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ABSTRACT

Income Equality in the Nordic Countries: Myths, Facts, and Lessons*

Policymakers, public commentators, and researchers often cite the Nordic countries as examples of a social and economic model that successfully combines low income inequality with prosperity and growth. This article aims to critically assess this claim by integrating theoretical perspectives and empirical evidence to illustrate how the Nordic model functions and why these countries experience low inequality. Our analysis suggests that income equality in the Nordics is primarily driven by a significant compression of hourly wages, reducing the returns to labor market skills and education. This appears to be achieved through a wage bargaining system characterized by strong coordination both within and across industries. This finding contrasts with other commonly cited explanations for Nordic income equality, such as redistribution through the taxtransfer system, public spending on goods that complement employment, and public policies aimed at equalizing skills and human capital distribution. We consider the potential lessons for other economies that seek to reduce income equality. We conclude by discussing several underexplored or unresolved questions and issues.

Keywords: Nordic Model, facts and myths

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1 Introduction

In recent years, economic and social inequality has risen to the top of the agenda of politicians, commentators, and social scientists. Policies considered radical only a few years ago, such as subsidized and readily available daycare, generous parental leave policy, universal health care, free college, and strong labor rights and unions, are now being debated, proposed, or implemented in many developed countries, including in the U.S. Advocates of such reforms often point to the Nordic countries where these policies have been in place for decades. The Nordics, it is argued, have found a social and economic model that combines low income inequality with prosperity and growth. The goal of this article is to critically examine this argument by combining theory and evidence to characterize how the Nordic model works, investigate why these countries have low inequality, and discuss what lessons, if any, can be learned for other economies.

In Section 2, we provide an overview of the social and economic model of the Nordic countries.[1] We argue that the contemporary Nordic model is built on four principal pillars: (i) significant public investment in family policies, education, and health services; (ii) coordinated wage-setting within and across industries; (iii) substantial expenditure on social insurance to safeguard against income losses due to unemployment, disability, and illness; and (iv) high and progressive taxation of labor income, complemented by subsidies for services that support employment.

In Section 3, we present key facts and debunk some myths and misconceptions about income equality in the Nordic countries. Our analysis focuses on the Nordic countries, the U.K., and the U.S. Although all these countries are advanced market economies with relatively high income per capita, they differ significantly in terms of inequality. The U.K. and the U.S. are at one extreme among OECD countries, exhibiting very high income inequality. The Nordic countries represent the other extreme with a much more compressed income distribution. Our analysis in Section 3 explores what can and cannot statistically explain or account for the large discrepancies in income inequality between these nations.

A key finding is that a more equal predistribution of earnings, rather than income redistribution, is the main reason for the lower income inequality in the Nordic countries compared to the U.S. and the U.K. While the direct effects of taxes and transfers contribute to the relatively low income inequality in the Nordic countries, the key factor is that the distribution of pre-tax market income, particularly labor earnings, is much more equal in the Nordics than in the U.S. and the U.K.

Another key finding is that equality in hourly pay, not work hours, is the primary explanation for why the Nordic countries have much lower inequality in labor earnings than the U.S. and the U.K. Qualitatively, earnings inequality is relatively low in the Nordic coun-

[1]The term "Nordic model", which is sometimes referred to as the "Scandinavian model" or even more narrowly as the "Swedish model," pertains to the economic and social policies of certain Northern European nations. These Nordic countries include Denmark, Norway, Sweden, Finland, and Iceland. In our analysis, we concentrate on the first four countries, excluding Iceland due to its relatively small economy, unique characteristics, and insufficient data availability.

tries both because of a compression of the hourly wage distribution, a lower dispersion in hours of work, and a smaller covariance between hours of work and hourly wages. Quantitatively, the compression of hourly wages matters the most, explaining a large majority of the difference in earnings inequality between the Nordic countries and the U.S. and the U.K.

Third, hourly wage compression within gender, not between men and women, explains why the Nordic countries have a more equal hourly wage distribution than the U.S. and the U.K. While popular and academic discussion of income inequality in the Nordics is often focused on gender equality, the within-gender component of inequality is much more consequential. For example, although the gender gap in hourly wages is about 30 percent lower in the Nordics than in the U.S., it explains less than 2 percent of the difference in the dispersion of hourly wages between the Nordic countries and the U.S.

