	3.42	1.48	2.54
Disposable income	3.01	0.38	1.96
Redistribution	-0.41	-1.10	-0.58
<i>of which: Demographic</i>			
Market income	3.36	2.72	1.58
Disposable income	1.09	0.50	0.50
Redistribution	-2.26	-2.22	-1.08
<i>Residual (market)</i>			
Market income	0.07	-1.24	0.96
Disposable income	1.92	-0.12	1.46
Redistribution	1.85	1.12	0.50
<b>Finland</b>			
<i>Total</i>			
Market income	1.29	0.88	1.22
Disposable income	4.36	4.86	2.31
Redistribution	3.07	3.97	1.09
<i>of which: Demographic</i>			
Market income	6.53	5.49	2.80
Disposable income	0.85	0.35	0.60
Redistribution	-5.68	-5.13	-2.20
<i>Residual (market)</i>			
Market income	-5.24	-4.60	-1.58
Disposable income	3.51	4.50	1.71
Redistribution	8.75	9.10	3.29
<b>Norway</b>			
<i>Total</i>			
Market income	2.22	0.13	2.07
Disposable income	0.96	0.30	0.35
Redistribution	-1.26	0.17	-1.71
<i>of which: Demographic</i>			
Market income	4.15	4.23	1.42
Disposable income	1.42	2.40	0.32
Redistribution	-2.73	-1.83	-1.10
<i>Residual (market)</i>			
Market income	-1.93	-4.09	0.65
Disposable income	-0.46	-2.09	0.04
Redistribution	1.47	2.00	-0.61

Change 1995-2013	Gini	Relative poverty	Top ten percent share
<b>Sweden</b>			
<i>Total</i>			
Market income	-1.03	-2.39	1.09
Disposable income	6.72	8.32	3.98
Redistribution	7.75	10.72	2.89
<i>of which: Demographic</i>			
Market income	-3.01	-3.00	-1.36
Disposable income	0.62	1.22	0.06
Redistribution	3.63	4.23	1.42
<i>Residual (market)</i>			
Market income	1.98	0.61	2.45
Disposable income	6.10	7.10	3.91
Redistribution	4.12	6.49	1.47
	1.98	0.61	2.45

Note: Contributions to inequality increase are expressed in percentage (Gini) points.

## Immigration

In order to include Norway in the analysis of immigration we redo the decomposition using 2000 as starting year. The results are presented in Table 6, and show a considerable effect from immigration in Norway, almost a half Gini point and a 0.7 percentage point increase in the poverty rate. Results for Sweden and Denmark are consistent with those found for the 1995–2013 period, and relatively modest. In Denmark the contribution from immigration accounts for about 9 percent of the increase in the Gini coefficient in disposable income between 2000 and 2013 and in Sweden it accounts for 5 percent. The immigration-related contribution to market income inequality is relatively similar to the contribution to disposable income inequality, except in Norway, where weakening redistribution to immigrants has accentuated the immigration-related increase of relative poverty.

**Table 6: Contributions from immigration (2000–2013), main methodology**

	Gini	Relative poverty	Top ten percent share
<b>Disposable income</b>			
Denmark	0.23	0.20	0.10
Norway	0.45	0.75	0.12
Sweden	0.18	0.25	0.06
<b>Market income</b>			
Denmark	0.30	0.22	0.18
Norway	0.38	0.39	0.17
Sweden	0.32	0.27	0.17

Note: Contributions to inequality increase are Shapley values controlling for changes to age, household structure, assortative mating and the student share, expressed in percentage (Gini) points.

Table 7 show the results for Denmark and Sweden from our alternative simulation approach using 2000 as starting year. The estimated contribution from immigration is larger both for Denmark and Sweden using this method. For the Gini coefficient and the poverty rate the contribution is twice the contribution in the original decomposition in Denmark and three times the decomposition result in Sweden.

**Table 7: Contributions from immigration (2000–2013), simulation methodology**

	Gini	Relative poverty	Top ten percent share
<b>Disposable income</b>			
Denmark	0.45	0.47	0.16
Sweden	0.60	0.72	0.17

Note: Contributions to inequality increase are expressed in percentage (Gini) points.

The key to understanding why the two methodologies yield widely different results is that in the simulation exercise, the counterfactual situation is one where immigration came to a complete halt after 2000. This means that the composition of the immigrant population in 2013 under this scenario resembles the 2000 population, but older and better integrated. The difference between the simulation scenario and actual 2013 values will hence represent the contribution from immigration taking into account not only the increasing foreign-born population share, but also the changing composition and characteristics of new immigrants since the base year. This contrasts our main methodology, where the relative size of

the immigrant population is as in 2000 but the immigrant population's characteristics and distribution of income is as in 2013.

These differences are shown explicitly in Table 8. The relative size of the immigrant population is somewhat smaller in the simulation scenario than in the decomposition for both Denmark and Sweden, without this being decisive for our results.<sup>13</sup> The difference is instead driven by the immigrant population's income distributions under the two scenarios. As shown in the table, the incomes of the immigrant population are distributed very differently under the simulation scenario than in the actual 2013 distribution and the decomposition scenario (The two have identical within-group income distributions by definition). In both countries the gap in mean disposable income and the relative difference in inequality levels between immigrants and native are much smaller than in 2013. This leads to lower overall inequality in the counterfactual scenario, and hence a larger contribution to inequality.

**Table 8: Immigrant population size and income distribution relative to natives**

		2013	Decomposition scenario	Simulation scenario
Denmark	Gini coefficient	25.39	25.16	24.94
	Immigrant population share	10.20	6.95	6.05
	Disposable income relative to natives	84.23	84.23	89.63
	Relative Gini coefficient	123.33	123.33	113.54
Sweden	Gini coefficient	28.23	28.05	27.63
	Immigrant population share	13.92	10.79	9.38
	Disposable income relative to natives	78.90	78.90	86.99
	Relative Gini coefficient	110.44	110.44	106.17

Note: Numbers are expressed in percentage (Gini) points. The relative Gini coefficient is calculated as the Gini coefficient within the immigrant group as a percentage of the Gini coefficient within the native group.

<sup>13</sup> The immigrant population share declines over the period because of native population growth and some immigrants re-emigrating in the simulation methodology.

## Summary and conclusions

The distribution of income at a given point in time is a complex outcome shaped by the interaction of market trends, demographics and redistribution. We isolate the inequality effect of demographic trends, and find that these trends combined have increased disposable income inequality from 1995 to 2013 by approximately 1.4 Gini points in Norway, 1.1 in Denmark, 0.9 in Finland, and 0.6 in Sweden. Demographic trends also contributed strongly to increased relative poverty in Norway and Sweden.

Household structure has affected disposable income inequality in all the countries, but most so in Norway. Finland has seen considerable ageing since the 1990s, and this has increased the Gini coefficient markedly. Contributions from ageing are relatively limited in the other countries. An increasing population share of students has had a large effect in Denmark, notably increasing relative poverty. An increasing share of foreign-born has widened inequality in Denmark, Sweden and Norway, but our main methodology only captures parts of the inequality effect of immigration. The contribution from immigration, taking into account not only the increasing foreign-born population share, but also the changing composition and characteristics of new immigrants may be between two (Denmark) and three (Sweden) times higher than our main results.

Demographic factors were the main contributors to widening market income inequality in Denmark, Finland and Norway. However, taxes and cash transfers have been particularly responsive to changes in demography and strongly dampened the extent to which increased market income inequality due to these factors have affected disposable income inequality. Sweden differs from the other countries, as demographic factors reduced market income inequality over the period. Redistribution related to demographics therefore weakened.

Having established that demographics have influenced the development of inequality in the Nordics, it is pertinent to ask whether policy should react. First, demographics is only one of several forces affecting inequality, and the big increases in inequality in Sweden, Denmark and Finland are for the most part not driven by demographics. Second, policy normally does not aim to change demographic trends as such,<sup>14</sup> so the question is rather whether policy should respond to the distributional

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<sup>14</sup> There are, however, ample examples of policy enabling and even purposefully altering such trends. Migration is one example where policy has a direct, although partial, effect. Policies towards contraception and tax-transfer policies may



consequences of demographic trends. This is not obvious in principle, since the inequality changes measured by our methodology do not reflect any new problems, they simply reflect that a higher share of the population end up in an existing situation of low or high income. To the extent this is an undesirable situation, policies should be put in place regardless of the increasing population share.

However, a more pragmatic view is that associating inequality increases with particular demographic trends can help understand why inequality changes over time and hence inform decisions about what to do about it. Such decisions will inevitably be value-based. If policy is guided by inequality of life-time income there will for example be little need to counteract the effects of ageing and an increasing share of students who invest in higher future incomes. If policy aims to prevent intergenerational transmission of low incomes, a focus on the income standards of households with children and trends of assortative mating, which might polarise inequality of opportunity, would be warranted. Furthermore, immigration raises a host of issues related to labour market and social integration and intergenerational mobility.

In addition, our estimates can help describe and understand the strength and direction of redistribution policies over the period we study. As an example, ageing trends are almost perfectly cancelled out by redistribution, except in Finland, while redistribution is less responsive to other demographic trends. This is probably at least partially a reflection of sharper trade-offs between inequality and work incentives for working-age taxes and benefits than for age-related redistribution, but might also reflect political economy, as ageing increases the political sway of pensioners and older workers.

Our results can offer better understanding of inequality trends and thus help getting the existing set of policies right. We see several possible extensions for future studies. Identifying the main demographic drivers of inequality still leaves open many questions regarding the exact mechanisms at play. A better understanding of the extent to which inequality trends reflect intra-generational or intergenerational inequality should be of interest to national administrations. Our study may help identify relevant areas for further research to this end. Better knowledge of how demographic trends affect inequality can be used to construct future scenarios which could guide policy. Finally, LIS data covers a number of countries, and expanding country coverage would allow better benchmarking and broader insights.

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enable and incentivise certain household patterns, or taken to the extreme; the Chinese one-child policy has altered the whole family-age structure of a country (and the world).

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## Annex 1 Decomposition by re-weighting

The distribution of income in period 1 (2013) can be expressed as the integral of the density of incomes conditional on some characteristics  $X$  of the population over the distribution of  $X$  in period 1:

$$(1) \quad f_1(Y) = f_1(Y; t_x = 1) = \int_x f_1(Y | X) dF_1(X)$$

If the distribution of  $X$  is independent from the conditional distribution of income, then the hypothetical distribution of income that would have prevailed in period 1 if  $X$  had been distributed as in period 0 (mid-1980s), can be written as

$$(2) \quad f_1(Y; t_x = 0) = \int_x f_1(Y | X) dF_0(X) = \int_x f_1(Y | X) \frac{dF_0(X)}{dF_1(X)} dF_1(X)$$

The right-hand side of (2) is identical to (1) except for the ratio  $dF_0(X)/dF_1(X)$ . Thus, multiplying the original income distribution in period 1 by the ratio between the distribution of  $X$  in period 0 and the distribution of in period 1 result in an adjusted distribution that is the distribution of income in period 1 weighted by the distribution of  $X$  in period 0.

For any measure of inequality  $I$ , the relative contribution of characteristics  $X$  to the change in  $I$  is calculated as

$$(3) \quad \frac{I(f_1(Y)) - I(f_1(Y; t_x = 0))}{I(f_1(Y)) - I(f_0(Y))}$$

The numerator in (3) is the absolute contribution.

## Annex 2 Decomposing redistribution

We start by the identity established by Reynolds and Smolensky (1977), that the redistribution,  $R$ , equals the difference between inequality,  $I$ , of disposable income (superscript  $D$ ) and market income (superscript  $M$ ):

$$R = I^D - I^M$$

The change in redistribution from period 0 to period 1 then equals:

$$(1) \quad \Delta R = R_1 - R_0 = (I_1^D - I_1^M) - (I_0^D - I_0^M)$$

With an additive decomposition of inequality in period 1, where the demographic contribution to inequality change and the residual (market) contribution sum up to total change in inequality, we can establish the following identities, where superscript  $d$  denotes the demographic contribution, and superscript  $r$  denotes the residual contribution to disposable (2) and market (3) income inequality:

$$(2) \quad I_1^D = I_0^D + \Delta I^{D.d} + \Delta I^{D.r}$$

$$(3) \quad I_1^M = I_0^M + \Delta I^{M.d} + \Delta I^{M.r}$$

Inserting (2) and (3) in (1) yields:

$$\Delta R = (I_0^D + \Delta I^{D.d} + \Delta I^{D.r} - I_0^M - \Delta I^{M.d} - \Delta I^{M.r}) - (I_0^D - I_0^M)$$

This simplifies to:

$$(4) \quad \Delta R = \Delta I^{D.d} - \Delta I^{M.d} + \Delta I^{D.r} - \Delta I^{M.r}$$

The change in redistribution related to demographic factors can be written as:

$$(5) \quad \Delta R^d = \Delta I^{D.d} - \Delta I^{M.d}$$

The change in redistribution related to residual (market) factors can be written as:

$$(6) \quad \Delta R^r = \Delta I^{D.r} - \Delta I^{M.r}$$

Since the individual contributions from the different demographic factors sum up to the total demographic contribution, equation 5 can be further decomposed to account for redistribution associated with each of the demographic trends,  $x$ :

$$(7) \quad \Delta R^d = \sum_x \Delta R^x = \sum_x (\Delta I^{D.x} - \Delta I^{M.x})$$

## Annex 3 Tables

Table 9: Changes in demographics as well as between- and within-group inequality

	Denmark			Finland			Norway			Sweden						
	Popu- lation share	Relative income	Gini contri- bution	Popu- lation share	Relative income	Gini contri- bution	Popu- lation share	Relative income	Gini contri- bution	Popu- lation share	Relative income	Gini contri- bution				
Age 0–17	-0.1	100.4	90.6	0.09	-3.2	99.4	91.4	0.44	-0.9	96.5	91.6	0.15	-1.0	97.9	93.1	-0.02
Age 18–34	-4.9	88.7	105.4	-1.6	91.5	98.5	98.5	-2.8	89.1	112.3	100.0	-0.4	89.7	100.0		
Age 35–49	-0.9	109.9	89.5	-5.3	111.4	91.3	91.3	0.1	105.4	92.6	90.2	-0.9	108.3	90.2		
Age 50–64	3.0	118.9	97.7	5.4	112.7	104.2	104.2	4.2	120.3	98.1	103.7	1.4	120.9	103.7		
Age 65+	2.9	79.3	86.9	4.7	83.6	96.2	96.2	-0.7	89.2	87.1	93.1	0.9	83.8	93.1		
One-person households	1.6	73.8	101.6	0.26	3.3	71.1	101.1	0.65	0.8	72.4	114.9	1.36	-0.3	109.7	86.2	0.41
Couples without children	0.9	107.2	102.4	6.7	113.5	98.4	98.4	0.9	114.5	91.3	96.4	-2.0	123.4	96.4		
Couples with children	-3.3	112.1	81.2	-7.0	108.8	85.9	85.9	-4.8	108.7	86.2	86.4	0.0	66.3	86.4		
Single parents	1.5	73.4	78.4	-0.5	72.2	78.5	78.5	-0.5	73.7	91.7	95.3	0.1	73.3	95.3		
Other	-0.6	106.4	104.0	-2.4	93.5	86.3	86.3	3.5	106.3	88.0	77.2	-0.14	92.7	77.2		
Same earnings quintile	2.1	118.9	102.1	0.06	-2.1	119.7	109.7	-0.17	1.8	115.2	111.2	-0.14	0.5	118.0	110.3	0.03
One quintile difference	1.3	111.1	74.2	1.0	107.3	77.5	77.5	-0.1	106.9	78.4	76.1	2.0	106.6	76.1		
Two quintiles difference	-1.7	114.6	63.7	1.5	108.5	81.8	81.8	1.0	109.4	69.6	74.3	-2.3	113.0	74.3		
Three quintiles difference	-1.0	121.7	74.2	0.9	112.3	76.0	76.0	-1.5	115.7	75.0	75.3	0.3	147.0	75.3		
Four quintiles difference	-0.7	142.5	102.5	-1.3	133.9	84.0	84.0	-1.2	135.3	97.4	111.9	-0.4	140.3	111.9		
No student aid	-6.6	101.6	97.3	0.32	2.3	102.9	99.7	-0.07	-4.9	101.6	98.2	0.04	-1.7	101.0	100.0	-0.01
Receiving student aid	6.6	91.0	113.0	-2.3	79.8	93.8	93.8	4.9	92.6	107.5	99.7	1.7	96.0	99.7		
Natives	-5.0	101.6	97.3	0.37	n.a.	n.a.	n.a.	n.a.	-5.5	103.0	96.1	-3.4	103.0	97.5	0.22	
Immigrants	5.0	85.6	120.0	n.a.	n.a.	n.a.	n.a.	n.a.	5.5	77.8	118.4	3.4	81.3	107.7		

Note: Population shares are expressed in percentage points change from 1995 to 2013. Relative income and relative Gini are expressed in percent of the corresponding population statistic. Contributions to inequality increase are Shapley values expressed in Gini points.

**Table 10: Changes to market income, disposable income and redistribution associated with individual factors**

		Market income	Disposable income	Redistribution
Denmark	Ageing	1.63	0.09	-1.54
	Household structure	1.20	0.26	-0.94
	Assortative mating	0.19	0.06	-0.14
	Student households	-0.12	0.32	0.44
	Immigration	0.46	0.37	-0.09
Finland	Ageing	4.12	0.44	-3.69
	Household structure	2.54	0.65	-1.89
	Assortative mating	-0.28	-0.17	0.11
	Student households	0.15	-0.07	-0.21
Norway	Ageing	0.51	0.15	-0.37
	Household structure	3.82	1.36	-2.46
	Assortative mating	-0.03	-0.14	-0.10
	Student households	-0.15	0.04	0.20
Sweden	Ageing	-2.30	-0.02	2.28
	Household structure	-0.65	0.41	1.05
	Assortative mating	0.06	0.03	-0.04
	Student households	-0.49	-0.01	0.49
	Immigration	0.37	0.22	-0.16

Note: Contributions to inequality increase are Shapley values, expressed in Gini points.

## Comment on P.O. Robling and J.K. Parelliusen: Demographic Change and Inequality Trends in the Nordic Countries

*Arent Skjæveland<sup>1</sup>*

The Parelliusen and Robling paper is a valuable contribution to the analysis of developments in income inequality in the Nordic countries. An even income distribution is at the core of the Nordic welfare model, and increased income dispersion tends to create strong political tensions in our societies. Therefore, understanding the drivers for increased income dispersion is crucial in order to identify a relevant political answer.

I guess the reason why I have been chosen as a discussant relates to my closeness to the finance minister. I will therefore discuss the paper in light of its policy relevance and will do so by asking three questions.

### *Do we have a problem?*

The answer is clearly yes! The strong increase in inequality, especially in Sweden and Finland, but also in Denmark, may challenge a cornerstone of our welfare models. The magnitude of the changes is alarming. When it comes to the widening of the disposal income distribution the development compares poorly even to the US, although from a much more compressed starting-level.

Increased inequality in the Nordics was recently discussed at a meeting in Working Party 1 in OECD, giving cause to the following statement from the OECD secretariat:

“It is noteworthy that Finland and Sweden, experiencing marked declines in redistribution, also displayed among the strongest economic performance for the period under consideration. It may well be that these countries, and the Nordics in general, which started from very high levels of redistribution, indeed faced a binding equity-efficiency trade-off and opted for less redistribution in exchange for more economic growth.”

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<sup>1</sup> Norwegian Ministry of Finance. Thanks to Kristin Solberg-Watle and Vibeke Øi for good remarks on earlier drafts of this comment. However, remaining shortcuts and possible mistakes are solely my responsibility.



The statement is strong, making me extremely curious about what is actually going on. Up until now, we thought there was no trade-off between equity and growth in the Nordics, but rather a “trade-in”, as discussed by Hopkin and Blyth (2012).<sup>2</sup>

Barth and Moene (2016) emphasize complementarity between wage setting and welfare spending across countries when explaining why almost equally rich countries differ so much in economic and social equality among their citizens, introducing the concept of an “equality multiplier”. They argue that more wage equality fuels the generosity of the welfare state, via political competition in elections, while a more generous welfare state fuels wage equality via empowerment of weak groups in the society. Together, the two mechanisms may generate a cumulative process that explains how equality – and inequality – multiplies.

Thus, are we witnessing the beginning of the end of the Nordic welfare model? Or could there be several steady states here, implying there are a number of corresponding levels of equality and growth?

### *Is demography the main driver?*

The answer is clearly *no!* At least it is not the case for the countries with the largest changes in inequality, which can be seen from Table 5 in the paper. The main driver behind the changes in disposal income distribution in all countries, except Norway, is clearly *market changes*, represented by the residual effect in the table.

Even more interesting from a political point of view – it seems like *less redistributive policies* is the major driver, as stated in Parelussen et al. (2018) also in this volume. Even though redistribution is not the topic of the present study, let me add one point on this. At an earlier OECD meeting, a Danish colleague, Peter Eibye Bache, was lead speaker in our discussion on redistribution. His main comment underlined the strong endogeneity in the explaining factors here. Since an important driver of the reduced redistribution is lower unemployment and successful “make work pay” reforms, it could be questioned whether the findings are good or bad news.

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<sup>2</sup> In the wording of Hopkin and Blyth: “...as our empirical analysis (below) demonstrates, there is a world where equality trades off against efficiency; primarily Anglo-America. Yet to identify that world, econometrically speaking, you need to leave every OECD country with greater level of market regulation than Germany out of the equation. There is also a world of trade-ins, primarily the Scandinavian and Northern European states, that stand in contrast to Okun’s thesis. Finally, there is everyone else, from Mexico to Italy to Turkey, that neither trades off nor trades in, and where inequality and inefficiency have unfortunately, a positive and reinforcing relationship.”

Lower unemployment (both cyclical and structural), as witnessed in Denmark and Sweden, reduces the need for redistributive policies. Reforms seeking to increase employment among seniors, also imply reduced transfers (at least in the short run) – and thus less redistributive policies. The same is the case when the number of students increases if we assume the alternative to be higher unemployment transfers. In the case of Denmark, the decline in redistributive policies is almost eliminated if one corrects for intended policy changes.

### *Does this study still have something interesting to offer?*

In my view – yes! We need to know what drives changes in inequality to draw relevant policy conclusions and understand the relative importance of the different factors. Thus, the distinction between different demographic factors is helpful:

- *More students*  
An increase in the number of students represents no problem from a policy point of view. More education produces long-term gains, both to society and individuals. The students will get their reward when they leave school.
- *More elderly people*  
An aging population challenges the welfare state, since fewer contributes to government revenues, while there is an increasing number of recipients of pension and health and care services, pushing public expenditures upwards. How to deal with these long-term consequences for government budgets is a major policy challenge. However, from an income distribution point of view, aging should not represent a problem. There are good reasons why pensions should not match earlier work income completely, and, consequently, a widening income distribution due to a higher fraction of elderly people should not be regarded as a poverty problem.
- *More immigrants*  
The study would have benefited from drawing a distinction between non-western and western immigrants, the latter referring mainly to the inflow of workers from EU countries and other advanced economies. An increasing number of immigrants from non-western countries, as experienced in the Nordic countries in 2015 when the bulk of the inflow was asylum seekers, raises a range of policy

challenges. However, the main challenge is probably not inequality – at least not in the short run. It is simply not feasible to give all newly arrived immigrants an average income. Rather, non-western immigration is a challenge for integration. It is also worth noting that since data in the study are presented only up until 2013, the effect of non-western immigration as a driver for increased inequality is not very pronounced in the study – it does not cover the most interesting years. Labour immigration from the EU countries represents another type of immigration, which also may pose challenges. Such effects can be seen in a tendency of increased divergence in wage developments between industry sectors. In several countries, this has translated into a discussion around “social dumping”. To address this concern, a generalisation of collective tariff agreements has been introduced by law for some sectors in Norway.