Motivated by these facts, Section 4 critically examines the evidence base for three popular economic explanations for income equality in the Nordic countries. This discussion contrasts economic theory with existing empirical studies and extensive micro data.

The first hypothesis is that, in the Nordic countries, governments spend heavily on children and families through heavily subsidized daycare, education and health programs. Although these programs are typically universal, they could help equalize the distribution of skills and human capital if the take-up or the positive effects of the program are concentrated among children from poor or disadvantaged families.

We argue that most of the available evidence suggests that this is not the key explanation for income equality in the Nordics. A substantial body of research evaluating the causal effects of daycare, education, and health policies in the Nordics suggests that these policies have a relatively modest impact on inequality in skills, educational attainment, and labor market outcomes.[2] Consistent with these findings, the observed distributions of education and skills are relatively similar between the Nordic countries, the U.S. and the U.K. In contrast, the wage premium for education and skills is twice as large in the U.S. and the U.K. as it is in the Nordics. We show that differences in the wage premium for education and skills are the key factor in statistically explaining the wage equality in the Nordic countries as compared to the US and the U.K.

The second hypothesis posits that although the Nordic countries have relatively high and progressive income taxes, which might discourage labor supply, they also subsidize services that are arguably complementary to working, such as daycare and other family-friendly policies. These policies act as subsidies to the costs of market work, particularly at the extensive margin, which may both increase labor force participation and reduce inequality in hourly wages by decreasing dispersion in learning and experience in the labor market. However, the findings of a growing body of research that evaluates the effects of subsidized daycare and other family policies are in conflict with this hypothesis. The reported impacts on employment and earnings tend to be small. For example, subsidized daycare appears to primarily replace other forms of out-of-home care used by working mothers, resulting in

[2]This is, of course, not an argument against these policies. The benefits may well exceed the costs, even if they do not matter greatly for income inequality.

little to no increase in maternal employment or earnings.

The third hypothesis we consider is that income equality in the Nordics is primarily attributed to the method of wage setting. In the Nordic countries, the collective bargaining system typically adopts a two-tier structure, starting with sectoral bargaining of wage floors or base wages followed by local bargaining at the firm level. Importantly, there tends to be strong wage coordination both between and within industries. We argue that both theory and data suggest that this coordination significantly compresses the distribution of wages compared to the distribution of labor productivity.

The argument that income equality in the Nordics is primarily a result of wage compression attained through coordinated wage-setting begs the questions: What is the impact on productivity and growth? Why can't we all be more like the Nordics? Or can we?

In Section 5, we discuss two opposing views on these questions. One view is that the Nordic model's ability to sustain high income and growth depends inherently on other countries choosing an economic system with higher inequality, giving stronger incentives to innovate. Therefore, it is argued, we cannot all be as prosperous and equal as the Nordic countries.

The other view is that wage compression and social insurance stimulate innovation, productivity, and growth for reasons that are not necessarily specific to the Nordic countries. One stated reason is that wage compression increases the cost of low-skilled labor and lowers the price for high-skilled workers, thereby affecting the profitability of new technology and potentially driving out firms using inefficient technologies from the market. Another stated reason is that wage compression and social insurance serve as effective mechanisms for sharing risk and compensating workers affected by the negative effects of structural change. This may reduce the social and political barriers to new technology, international trade, and competition in domestic markets. We make the case that empirical research to date has been limited in its ability to distinguish between these two views, and most of what we know is correlational or circumstantial.

In Section 6, we conclude the article by discussing several underexplored or unresolved questions and issues. We argue that real progress on many of these questions and issues necessitates advances in both theory and measurement. This will require a shift in empirical research towards careful modeling of labor markets and wage-setting institutions and tighter connections between data and theory.