- *More singles*

If a main demographic driver is an increase in the number of singles, it may pose a policy challenge. More single households may affect optimal housing policies, optimal tax policies and maybe the design of the benefit system.

- *Assortative mating*

Assortative mating may also represent a policy challenge. It could fortify poverty challenges if for instance the low-paid find spouses in the same group.

To sum up, if more singles and more assortative mating prove to be important drivers of the changes in income distribution, policy measures might be relevant and necessary, but less so if the main drivers are more students, more immigrants or more elderly people.

### *A final point on in-kind benefits*

I will conclude by making a final point on the importance of *in-kind benefits* (e.g. provision of public services to improve living standards for individuals, such as health care services and school). In-kind transfers are double the size of cash transfers. While cash transfers have gone down, in-kind transfers have gone up over the period studied.

In-kind benefits are at the core of the Nordic welfare model, as discussed in Aaberge et al (2018). In-kind transfers are often less problematic from a labour supply perspective than taxes and cash transfers. To analyse distribution without taking them

into account, might give misleading results. In fact, increased in-kind benefits could possibly have counteracted the increased inequality in disposal income.

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## Comment on P.O. Robling and J.K. Parelliusen: Demographic Change and Inequality Trends in the Nordic Countries

*Thorvaldur Gylfason*<sup>1</sup>

This is a nice and clear and useful paper. It is especially useful to have for the first time a decomposition of Nordic Gini indices of inequality to help us understand the contribution of demographic change to increased inequality and how these demographic effects vary from one country to another. The presumption must be that the effects ascribed to demographic change cannot be the result of, e.g., regressive fiscal policies.

This having been said, it is a bit surprising to be shown a decomposition of inequality measures based on Gini indices rather than Theil indices. This is because a well-known drawback of the Gini index is that it is non-additive and thus cannot be easily decomposed if at all. On the other hand, an important advantage of the less intuitive and less widely used Theil index is that it is additive and, therefore, decomposable. For example, income distribution as measured by the Theil index can be assessed across, as well as within, groups and regions as emphasized by income distribution researchers such as James Galbraith (see, e.g., Galbraith 2012).

The authors are clearly constrained by existing data sources from the OECD and the Luxembourg Income Study (LIS) which, thus far, have offered only Gini indices. Even so, it would have been helpful to have a discussion of these issues, what might change were Theil indices available and what it would take to make such indices available and applicable.

The deficient treatment of capital income and especially capital gains in existing statistical sources needs to be addressed up front and not as a technical detail midstream because it is crucial. A serious problem with available internationally comparable data from the OECD and the LIS is that they leave out capital gains on the grounds that they can be viewed as windfalls, like, say, lottery winnings. But this is not correct. Capital gains have in many cases been shown to be the result of self-dealing

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through stock options that members of economic elites bestow on each other, for example – a phenomenon that is very different from unexpected windfalls.

Exposures of sundry financial misconduct by self-dealing elites in recent years make it imperative to acknowledge the limitation of looking at the distribution across households of disposable wage income from labor and underestimated interest income from capital alone, underestimated because of the huge sums of money stashed away in secret tax havens as shown by Zucman (2015) among others. What is needed is comprehensive measures of the distribution of total income, properly defined, before and after tax, as well as the distribution of wealth and of health. Wealth distribution measures were until recently difficult to come by except in a handful of countries, and such measures as are available may not be easily comparable across countries. Hidden wealth in tax havens exacerbates the problem. The distribution of health, and of life expectancy in particular, a more recent concern, is, however, easier to gauge. A brief acknowledgment of the burgeoning literature on those issues would have been welcome, with references to, e.g., the seminal work of Anne Case and Angus Deaton (see, e.g., Case and Deaton 2015) as well as Hederos et al. (2017), to suggest one relevant Nordic reference. These discussions, admittedly a bit outside the box, would have placed this useful paper in a clear context of the broader, burning issues at stake.

At last, as the authors acknowledge, Iceland is left out of much of the discussion in the paper for lack of data. But Iceland provides, nonetheless, a good illustration of some of the difficulties described above because this country's Gini coefficient, based on total disposable income, rose by one point a year from 1993 to 2008, a unique event that statistical and political authorities pretended not to notice, as described in Gylfason et al. (2010).<sup>2</sup> Ólafsson and Kristjánsson (2013, 2017) document these developments and their background in detail. In their path-breaking 2017 book, they present new information on the distribution of wealth, showing Iceland's wealth distribution to be the third least equal in a group of 29 countries based on the assets held by the richest ten percent of households. By this measure, only the United States and Switzerland have a less equal wealth distribution than Iceland. Further, Ólafsson and Kristjánsson (2017) show Iceland's wealth distribution to be the sixth least equal in the same group of countries based on the assets held by the richest one percent of

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<sup>2</sup> See Chapter 7, Figure 7.5.

households.<sup>3</sup> By this narrower measure, only the United States, Switzerland, Denmark, Sweden, and Indonesia have a less equal wealth distribution than Iceland. These findings strengthen the afore-mentioned suspicion that something is amiss in the income distribution statistics that suggest that Iceland has the most equal distribution of disposable income among the OCED countries as reported by Pareliussen and Robling (2018).<sup>4</sup> Among their sources, Ólafsson and Kristjánsson (2017) cite the Global Wealth Report from the Credit Suisse Research Institute. The OECD and other international organizations need to start gathering and reporting internationally comparable statistics on the distribution of wealth. This is important because inequality has suddenly become one of the most pressing political and moral issues of our time.

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<sup>3</sup> See Chapter 14, Chart 4.11.

<sup>4</sup> See Figure 38.

# Accounting for Public In-Kind Transfers in Comparisons of Income Inequality between the Nordic Countries

*Rolf Aaberge, Audun Langørgen and Petter Y. Lindgren<sup>1</sup>*

## Abstract

The purpose of this paper is to study the impact of publicly provided health care, long-term care, education and child care services on estimates of income inequality and poverty in the Nordic countries. The valuation and allocation of public services to target groups rely on accounting data and recipient age profiles for each country. Because the entitlement to public services like education, health care and care for the elderly is associated with particular needs, we replace the conventional EU scale for cash income with a theory-based needs-adjusted EU scale (the NA scale). The empirical results show that inclusion of public in-kind transfers has a significant effect on measurement of inequality and reduces poverty estimates by around 50 per cent.

Keywords: Income distribution, poverty, needs adjustment, equivalence scales, public in-kind transfers.

JEL classification: D31, I10, I20, I32.

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## Introduction

Most analyses of income distribution rely on household data on cash income after tax and ignore the distributional impact of public services, despite the fact that the tax burden levied on households is justified by in-kind as well as cash transfers financed by income taxes. Moreover, differences in the size and composition of public services weaken the comparability between countries when public in-kind transfers are not accounted for. Inclusion of public welfare services contributes therefore to a more complete picture of the income distribution and the redistribution mechanisms of modern welfare states, not least because publicly funded welfare services constitute around half of the welfare states' transfers to individuals and households (Atkinson et al. 2002 and Garfinkel et al. 2006). During the recent years a number of studies have, however, included public welfare services to produce a more accurate comparison of people's material well-being.<sup>2</sup>

The purpose of this paper is to analyse the impact of public in-kind transfers on the distribution of income in the Nordic countries, where public services are either free or heavily subsidised. To this end, we will rely on results from Aaberge et al. (2013, 2017). These studies provide estimates of income inequality and poverty for distributions of extended income in European countries, where extended income was defined as the sum of cash income after tax and public in-kind transfers. Specifically, Aaberge et al. include four main public service provisions: child care, education, health care and long-term care. Since such services are part of the social security systems of the welfare states, it is of particular interest to evaluate the effects of the Great Recession on distributions of cash and extended income and compare the outcomes for the Nordic countries with the outcomes for other European countries in 2006 and 2009.

Assessing the value of public services enjoyed by different households cannot be achieved without relying on various basic assumptions. First, since most public services are produced by public institutions we only observe expenditures and not prices. Thus, this study draws on standard practice by assuming that the total value of these services

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<sup>2</sup> For previous studies on the impact of in-kind benefits on the income distribution, see O'Higgins and Ruggles (1981), Gemmill (1985), Smeeding (1986), Smeeding et al. (1993), Evandrou et al. (1993), Ruggeri et al. (1994), Slesnick (1996), Antoninis and Tsakloglou (2001), Aaberge and Langørgen (2006), Garfinkel et al. (2006), Callan et al. (2008), Paulus et al. (2010), Aaberge, Bhuller, Langørgen and Mogstad (2010), Aaberge, Langørgen and Lindgren (2010, 2013, 2017), Vaalavuo (2011), Verbist et al. (2012), and Koutsampelas and Tsakloglou (2013).

is equal to the total costs of producing them. Secondly, again in accord with standard practice we allocate the average costs of producing services to beneficiaries. We have hence used the national spending data on child care, education, health care and long-term care provided by the OECD. The recipients are classified by gender and age group, and individuals are assumed to receive the average benefit of their respective groups for each public service, while the average benefit is allowed to vary across countries. The value of public services received by a given household is the aggregate of the values received by the household members.

The importance of accounting for needs and economies of scale in households when analysing the distributional impact of public services is universally acknowledged. However, since equivalence scales designed to account for needs and economies of scale in cash income are not necessarily appropriate for public services, it is required to relax the assumption that the relative needs of different subgroups remain unchanged when the definition of income is extended to include the value of public services. To this end, Aaberge, Bhuller, Langørgen and Mogstad (2010) and Aaberge, Langørgen and Lindgren (2013, 2017, 2018) introduce theory-based equivalence scales for extended income denoted needs-adjusted (NA) scales. The NA scale is defined as a weighted average of the EU scale and a non-cash income (NC) scale for public in-kind transfers. The NA scale assigns higher weights to children and the elderly compared to the EU scale, because children and the elderly have greater needs for basic public welfare services like education and health care.

Using the EU scale rather than the NA scale creates a different picture of poverty in a society. In particular, poverty rates appear to be underestimated among single adults with children when using the EU scale for adjusting extended income, because that scale ignores that such households have great needs for public services. Similarly, poverty rates among single adults (below 75 years) without children are overestimated when adjusting extended income by the EU scale rather than by the NA scale.

The remainder of the paper is organised as follows. The second section provides a brief discussion of the theoretical foundation for needs-adjusted (NA) equivalence scales and presents common equivalence scales of public services and extended income for European countries. In the third section, empirical results on income inequality and poverty for the Nordic countries and a selection of Eastern and Western European countries are shown. A brief conclusion is presented in the final section. For more detailed information on data and empirical methods we refer to Aaberge et al. (2013).

## Needs for public services and equivalence scales

Equivalence scales play an important role in analyses of income inequality and financial poverty as a method to account for different needs of people living in different types of households. For example, couples without children need more income than a single individual, but since they can share some expenses they need less than twice the income of single individuals to attain the same standard of living. The equivalence scale assigns values to each household in proportion to their needs. The couple will be assigned a value between 1 and 2, when the single household is used as a reference household. One way to derive theoretically justified equivalence scales is to exploit the cost functions of households with different demographic characteristics. This method requires in-depth information about the consumption patterns of households. Because of the lack of such data, most empirical analyses typically use more pragmatic scales adjusting crudely for differences in household size and composition (see e.g. Coulter et al. 1992). The standard practice in applied work is to use the so-called EU scale (modified OECD scale) to account for heterogeneity in needs for cash income. The EU scale assigns weight 1 to the household head, 0.5 to each additional member aged 14 and above and 0.3 to each member aged below 14.

When adding public services to cash income into an extended income concept, a new methodological issue is introduced: how can we compare the income of individuals when needs not only differ for cash income but also for public services? As argued by Radner (1997), equivalence scales designed to account for needs and economies of scale in cash income are not necessarily appropriate when analysing an income concept that includes the value of public services. For instance, the elderly tend to utilise health services more frequently than younger people due to differences in health status, whereas children have a genuine need for education.<sup>3</sup> As a consequence, studies using equivalence scales designed for cash income overstate the equivalent incomes of groups with relatively great needs for public services.

Scale economies in consumption are used as justification for assigning a larger weight to the first adult of the household (as discussed above). The relatively low weight that is given to children in the EU scale is due to the fact that children generally consume small quantities of basic goods, such as food and beverages. Thus, it is

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<sup>3</sup> For references to equivalence scales that introduce needs adjustment, see Jones and O'Donnell (1995) and Zaidi and Burchardt (2005). They show that the disabled have relatively high needs for non-cash as well as cash income.

implicitly assumed that children have smaller needs for private consumption goods than adults. Even if this assumption is correct for consumption of goods financed by cash income, the picture may change when we extend the needs concept to include needs for public education services. Thus, if the weight 0.3 is considered appropriate for children when analysing the distribution of cash income, it makes sense to increase the weight for children when income is extended to include public child care and education expenditures. This proposition is based on the assumption that children are in need of child care and education, and that the children and the associated household members should not suffer economically when they belong to a household with large needs for child care and education services. Similarly, larger needs for health care and long-term care among the elderly mean that the equivalence scale should differentiate between adults in different age groups when the income definition includes public health care and care for the elderly. Finally, the consumption of health services differs between genders, and thus, estimates of needs for such public services should be gender-specific.

### *Needs-adjusted equivalence scale*

This section provides a brief presentation of the common needs-adjusted EU equivalence scale for European countries proposed by Aaberge et al. (2013, 2017). The common needs-adjusted EU equivalence scale (NA) is designed to deal with situations where the income concept is extended to include public in-kind transfers. The first step of designing a common needs-adjusted EU scale consists of estimating needs-adjusted scales for each of the European countries included in this study. Next, the common scale is determined by the average of the country-specific needs-adjusted equivalence scales for every household in all countries.<sup>4</sup> A theoretical discussion of the NA scale is given in Aaberge et al. (2018).

The purpose of an equivalence scale is to convert household incomes into comparable individual-specific incomes (equivalent incomes). Equivalence scales may be absolute or relative. Applying an absolute scale to translate household income to

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<sup>4</sup> In comparisons of inequality and poverty across countries, the standard practice is to apply the same equivalence scale to different countries. We use a weighted average of country-specific NA scales (where countries are weighted by population size). This means that relatively extensive public service provision allows a country to meet recipient needs better and is not interpreted as being due to recipients having larger needs for a given age.

individual equivalent income involves subtracting a fixed sum per household member from the household income. The underlying assumption is then that each person needs a certain amount of income to survive and partake in society. A relative scale, on the other hand, provides the rate at which one Euro for one household translates into the Euro amount that will produce the same well-being for another household. Thus, if household  $h$  enjoys income  $y_h$ , and  $m_h$  is the conversion rate from the reference household to household  $h$ , then the reference household needs income  $y_h / m_h$  to obtain the same level of well-being as (members of) household  $h$  enjoys. Consequently,  $y_h / m_h$  is defined as the equivalent income of household  $h$ , and it follows that the relative scale is given by the ratio of income to equivalent income.

When applying a relative equivalence scale, one assumes that the need for income is independent of the income level. This assumption might be considered to be fairly strong since it implies that the degree of economies of scale in consumption in a household is independent of the level of income. However, for reasons of simplicity and due to lack of detailed data on consumption patterns, income-independent scales like the EU scale are the ones commonly used.

**Table 1: Equivalence scales for cash income (EU) and extended income (NA)**

Type	Age	EU	NA
Single males	18–24	1.00	0.99
	25–34	1.00	0.99
	35–44	1.00	1.00
	45–54	1.00	1.03
	55–64	1.00	1.07
	65–74	1.00	1.16
	75+	1.00	1.31
Single females	18–24	1.00	0.99
	25–34	1.00	1.01
	35–44	1.00	1.01
	45–54	1.00	1.03
	55–64	1.00	1.06
	65–74	1.00	1.14
	75+	1.00	1.33
Couples	18–24	1.50	1.51
	25–34	1.50	1.53
	35–44	1.50	1.54
	45–54	1.50	1.59
	55–64	1.50	1.66
	65–74	1.50	1.83
	75+	1.50	2.18

Type	Age	EU	NA	
Couples with one child	0	1.80	1.92	
	1–2	1.80	1.99	
	3 – education age	1.80	2.12	
	Primary education	1.80	2.21	
	Lower secondary education	1.80	2.26	
	Upper secondary education	2.00	2.49	
	Couples with two children	0	2.10	2.30
		1–2	2.10	2.43
3 – education age		2.10	2.70	
Primary education		2.10	2.88	
Lower secondary education		2.10	2.98	
Upper secondary education	2.50	3.44		
Single mothers with one child	0	1.30	1.39	
	1–2	1.30	1.45	
	3 – education age	1.30	1.59	
	Primary education	1.30	1.68	
	Lower secondary education	1.30	1.73	
	Upper secondary education	1.50	1.96	
Single mothers with two children	0	1.60	1.77	
	1–2	1.60	1.90	
	3 – education age	1.60	2.17	
	Primary education	1.60	2.35	
	Lower secondary education	1.60	2.45	
	Upper secondary education	2.00	2.91	

Note: Household types with children in lower secondary education level include only children below 14 years of age. The age group 18–24 years includes only persons above secondary education age.

The use of an income-independent equivalence scale for extended income means that the need for public services constitutes a share of extended income that is depending on household type, but not on the level of income. Except for the Nordic countries, detailed municipal accounting data are in general not available. Thus, in order to estimate needs parameters for 22 European countries we have to rely on less informative data like the mean public spending targeted to different population subgroups defined by age and gender. Average spending per person received by the different target groups of public services, such as children and the elderly, is used as indicators of the population groups' need for child care, education, health care and long-term care. The mean in-kind transfers received by different target groups are assumed to reflect the relative needs of the target groups. Since the estimated need parameters for public services are referring to individuals, household specific need parameters are obtained by simply aggregating the need parameters of the individuals in each household.

The equivalence scale for extended income (the NA scale) is defined as a weighted average of the equivalence scales for public in-kind transfers and cash income. As explained in Appendix A, the needs parameters for public services and cash income form the basis for estimating the NA scale. The needs parameter of the reference household for cash income is defined by the median of equivalent cash income within each country.<sup>5</sup> For households that are not of the reference type, we assume that the EU scale identifies the ratio of the needs parameters for cash income of a given household and the reference household. Hence, we follow much of the previous literature in using the EU scale to account for differences in the needs for cash income across households who differ in size and composition.

Table 1 displays the EU and NA scales by household types when including all four public services in the definition of extended income. While the EU scale takes into consideration economies of scale and give different weights to children and adults in the household, the NA scale accounts for the needs of child care, education, health care and long-term care as well as for the needs of cash income. Thus, the NA scale is relatively high for households with elderly people or with children.

## Empirical implementation

This section presents the empirical implementation of the methods for allocating the value of public services to individuals, and the methods used for evaluating the income distribution. First we describe the population of study, the data and methods for valuation of public services, and the allocation of the value of public services to individuals. Then, we report the estimates for the adjusted equivalence scale, discuss the different income definitions, and define the inequality measures and poverty thresholds.

### *Population of study*

This study relies on the EU-SILC 2007 and 2010 cross-sectional data, which are survey data on income and living conditions assembled by EUROSTAT. The data sets refer to the year the data were collected (2007, 2010), although the incomes

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<sup>5</sup> In this study the reference household type is defined by childless single male adults of age 35-44 years.

were earned in 2006 and 2009. However, the demographic information refers to 2007 and 2010. We assume that the household composition was the same in 2006 (2009) as in 2007 (2010). The results in this study concern the five Nordic countries and 17 other European countries.

**Table 2: Population of study by household type and country, percent of individuals, 2009**

Age of adults	Household type										
	18-64		18-64		65-74		75+		18+		Other
Number of adults	1	2	1	2	1	2	1	2	3+	3+	0-2
Children	No	No	Yes	Yes	No	No	No	No	No	Yes	No/Yes
Denmark	15	17	6	34	3	4	4	2	3	6	5
Finland	11	19	4	34	3	4	4	3	6	7	6
Iceland	8	12	7	38	2	3	3	2	10	12	4
Norway	12	16	8	36	2	4	4	2	4	6	5
Sweden	11	17	5	35	3	5	5	3	5	6	6
Austria	10	13	3	28	3	4	3	2	17	12	5
Belgium	9	16	5	30	2	4	4	2	12	10	5
Czech Republic	5	14	3	30	2	3	3	2	21	11	6
Estonia	8	14	3	29	3	3	4	1	16	12	6
France	10	17	5	32	2	3	4	3	9	8	5
Germany	13	17	4	27	4	7	2	2	11	6	7
Greece	3	9	1	33	1	2	2	2	29	8	9
Hungary	5	13	3	26	2	3	2	1	21	18	7
Ireland	4	12	8	39	2	3	2	1	12	12	5
Italy	7	10	3	28	2	3	4	3	22	12	7
Netherlands	10	18	3	36	2	4	3	2	9	7	5
Poland	4	10	1	23	2	2	3	1	24	26	4
Portugal	2	10	2	29	2	3	3	3	24	15	6
Slovakia	4	9	1	21	3	2	2	1	31	21	5
Slovenia	5	10	2	29	2	3	3	2	23	14	6
Spain	4	12	1	31	1	3	2	3	26	12	6
UK	7	16	6	33	3	3	4	2	11	10	5

Note: Children are defined as aged below 18 years. EU-SILC cross-sectional weighting is used to produce estimates for the population. Students are omitted from the population.

Source: : EU-SILC, EUROSTAT.

To provide some basic information of demographic characteristics of the countries in question, Table 2 shows the population composition for each country by household types. Since children and the elderly are important recipients of public services, we have classified households in the following way:



- We distinguish between households with adults in the age groups 18–64, 65–74 and 75 years and above.
- We distinguish between households with 1, 2 or 3 or more adult household members (18 years and above).
- We distinguish between households with or without children (at least one child below 18 years of age).

For households with adults in the age group 18–64 years we specify households with one or two adults combined with households with or without children to form the following four household types: Single adult without children, couple without children, single adult with children and couple with children. For the two elderly age groups we specify single and couple households without children. For households with three or more adults we do not specify the age of the adults, but we distinguish between households with or without children. The residual type “Other households” includes households with two adults that belong to different age groups, or with one or two elderly adults in households with children.

Table 2 shows the country-specific distributions of individuals by household. A fairly large share of the households is constituted by two adults below 65 years of age with one or more children. In particular, this household type is rather common in the Nordic countries as well as in Ireland and the Netherlands. Households with three or more adults are rather common in Estonia, Greece, Hungary, Italy, Poland, Portugal, Slovenia, Slovakia and Spain. Denmark, and Norway have relatively high shares of single adults aged 18–64 with and without children.