Our article builds on a large body of theoretical and empirical work. Throughout the article, we will critically review a number of studies that offer theory or evidence on or related to income equality in the Nordics. At the outset, however, it may be useful to make clear how our paper relates to some highly influential work in economics on the Nordic model. Lundberg (1985) and Lindbeck (1997) discuss the Nordic model with particular emphasis on the Swedish economic performance after World War II. The authors paint a dark picture of the Nordic model, questioning its sustainability,and predicting its demise. The reports of its death were greatly exaggerated. The Nordic model has evolved and adapted over time, yet

we will argue that its key pillars and apparent success remain largely unchanged. Today, Nordic countries continue to stand out as both economically prosperous and comparatively equal among developed nations.

In the remainder of this article, we explain why the Nordic countries continue to have so low income inequality and discuss the lessons, if any, for other countries. Both the focus and the content of our article differ from the review and discussion of the Nordic model in Andersen et al. (2007); Barth et al. (2014); Kleven (2014); Acemoglu et al. (2017); Bhuller et al. (2022). Our focus is centered on economic equality, not the (macro)economic performance, the functioning of the labor market, or the political economy of the model. Our perspective is also more eclectic and empirical, entertaining several competing hypotheses for the apparent success of the Nordic model, and using both existing empirical studies and rich micro-data to critically assess these hypotheses.

2 The Nordic model in a nutshell

The Nordic model today has four main features: (i) significant public investment in family policies (universal parental leave and daycare), education, and health services; (ii) highly coordinated wage-setting within and across industries; (iii) substantial expenditure on social insurance to safeguard against income losses due to unemployment, disability, and illness; and (iv) high and progressive taxation of labor income, complemented by subsidies for services that support employment.

Before discussing these pillars, we present a snapshot of the current state of the Nordic economies.

2.1 A snapshot of the Nordic countries and economies

In Table 1, we present key summary statistics of the population and economies in the Nordic countries, the U.K., the U.S., and the OECD average.

Denmark, Finland, Norway, and Sweden have relatively small population size. In total, there are approximately 26 million people living in the Nordics. Sweden, with around 10 million inhabitants, is roughly twice the size of the other Nordic countries: Denmark, Finland, and Norway. Demographically, the Nordic countries are broadly comparable to other European countries. Approximately 65% of the population are of working age. The fertility rate is about 1.6, which is comparable to the OECD average.

There is a common misconception that the populations in the Nordic countries are ethnically homogeneous. In 2021, for example, both Norway and Sweden recorded a higher share of the population born in a foreign country than the U.K. and the U.S. About half of these people were born in nonwestern countries. However, the increase in immigration started in the 1970s, after the birth of the Nordic model. In recent decades, there has been growing public concern about the potential impact of non-Western immigration on the welfare state and social cohesion in these countries (Brochmann and Hagelund, 2012).

The Nordic countries have a relatively well-educated and healthy population, with life expectancy surpassing 83 years in Sweden and Norway, 82 years in Finland, and 81.5 years in Denmark as of 2019. In comparison, the U.S. reports a significantly lower life expectancy of around 76.4 years. The Nordic countries consistently rank at the top in global comparisons of quality of life indicators.[3]

The Nordic economies are often described as small, open economies with a significant public sector presence. Finland exports just under 50% of its GDP, while the other three countries export half or more of the goods and services they produce. The composition of exports varies considerably: Finland's exports include machinery, electronics, paper products, and chemicals; Norway's exports are predominantly oil, gas, and fish; Sweden exports a substantial amount of manufactured goods; and Denmark is a leading exporter of chemical products, particularly pharmaceuticals.

Despite the differences in industry structure, all the Nordic countries are relatively prosperous and productive. For example, the average incomes in the Nordic countries are above the OECD average and not far below the average income in the U.S. In Norway, GDP per capita is slightly higher than in the U.S. In Denmark and Sweden, the GDP per capita was around 13 percent and 16 percent lower than in the United States. However, Sweden is still a relatively rich country, with a GDP per capita considerably higher than in the U.K. and the OECD average. Even Finland, the poorest Nordic country, has a higher GDP per capita than the U.K. and the OECD average.