### *The value of public services*

Analyses of extended income normally assume that the value of public services is equal to the cost of providing them (O’Higgins and Ruggles 1981, Gemmill 1985, Smeeding et al. 1993, Evandrou et al. 1993, Ruggeri et al. 1994 and Paulus et al. 2010). Aaberge and Langørgen (2006) question this assumption by demonstrating that local governments provide public services at different costs. Furthermore, the production cost approach disregards differences in quality and efficiency in the service production, and does not account for the possible welfare losses when the government imposes quantity constraints in the consumption of public services. Estimating the real value of public services to the beneficiaries’ demands, however, in-depth data on efficiency, quality and

cost differences across and within 22 countries. This is beyond the objective of this paper. Nevertheless, the production cost approach provides a useful benchmark by offering an estimate of the value of public services, whereas the standard approach simply ignores the impact of public services on welfare.

This study includes four publicly financed services: health services, long-term care, education and early childhood education and care (ECEC). While Aaberge, Langørgen and Lindgren (2010) focused on the distributional impact of education and health services, we extend the analysis by also including long-term care and ECEC services based on OECD data. The data are net public expenditure, and thus the households' out-of-pocket payments and other financial sources beyond government sources are excluded.

The OECD System of Health Accounts provides expenditure data on health and long-term care. In the System of Health Accounts, long-term care spending comprises both health and social support services to people suffering from chronic conditions and disabilities who need care on an ongoing basis. Since the reporting practices of the allocation of long-term care spending between the health and social components may differ between countries, we have chosen to include total spending on both components to facilitate comparability across countries.

Education expenditure is available from the Education Database at OECD Statistics.<sup>6</sup> The data are separated into primary, lower secondary and upper secondary education. This enables us to identify the value of three levels of basic education in European countries. The data also include information on pre-primary education, but we have instead included pre-primary education as part of the kindergarten services.

The OECD Family Database provides public expenditure on child care and pre-primary education as a share of each country's gross domestic product (GDP). As the OECD also offers GDP data, these data are combined to calculate the value of ECEC services in millions of the national currency. A limitation is that the Family Database does not provide a separation between different types of public financial support for ECEC services. Consequently, in-kind transfers are mixed with cash transfers and support through the tax system in the data for public spending on ECEC services. In some countries this may lead to double counting of

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<sup>6</sup> UNESCO-OECD-Eurostat (UOE) data collection on education statistics, compiled on the basis of national administrative sources, reported by Ministries of Education or National Statistical Offices.

benefits, for instance in the UK where many parents pay for private child care and are partly reimbursed through the tax system.

### *Allocation of public services*

Who receives what of public services is an outcome of both central and local government decisions. The governments are assumed to target public services to specific subpopulations based on evaluation of relative needs for public services associated with different demographic characteristics. Children are provided education services because they need to develop their skills, while the elderly need health-care and long-term care due to their high likelihood of becoming ill or disabled. Since both the selection of recipients and the amount of public services are decided by the government, it is important to account for the targeting policies of the Nordic and other European governments. Different welfare regimes may have consequences for economic inequality when countries provide different levels of public services.

### **Education and child care services – the actual consumption approach**

Two methods are used to assess the value of public services per receiver. Either the value is based on actual consumption or on the probability to use the services. In the former case (the ex post perspective) the value consumed by each individual forms the basic measurement unit. This method is applied for the value of education and kindergarten services. Enrolment numbers in each education level (primary, lower secondary and upper secondary) is accessible from the OECD. Total expenditure divided by the enrolment number provides an estimate of the value received per pupil. We assume that participants at a given education level and country receive an equal share of the value. In the EU-SILC data, actual participation in education institutions is only known for people aged 16 years or above. For younger children, however, education participation is largely compulsory and we therefore assume 100 percent participation rates for these children. All three education levels are seen as necessary for attaining the required skills to participate actively in a developed society. Thus, people that are in the age-group for which education is targeted but do not participate thus have a need for education that is not fulfilled. Older persons that do in fact

participate in one of the education levels acquire a value that they do not seem to need at the time.<sup>7</sup>

A limitation of the data is that information on participation in public or private education is not accessible. Thus, it is assumed that every pupil in a certain education level receives the same amount of government funding, irrespective of whether or not the person actually participates in publicly funded schooling.

Our method assumes that the value of child care and pre-primary education is allocated to users only. The calculation from total public expenditure to per hour value is based on actual participation. Since there are no reliable data on children's total use of kindergartens in European countries, we have assumed that the total use in a country equals a weighted sum of the individual participation rates in the EU-SILC data. The EU-SILC data include variables that provide information about the average hours of participation per week in child care and pre-primary schooling. We estimate the public expenditure per hour per week given to children in each country, and allocate this value multiplied by the number of hours attended in kindergarten to the actual recipients registered in the EU-SILC. The EU-SILC data do not distinguish between children in private and public ECEC institutions, which means that we allocate benefits to all children receiving ECEC services, irrespective of whether or not the child actually participates in publicly funded child care or pre-primary education.

### **Probability to use health and long-term care services – the insurance approach**

Health and long-term care services are treated as insurance arrangements, i.e. the value is assessed on an ex ante basis. This means that it is the probability to consume rather than the actual use of the service that matters. Such a view has been applied by Smeeding (1986), Smeeding et al. (1993), Aaberge and Langørgen (2006), Paulus et al. (2010) and Aaberge et al. (2010, 2017). The probability of receiving health and long-term care services depends on demographic characteristics – age and gender. The European Commission has established user profiles by age and gender for both health and long-term care services.<sup>8, 9</sup> By combining these user profiles with population data,

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<sup>7</sup> Several of these data challenges are rooted in the methodological choice of analysing only one year. By applying a perspective of such a short time span as a year, we are not able to account for intertemporal planning and adjustment. In a life-cycle perspective the understanding of income, needs, and public services can be tackled in a less rigid manner.

<sup>8</sup> See European Commission (2010: 111-112).

<sup>9</sup> Iceland, however, lacks a long-term care profile, so we assume that the provision is similar to its Nordic neighbours. Hence, we calculate the long-term care user profile for Iceland as the average of Denmark, Finland, Norway and Sweden.

the relative provision to each citizen is established. Multiplication with the total expenditure gives the individual health and long-term care insurance. Since the probability of using health and long-term care services differs across individuals by age and gender, the allocation procedure is carried out separately for health services and long-term care. It is important to note that the probability of using health and long-term care is solely determined by demographics. For instance, we assume that the value of the health premium is unaffected by the individuals' position in the income distribution.<sup>10</sup>

### Heterogeneous population

Since individuals' needs of education, kindergarten, health care and long-term care depend on age and gender, we classify the population into target groups defined by age and gender. The following age groups are employed by EU-SILC: 0–17 years, 18–24 years, 25–34 years, 35–44 years, 45–54 years, 55–64 years, 65–74 years and 75 years and above. We find it required to introduce a more detailed classification for children and infants. The reason is that government expenditures to different levels of education (primary, lower secondary and upper secondary) vary. Moreover, the participation rate in kindergarten varies by age. Children in pre-education age are divided into three target groups: 0 year, 1–2 years and 3 years to primary education age. Since the age intervals for attending different education levels vary between countries, the age group classification is allowed to vary between countries to take into account the features of different education systems. Table 3 shows the 14 age groups used. When the age groups are combined with gender (males and females), the classification includes 28 different target groups.

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<sup>10</sup> We rely on this simplification despite the fact that empirical evidence from European countries suggests that there is a positive relationship between the health conditions and the income levels of individuals.

**Table 3: Target groups by gender and age**

Category	Age group
1	0 year
2	1–2 years
3	3 years – education age
4	Primary education age
5	Lower secondary education age
6	Upper secondary education age (17 years and below)
7	Upper secondary education age (18 years and above)
8	18–24 years, but not in upper secondary education age
9	25–34 years
10	35–44 years
11	45–54 years
12	55–64 years
13	65–74 years
14	75 years and above

### *Income definitions*

We consider two different combinations of income definitions and equivalence scales. First, we use the standard approach combining cash income and the EU equivalence scale. Next, our measure of extended income (cash income plus in-kind transfers) is converted by the NA equivalence scale. Table 4 displays the combinations of income definitions and equivalence scales used in this study.

**Table 4: Equivalent income definitions**

Income definition	Equivalence scale	Equivalent income definition
Cash income	EU scale	Cash income (EU)
Extended income	NA scale	Extended income (NA)

The EU-SILC variable disposable income (HY020) is used as a measure of cash income.<sup>11</sup> The disposable income variable is defined by the sum of earnings, self-employment income, capital income, public cash transfers, imputed rent and

<sup>11</sup> Disposable income in national currency is defined by HY020 (disposable income in Euros) \* HX010 (Exchange rate) \* HY025 (Inflation factor).

subtracted income taxes. Note that this variable also includes non-cash components, such as non-cash employee income, imputed rent<sup>12</sup> and value of home produced goods for household consumption. Table 5 presents country-specific relative distributions of extended income by income components. The results show that while cash income is by far the most important income component in all countries, there are significant differences in relative cash income. Note also that health insurance and education account for a major share of in-kind transfers from the government to the households.

**Table 5: Mean extended income (NA) shares by income components and country, percent, 2009**

Country	Cash income	ECEC	Education	Health care	Long-term care
Denmark	72.4	3.3	8.5	12.2	3.7
Finland	77.7	2.3	7.0	9.8	3.2
Iceland	76.0	2.2	9.6	10.1	2.2
Norway	74.6	2.2	10.0	9.8	3.4
Sweden	72.5	3.1	7.4	12.1	4.9
Austria	77.4	0.8	7.5	12.4	1.9
Belgium	76.4	2.0	7.1	11.7	2.8
Czech Republic	77.8	1.1	7.0	13.6	0.6
Estonia	78.0	1.0	9.1	11.3	0.5
France	76.6	2.1	6.6	12.3	2.5
Germany	78.4	1.0	5.9	13.5	1.2
Greece	79.6	0.3	6.4	13.2	0.5
Hungary	77.5	1.9	8.4	11.7	0.6
Ireland	73.2	0.7	11.6	13.3	1.2
Italy	77.0	1.6	7.5	12.1	1.8
Netherlands	72.9	1.6	8.0	12.2	5.2
Poland	78.9	1.1	8.1	11.0	0.9
Portugal	75.7	0.9	8.0	15.1	0.3
Slovakia	77.4	1.1	7.1	14.3	0.1
Slovenia	79.4	1.2	7.7	10.1	1.6
Spain	74.5	1.4	7.5	15.0	1.6
UK	75.5	2.3	8.4	12.5	1.3

Source: EU-SILC, OECD.

<sup>12</sup> Imputed rent is defined as the value of owning your dwelling or having access to below-market or free-of-rent dwelling and is estimated at the market rent.

## Measuring inequality and poverty

This section discusses and presents the methods for measuring inequality and poverty. Moreover, the role of household weights is discussed.

### *Inequality*

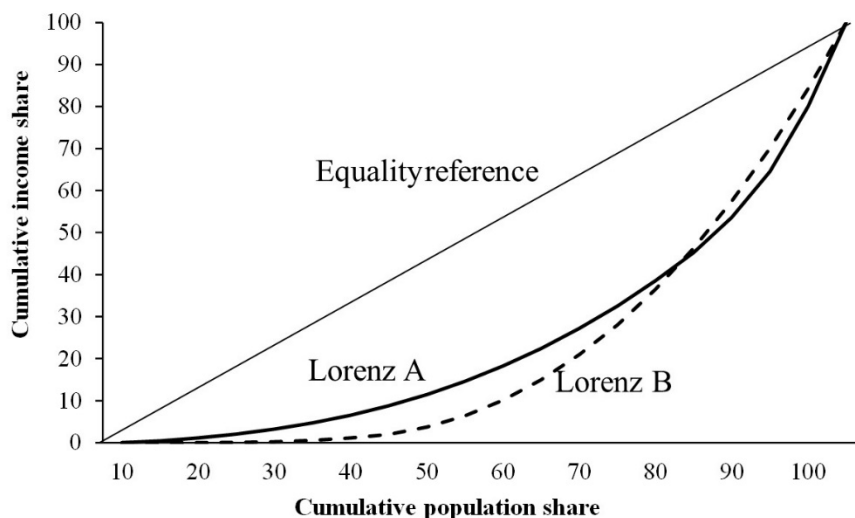
Empirical analyses of inequality in income distributions are normally based on the Lorenz curve. To construct this curve, the population is ranked according to the (equivalent) income per individual, from lowest to highest income, and then the individuals' shares of income are aggregated across the individuals. The Lorenz curve then represents the cumulative income shares for proportions of the population.

In Figure 1, two examples of Lorenz curves are displayed. The black straight line is the equality reference, which illustrates the situation where all individuals enjoy the same amount of income (complete equality). To summarise the information content of the Lorenz curves and to achieve rankings of intersecting Lorenz curves the standard approach is to employ the Gini coefficient, which is equal to twice the area between the Lorenz curve and its equality reference. The Gini coefficient takes values between 0 and 1, where 0 is attained when the Lorenz curve coincides with the equality reference. A Gini coefficient of 1, on the other hand, represents complete inequality and is attained if one individual receives the total income.

In Figure 1, the area between Lorenz A and the equality reference curve is smaller than the area between Lorenz B and the equality reference curve. Hence the Gini coefficient is smallest in the case of Lorenz A. The Gini coefficient is a relative measure of inequality. This means that if all incomes increase by the same percentage, for instance a doubling of all incomes, the Gini coefficient will be the same, despite the fact that the richest person will receive much more than the poorest person, in absolute terms.



Figure 1: The Lorenz curve



### Poverty thresholds

In most studies of income distribution in developed countries, poverty is regarded as a relative phenomenon. This perspective is based on the observation that people usually compare their material situation with other citizens. They consequently adjust their expectations and demands for material well-being relative to other individuals in the same society. The alternative to a relative poverty threshold is to agree on a certain level of income that is needed in order to not be considered poor. This is the norm when assessing poverty in the developing world, such as in analyses of people living for under 1 or 2 USD per day.

This paper follows the standard reasoning in assessments of poverty in developed countries, and applies a relative poverty threshold to measure whether or not people are classified as poor. The relative poverty threshold is normally calculated as a certain percentage of the median income in a country. The median income means the income of the individual who is located exactly in the middle of the income distribution. According to the EU method, 60 percent of the median equivalent income is the poverty line (see Atkinson et al. 2002). Each country has its own poverty line. As an aggregate measure of the poverty rate in different countries we use the head-count

ratio defined by the share of *individuals* who live in a household with income below the poverty line.

### Household weights

In this paper statistics on income distribution are generally calculated on the basis of equivalent incomes allocated to individuals, using cross-sectional sampling weights available in the EU-SILC data set. The purpose of weighting is to reduce biases in the estimation in order to draw inference from the EU-SILC sample to the whole population. For obtaining population estimates, respondents are given weights which are inversely proportional to the probability of being selected. Moreover, the sample weights are adjusted to counterbalance non-response. However, we do not have full information on how these weights are constructed in each country, because the national statistical institutions are not obliged to provide full details.

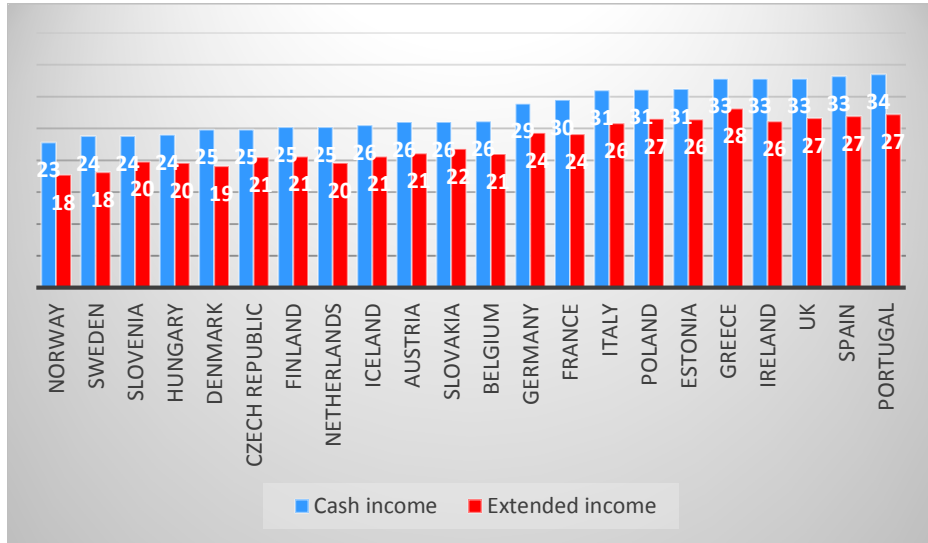
## Empirical results

This section examines the impact on income inequality and poverty estimates of accounting for non-cash income from public services. For more detailed results by country and year, see Appendix B.

### *Income inequality*

Figure 2 shows relative low inequality in the distribution of cash income (after tax) in the Nordic countries, whereas it is rather high in Estonia, Greece, Italy, Poland, Portugal, Spain and the UK – the Gini coefficient shows a difference of around ten percentage points. By replacing cash income (EU) with extended income (NA), the inequality is significantly reduced for all countries. However, the ranking of European countries by estimates of overall inequality is only slightly affected by the change in income definition.

Figure 2: Gini coefficient by income definition and country, percent, 2009



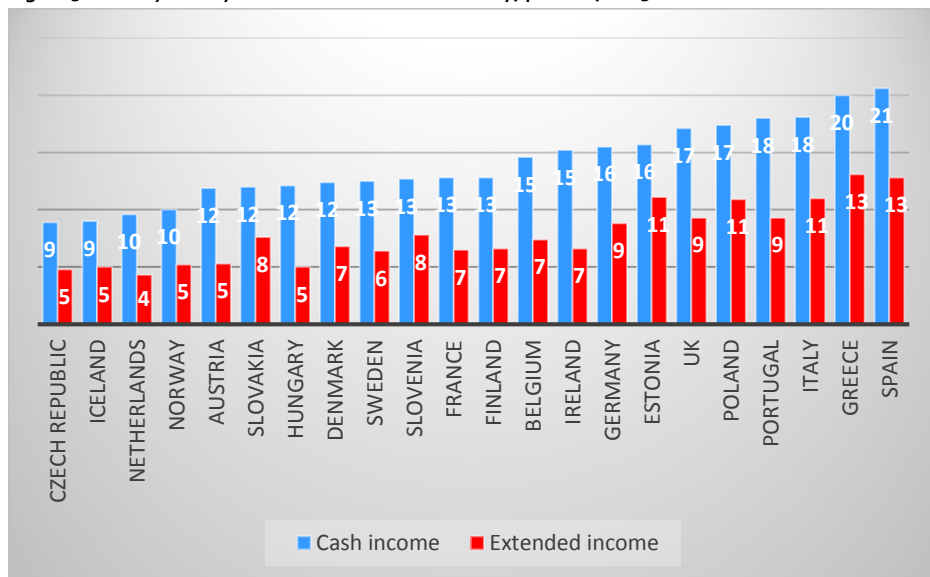
### Poverty

Figure 2 displays the poverty rates in European countries according to two different income definitions. A person is defined as income poor if he or she has lower income than 60 percent of the median equivalent income.<sup>13</sup> In general, poverty rates are low in the Nordic countries in comparison to most other European countries. By replacing cash income (EU) with extended income (NA), the estimated proportion of poor is reduced by approximately 50 per cent in most countries.

The ranking of countries by the poverty headcount is rather insensitive to changes in the income measure. For both definitions the Czech Republic, Iceland, Netherlands and Norway display a low poverty rate, while Estonia, Greece, Italy, Poland, Portugal, Spain and UK have relatively high poverty rates. Table 7 in Appendix B shows that most countries experience a rise in poverty from 2006 to 2009, irrespective of the income definition that is used.

<sup>13</sup> Note that the poverty threshold differs between income definitions and is higher for extended income because median extended income is higher than median cash income. By using 60 percent of the median income (within each country) as poverty threshold, the interpretation of poverty as a relative concept is retained.

Figure 3: Poverty rate by income definition and country, percent, 2009



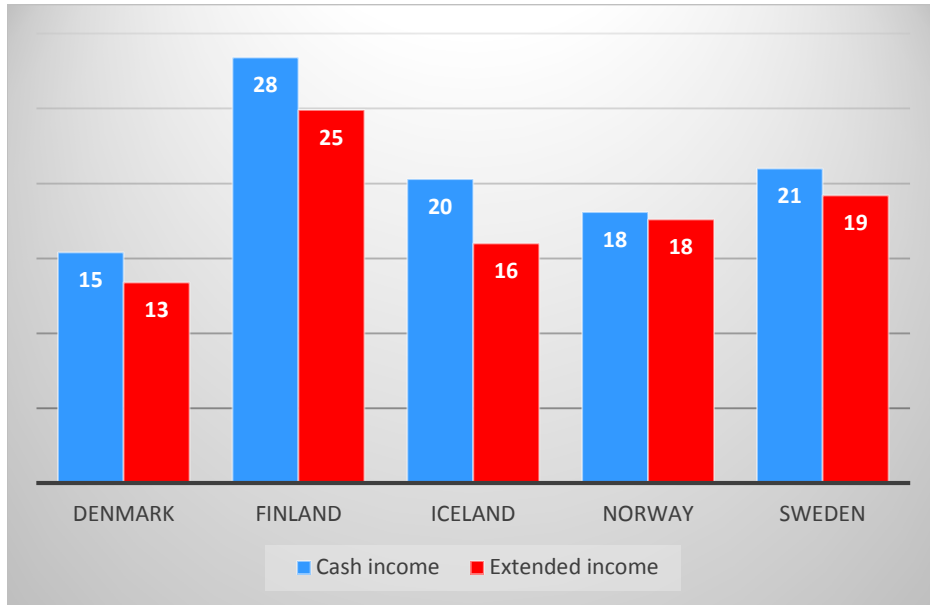
Tables 8 and 9 in Appendix B display estimated poverty rates for individuals belonging to different household types according to cash and extended income. For cash income adjusted by EU scale, we find that the poverty rates in most countries are rather high for single adults. This is the case for all age groups and in particular for single adults with children. However, Figures 4–6 (and Tables 8–9) show that the changes in poverty estimates when accounting for in-kind transfers vary significantly across family types. Specifically, for families with a single household head, we find that the changes in poverty estimates due to the change in income definition are as follows:

- For childless single adults, the poverty reduction is relatively small.
- For single parents, there is a strong poverty reduction.
- For single elderly, the poverty reduction is even stronger.

Hence, in most countries the overestimation of poverty based on the cash income measure is rather large for single adults with children and for elderly single adults. In general, we find that poverty estimates for households with children and elderly

households are significantly overestimated by ignoring public in-kind transfers in the analysis of income distribution.

Figure 4: Poverty rate among childless single adults (aged 18–64) by income definition and country, percent, 2009



By accounting for the distributional impact of publicly provided services, the Nordic countries exhibit low poverty estimates among the elderly, except for single elderly in the age group 65–74 years. In the latter group, poverty in Finland is high and poverty in Iceland is low compared to the remaining Nordic countries (see Appendix B). Couples living in Nordic countries are exposed to low poverty rates regardless of age and whether or not they are childless. Among Nordic countries, Finland has a high poverty rate in the group of childless single adults, whilst Iceland and Sweden show high poverty rates for single parents.

Figure 5: Poverty rate among single parents by income definition and country, percent, 2009

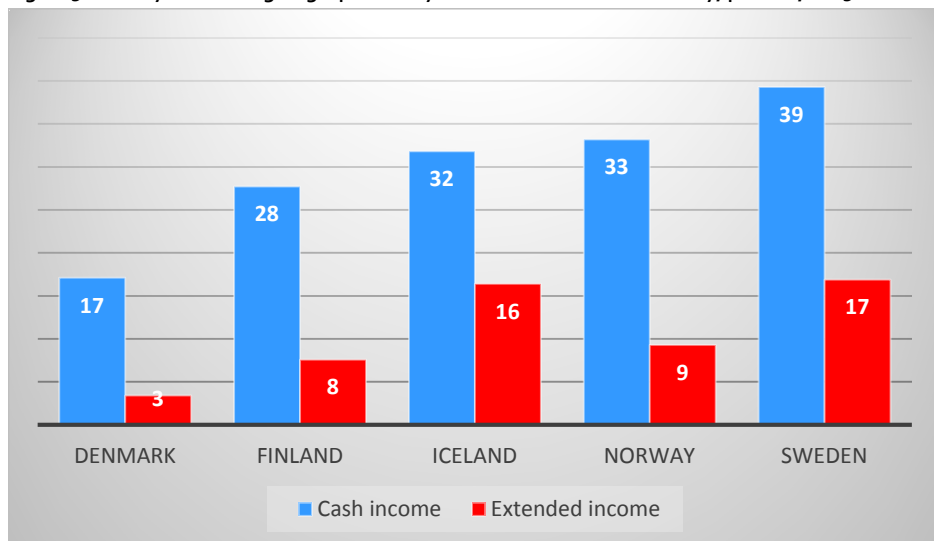
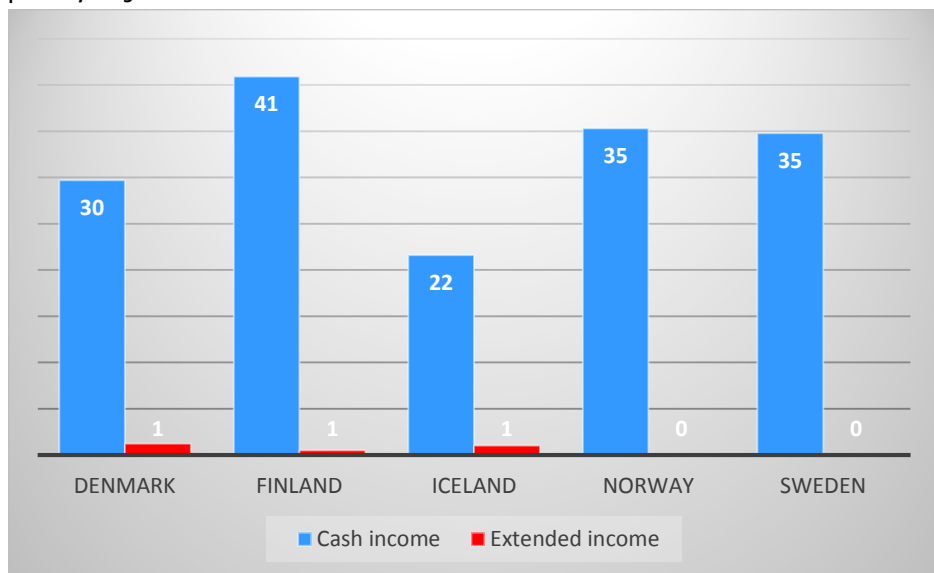


Figure 6: Poverty rate among single elderly (aged 75 and above) by income definition and country, percent, 2009



## Conclusions

This paper studies the distributional impact of public welfare services in the Nordic countries and compares the prevalence of income inequality and poverty with other European countries by applying an extended income concept. In order to obtain unbiased estimates of inequality and poverty, however, it was necessary to go beyond the standard approach of applying the EU equivalence scale to extended income, because the needs of public services differ between individuals and households. We make extended incomes comparable across household types by adjusting the commonly used EU scale to include needs for public services.

The most common income definitions for analysing income inequality and poverty are disposable cash income and extended income, normally adjusted by the EU scale. However, both income definitions prove to be biased as measures of economic living standards in a community where the welfare state provides substantial transfers in-kind to the households. These biases arise because cash income is obtained by subtracting direct taxes used to finance public welfare services but without including the value of received services, while using the EU scale equates needs for public services and needs for cash income. An important aim of this study is to account for heterogeneity in needs for publicly funded services by using a theoretically justified needs-adjusted equivalence scale (NA scale). The NA scale reflects the fact that elderly have relatively large needs for health care and long-term care, whereas children have large needs for child care and education.

The empirical results show that households with childless single adults below 65 years are exposed to relatively high risk of poverty in all Nordic countries even if we account for public in-kind transfers. When estimates rely on the extended income concept, poverty rates for single adults with children are particularly high in Iceland and Sweden. By contrast, for couples at all ages (with or without children) and for single elderly above 75 years, relatively few Nordic households will be classified as poor when extended income forms the basis of the poverty estimates.

Taken together, our findings may have implications for policies aimed at fighting inequality and poverty. By accounting for public in-kind transfers, poverty among the elderly and families with children appears to be rather low compared to standard estimates based on cash income. Conversely, public in-kind transfers like subsidized education and health care are not very effective policy instruments for alleviating poverty among childless single adults aged under 65. As a consequence, it might be

necessary to address poverty in this latter group through other policy tools complementary to major public in-kind transfer programmes.

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## Appendix A Needs for cash income

We use the EU scale to account for differences in needs of cash income for households who differ in size and age composition and the median of the distribution of equivalent income in a given country as a basis for determining the needs parameter for the reference group. Thus, the needs parameter of cash income for the reference household in country  $k$  is defined by:

$$\gamma_{0rk} = \text{median} (x_{0k}^{EU})$$

Where  $x_{0k}^{EU}$  is the vector of equivalent cash incomes in country  $k$  using the EU scale to make cash incomes comparable across heterogeneous households. Note that the vector  $x_{0k}^{EU}$  includes one component for each individual in country  $k$ . This means that  $\text{median} (x_{0k}^{EU})$  is the median equivalent cash income in country  $k$ .

For households that are not of the reference type we use the chosen EU scale to assess the need for cash income in the following way:

$$\gamma_{0rk} = \gamma_{0rk} EU_h$$

where  $EU_h$  is the EU scale for cash income pertaining to household  $h$ . Thus, the size of the needs for cash income for household  $h$  relative to the reference household  $r$  is equal to the EU scale. The country-specific needs parameters of cash income and non-cash income are used as a basis for weighting cash income versus non-cash income by construction of the NA scale.

## Appendix B Inequality and poverty estimates

**Table 6: Gini coefficient for the distribution of income by income definition, country and year**

Country	Cash income (EU)		Extended income (NA)	
	2006	2009	2006	2009
Denmark	0.240	0.248	0.184	0.191
Finland	0.259	0.252	0.213	0.206
Iceland	0.278	0.255	0.221	0.206
Norway	0.232	0.228	0.180	0.177
Sweden	0.232	0.238	0.173	0.181
Austria	0.261	0.260	0.213	0.211
Belgium	0.262	0.261	0.213	0.210
Czech Republic	0.252	0.248	0.208	0.205
Estonia	0.328	0.312	0.283	0.264
France	0.263	0.295	0.207	0.241
Germany	0.298	0.289	0.254	0.243
Greece	0.343	0.328	0.289	0.281
Hungary	0.255	0.240	0.203	0.196
Ireland	0.313	0.328	0.257	0.261
Italy	0.321	0.310	0.264	0.258
Netherlands	0.271	0.252	0.213	0.196
Poland	0.320	0.311	0.269	0.265
Portugal	0.366	0.335	0.298	0.272
Slovakia	0.246	0.260	0.204	0.218
Slovenia	0.226	0.238	0.188	0.198
Spain	0.312	0.332	0.259	0.269
UK	0.328	0.328	0.276	0.266

**Table 7: Poverty rate by income definition, country and year, percent**

Country	Cash income (EU)		Extended income (NA)	
	2006	2009	2006	2009
Denmark	10.5	12.4	5.2	6.8
Finland	12.5	12.8	5.9	6.6
Iceland	9.5	9.0	3.7	5.0
Norway	11.2	10.0	6.6	5.2
Sweden	10.1	12.5	5.3	6.4
Austria	11.8	11.9	5.6	5.3
Belgium	15.1	14.6	7.3	7.4
Czech Republic	9.5	8.9	4.8	4.8
Estonia	19.6	15.7	14.1	11.1
France	13.0	12.8	5.2	6.5
Germany	14.7	15.5	9.3	8.8
Greece	20.5	20.0	12.5	13.1
Hungary	12.2	12.1	5.6	5.0
Ireland	16.5	15.2	7.0	6.6
Italy	19.7	18.1	11.5	11.0
Netherlands	9.8	9.6	4.2	4.3
Poland	17.3	17.4	10.3	10.9
Portugal	18.2	18.0	9.4	9.3
Slovakia	10.5	12.0	5.9	7.6
Slovenia	10.8	12.7	6.2	7.8
Spain	19.7	20.6	11.8	12.8
UK	18.8	17.1	10.6	9.3

**Table 8: Poverty rate for cash income measure (EU scale) by household type and country, percent, 2009**

Age of adults	Household type									
	18-64		18-64		65-74		75+		18+	
Number of adults	1	2	1	2	1	2	1	2	3+	3+
Children	No	No	Yes	Yes	No	No	No	No	No	Yes
Denmark	15.4	3.5	17.1	6.1	20.1	9.5	29.7	33.6	3.4	7.6
Finland	28.4	7.4	27.7	9.1	30.8	4.3	40.9	8.5	7.7	13.1
Iceland	20.3	4.7	31.8	10.5	5.5	0.9	21.6	0.0	2.3	2.8
Norway	18.1	3.1	33.2	5.4	18.0	0.8	35.3	0.8	3.3	7.1
Sweden	21.0	6.6	39.3	8.3	28.8	4.3	34.8	9.9	5.1	13.5
Austria	18.5	7.3	28.0	10.4	24.7	7.2	22.7	16.3	3.9	12.7
Belgium	17.7	10.4	37.3	14.9	17.5	19.9	22.8	26.3	8.2	17.3
Czech Republic	16.9	4.0	45.1	9.6	19.6	0.0	18.8	0.5	2.8	9.5
Estonia	33.0	14.1	52.0	18.4	30.3	0.5	27.3	0.0	11.6	20.5
France	14.3	6.4	38.9	12.7	11.9	3.8	16.8	10.3	8.3	20.6
Germany	27.1	9.5	43.4	11.7	23.0	9.4	15.8	7.7	5.2	11.6
Greece	21.7	21.0	30.0	25.5	25.7	14.4	35.7	27.8	15.0	33.2
Hungary	17.6	9.8	29.4	17.9	9.8	2.5	6.2	1.4	6.0	23.0
Ireland	31.2	12.1	30.9	15.3	9.6	5.8	12.6	6.7	6.3	16.1
Italy	19.4	11.8	37.4	19.4	29.8	8.5	25.9	12.7	10.2	24.8
Netherlands	7.6	3.1	19.9	5.4	5.3	2.4	5.1	3.3	2.3	6.4
Poland	30.4	14.1	42.5	25.4	27.9	7.8	18.5	3.5	13.5	25.7
Portugal	25.6	17.5	51.0	21.0	28.6	13.7	38.7	29.8	10.7	25.1
Slovakia	20.7	7.2	36.3	17.1	13.3	1.8	16.2	1.6	4.7	19.2
Slovenia	36.6	9.2	46.7	10.9	43.7	8.0	50.2	10.9	5.2	7.4
Spain	23.9	15.1	48.3	27.7	25.9	23.3	30.9	29.4	14.5	30.1
UK	26.9	11.7	34.3	15.7	27.5	20.6	30.7	24.3	10.3	19.4

**Table 9: Poverty rate for extended income measure (NA scale) by household type and country, percent, 2009**

Age of adults	Household type									
	18-64		18-64		65-74		75+		18+	
Number of adults	1	2	1	2	1	2	1	2	3+	3+
Children	No	No	Yes	Yes	No	No	No	No	No	Yes
Denmark	13.4	3.0	3.4	2.1	7.5	1.1	1.2	0.0	2.4	4.4
Finland	24.9	5.4	7.6	4.5	15.6	1.1	0.5	0.0	5.1	4.0
Iceland	16.0	4.7	16.4	4.3	1.4	0.0	1.0	0.0	2.0	1.1
Norway	17.6	2.4	9.3	2.6	4.2	0.4	0.0	0.0	2.3	1.2
Sweden	19.2	5.7	16.9	3.4	8.2	1.6	0.0	0.0	2.8	5.8
Austria	14.7	5.4	8.6	3.2	10.1	1.8	2.2	0.0	1.2	4.2
Belgium	14.0	7.7	11.5	7.9	5.7	4.3	2.1	0.6	6.5	8.8
Czech Republic	9.2	2.5	20.3	4.7	2.8	0.0	6.7	0.0	1.5	3.9
Estonia	30.0	10.9	12.3	5.9	24.7	0.5	56.2	0.0	7.2	6.1
France	11.6	4.4	11.5	4.9	6.8	1.3	3.8	0.8	6.1	6.9
Germany	22.8	6.6	17.6	4.7	12.8	3.1	5.2	0.4	2.4	3.3
Greece	17.6	16.8	20.8	15.0	16.6	2.5	29.5	8.0	11.4	16.9
Hungary	13.4	7.3	5.0	4.2	3.7	1.0	4.4	0.0	4.2	5.8
Ireland	20.6	8.4	5.3	6.0	6.1	3.2	5.8	5.6	3.4	2.0
Italy	17.1	8.9	23.0	8.7	19.2	3.9	19.2	4.4	7.1	14.3
Netherlands	6.3	2.1	4.6	1.6	2.2	0.2	0.2	0.0	1.0	2.5
Poland	25.7	10.2	15.6	11.5	20.4	0.9	22.7	3.5	9.6	13.0
Portugal	20.6	14.3	9.0	6.9	20.9	2.5	28.2	3.0	7.2	12.7
Slovakia	13.2	5.2	25.5	8.6	2.0	0.0	13.8	1.6	3.1	11.8
Slovenia	31.4	6.9	8.9	3.0	34.3	4.8	41.0	7.6	3.2	3.5
Spain	20.4	12.8	27.1	15.5	10.4	5.6	13.2	5.8	10.1	19.6
UK	26.5	11.6	8.6	6.2	15.6	9.2	3.4	0.0	7.2	9.3

## Comment on R. Aaberge, A. Langørgen and P.Y. Lindgren: Accounting for Public In-Kind Transfers in Comparisons of Income Inequality between the Nordic Countries

*Tuulia Hakola*<sup>1</sup>

Measuring income inequality and comparing it across countries can be very tricky. One notable open issue is the accounting of public in-kind transfers such as free (or heavily subsidised) education and health care. As the potential value of these transfers can be large relative to the cash income of many low-income households, this accounting choice has immediate implications for the measurement of income inequality, and for any policymaker who attempts to deal with economic inequality. The implications are particularly large for the Nordic countries, where widely available and comprehensive public services are a substantial component of the economy (see e.g. OECD 2015).

The authors take on the ambitious task of measuring income inequality and poverty in a cross-country comparable way that also takes into account publicly funded welfare services. Drawing on their previous work, the authors' measure of in-kind transfers consists of health care, long-term care, education and child care services, thus covering the most significant in-kind services fairly comprehensively. Combining the total value of these services with household cash income, the authors then recalculate income inequality and poverty indices for 22 European countries, including the Nordics.

Using this approach, the authors arrive at an intuitive conclusion, which is consistent also with earlier research (e.g. Paulus et al. 2010), that the measures of poverty and income inequality are generally lower when services are taken into account. A particularly dramatic finding is that relative poverty rates are almost halved in most countries (including the Nordics) when in-kind transfers are included.

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### *Recalculated equivalence scales and income distributions*

The authors approach the issue on several different levels and obtain results of different types. First, they introduce a needs-adjusted equivalence scale to extend the traditional household income equivalence scale, and calculate the scale values for different demographic groups. Then, the authors combine households' cash income with their in-kind transfers, and use this extended income to measure income inequality within the countries studied. And finally, the authors recalculate poverty rates using the same definition of extended income, and compare the results across countries. Each of these steps produces results that are interesting on their own for both academic and policy purposes, and therefore each of them warrants a separate discussion.

The needs-adjusted equivalence scale, first introduced (to the best of my knowledge) in Aaberge and Langørgen (2006), extends the traditional income equivalence scales by acknowledging that different demographic groups have different needs for public services such as health care and education. The scale gives people different weights based on their estimated need of services, which in turn is based on the observed expenditure on the aggregate level. The weights calculated this way draw particular attention to older people (age bracket 75+) and children in upper secondary education, both of whom use a large amount of public services in the forms of health care and education respectively.

The new scale expands the concept of income equivalence in a meaningful way by explicitly taking into account that the needs of different demographic groups can differ. However, when it comes to policymaking, the definition of a new equivalence scale brings back into light the old question of how to compare incomes across households of different types and sizes. In this case, the scale used by the authors requires us to assume that the needs of different demographic groups are reflected well in the amount of services they are currently receiving. However, it is not clear that this is the case, and the authors also remain fairly agnostic about how reasonable this assumption is. When compared to Aaberge et al. (2010), where the authors use detailed local government spending to identify minimum expenditures for different groups, the potential shortcomings of this very aggregate approach become even clearer. As the authors point out, this choice is mostly driven by the lack of more detailed data in most EU countries, and therefore the issue is definitely worth a revisit if better data becomes available in the future.



The second set of results is about the distribution of income after in-kind transfers are taken into account. The general impression from the results is that the Nordic countries are doing great, with relatively low measures of income inequality being even lower after public services are taken into account. As the drop of the Gini coefficients can be quite large (a drop of five percentage points being fairly common), the results suggest that policymakers should take a closer look at in-kind transfers when addressing income inequality.

### *Implications of the recalculated poverty rates*

Finally, the authors recalculate poverty rates at the national level and within demographic groups. As for the inequality indices, a general result is that the poverty rates are notably reduced for every country after public services are taken into account. The effects on different demographic groups, however, are more heterogeneous. In the case of the Nordic countries, the biggest winner seems to be the 75+ age group. Based on the results, poverty in this group is almost non-existent after extended income is taken into account. Another group of winners is single parents, whose poverty rates are also notably reduced, although the rates in Iceland and Sweden remain comparatively high. Similarly, with the exception of Finland, the poverty rates are reduced for older single households (65–74).

On the side of the losers, working age (18–64) single households have relatively high poverty rates in all Nordic countries even after public services are included. As the age group is fairly wide, we cannot be certain about the driving cause, but potential groups include the unemployed and students. Obtaining more information about the composition of this groups would offer policy makers more information.

Beyond changing the poverty rankings of different demographic groups, the recalculated poverty rates also raise a deeper question: who do we consider to be poor? On the surface, the authors use a typical income-based criterion (income below 60 per cent of the median income), but as their definition of income takes into account both the utilisation of public services and the estimated need for the, the resulting definition of poverty and its implications are also different. This raises interesting and important questions. For example, should we think that the cash income poverty of old people is not a major problem in the Nordic countries, as their extended income is heavily supplemented by health care and long-term care services? The answer to questions like these is far from clear. One particular challenge also

comes from the data, where the use of health care and long-term care is averaged within demographic groups, thus hiding individual variation in need and actual usage. A further look at this distribution could be a fruitful direction for future research.

## Conclusions

Even if the complete implications of the results remain unclear, the authors have advanced an important area of research. Income inequality and poverty are clearly questions where just looking at cash incomes will only tell us a part of the story. In their research, the authors have explicitly taken into account several non-cash transfers, and measured their effect in a way that acknowledges the fact that different demographic groups have different needs for these services. Additionally, they have done this for a large group of countries in a way that allows cross-country comparisons, thus making a valuable overview of an area where our understanding is still very limited.

## References

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## Comment on R. Aaberge, A. Langørgen and P.Y. Lindgren: Accounting for Public In-Kind Transfers in Comparisons of Income Inequality between the Nordic Countries

*Jukka Pirttilä*<sup>1</sup>

This is an extremely valuable study, since one key characteristic of the Nordic model is the extensive provision of public services. As the authors point out, this can also motivate the heavy tax burden in these countries. Also, public service provision can help in reaching the redistributive goals of the government without necessarily imposing very progressive tax schedules; and indeed, many Nordic countries rely heavily on flat taxes, such as the VAT, in raising revenue, and redistribute more using expenditure-side instruments.

The authors are among the leading researchers in the field, and the high-quality level of the current study duly reflects their knowledge. Their work and application of the needs-adjusted equivalence scales is certainly of great importance for examining the role of publicly provided services.

### *Some qualifications*

One conceptual, or philosophical, question that may be asked is whether it is entirely legitimate to only examine the role of public services by turning them into monetary equivalents. Recent years have seen an increase in the interest in multidimensional poverty measurement, and some studies (see Alkire and Apablaza 2016) have been conducted using the EU-SILC data the authors of the current paper also rely on. Health and education have also intrinsic value themselves, and it is not clear that the “exchange rate” in valuing them is one-to-one with cash income. But of course, since the objective of the present study is to examine the redistributive effect of public services, the route taken here, and in other similar studies, is the only feasible one: it would be almost impossible to back out the health and education status of individuals had they not been subject to public intervention.

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A second complication in the exercise is that we often only observe the producer prices of these services, and hence cannot really know much about their quality. The authors have done some work on this in a one-country context, and the reference to such a study is useful. It is also expected that the use of public services varies by the socio-economic background of people so that those with less education and lower incomes seek care less, for example. In this study, the authors acknowledge that they cannot really address this issue with the data at hand. This is a caveat to bear in mind when interpreting the results.

### *Are the Nordics different?*

The authors could perhaps have pushed a bit further when commenting on the cross-country differences in the results. Based on the data behind Figure 2, it is interesting to note that, while the *absolute* reduction in the Gini coefficient when one moves from cash income to extended income is not greater in Nordic countries than elsewhere, the *relative* reduction (as a share of the cash-income Gini) is in fact among the largest in Sweden, Norway and Denmark. Moving on to poverty reduction (Figure 3), the same observation does not hold. The greatest relative poverty reduction appears to take place in countries such as Hungary, Ireland, and Austria. The large reduction in inequality due to public services is hence in line with the view of the Nordic countries redistributing a lot via service provision, but the poverty reduction is not. Perhaps this could be linked with the fairly universal way of service provision in the Nordic countries?

### *Old-age poverty still remains an issue*

I am a bit uncertain about what to conclude from the results related to the almost complete (or complete) disappearance of poverty among the old-aged when taking into account public service provision (See Table 9 and Figure 6). This also happens in countries such as Estonia, where one would expect to come across some very poor old people. I understand from where this finding stems: the poverty line is based on median extended income, but the service use is so extensive among the old-aged, that therefore their public-service-value augmented extended income climbs above the poverty line. Perhaps the poverty line should rather be based on needs-adjusted values calculated differently for people in different age groups – in a similar way as the

equivalence scales are needs-adjusted, or there should be some minimum level of cash income that all households need to have. The latter observation, especially, goes clearly beyond measuring poverty in the conventional relative way. Within the scope of a brief study, these issues are also hard to take into account analytically. For this reason, I would be more cautious in drawing the conclusion that poverty at old age is very much below the cash-based measured one when taking into account the role of public services.

### *Reference*

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## **INCREASING INCOME INEQUALITY in the Nordics** **Nordic Economic Policy Review 2018**

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