It is instructive to decompose GDP per capita into labor productivity, as proxied by GDP per work hour, and labor quantity, as measured by work hours per capita. This decomposition shows that the Scandinavian trio (Denmark, Norway, and Sweden) is at least as productive as the U.S., and considerably more productive than the U.K. and the OECD average. Finland, while more productive than the U.K. and the OECD average, lags considerably behind the Scandinavian countries in terms of productivity.

The breakdown of GDP per capita also reveals that the higher average income in the U.S. compared to Sweden and Denmark is primarily due to the greater quantity of labor supplied rather than higher labor productivity. On average, Americans work over 200 hours more per year than workers in the Nordic countries. The labor quantity in the Nordics is also low compared to the United Kingdom and the OECD average. This is because of fewer work hours per worker, not lower rates of employment or labor force participation. In fact, the employment rate in the Nordic countries is several percentage points higher than in the U.K., the U.S., and the OECD average. This difference largely stems from higher rates of female labor force participation in the Nordics compared to other developed countries.

[3]In the 2022 Human Development Index (HDI) rankings, which evaluate countries based on longevity, education, and GDP per capita, Finland holds the 12th position, while Sweden and Denmark share the 5th spot, and Norway ranks 2nd globally. The Legatum Prosperity Index, which assesses over 300 variables encompassing various aspects of quality of life, places Finland, Denmark, Sweden, and Norway in the top four positions, respectively.

Table 1: Demographics and Economics

	Nordics Average	Denmark	Finland	Norway	Sweden	United Kingdom	United States	OECD Average
Demographics								
Population (millions)[1]	7.4	5.8	5.5	5.3	10.3	66.8	328.3	35.9
Working-age population (millions)[2]	4.2	3.4	3.1	3.2	5.8	38.8	192.6	21.1
Old-age dependency ratio[3]	35	34	39	29	35	32	28	29
Fertility rate[4]	1.6	1.7	1.4	1.5	1.7	1.6	1.7	1.6
Foreign born residents (percent)[5]	14	10	7	15	19	14	14	14
Non-western immigrants (percent)[6]	46	43	32	45	54	54	87	65
Social trust[7]	.68	.74	.68	.72	.63	.43	.37	.37
Life satisfication[8]	7.5	7.5	7.9	7.3	7.3	6.8	7.0	6.7
Economy								
Total GDP (billions)[9]	384	306	253	333	524	2,984	20,137	1,548
GDP per capita (thousands)[10]	53	53	46	62	51	45	61	43
GDP per work hour[11]	72	74	62	83	71	59	72	52
Work hours per capita[12]	727	709	742	752	717	755	842	825
Work hours per worker[13]	1,446	1,371	1,538	1,419	1,453	1,537	1,742	1,742
Labor force participation[14]	.91	.90	.88	.89	.94	.88	.85	.83
Employment rate[15]	.86	.85	.82	.86	.88	.85	.82	.79
Public sector employment[16]	.28	.28	.25	.31	.29	.17	.16	.19

Notes: This table presents demographics and economic productivities of each country. [1−3] Working-age population is defined as population aged 20-64. Old-age dependency ratio is the number of individuals aged 65 and older, divided by the number of working-age population. Source: OECD.Stat Demography and Population, sample year 2019. [4] Fertility rate is defined as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years. Source: OECD.Stat Family database, sample year 2019. [5] Foreign born resident is the proportion of foreign-born residents among residents of all ages in each country. Source: OECD.Stat Education and Training, sample year 2018. [6] Non-western immigrants is the proportion of immigrants born in non-western countries (Africa, Asia, or Latin America and the Caribbean) among all immigrants aged 15-64 in a country. Source: Indicators of Immigrant Integration 2018, OECD, sample year 2015-2016. [7] Social trust is defined as the percentage of individuals agreeing with the statement "most people can be trusted." Source: Joint European Values Study / World Values Survey 2017 - 2022 Dataset. [8] Life satisfaction evaluates individuals' general satisfaction of their life as a whole. Source: Better Life Index 2020. [9−13] GDP values are in 2015 PPP US dollars. GDP per work hour is defined as GDP divided by total hours worked by all workers in a country in one year. Work hours per capita is defined as total hours worked divided by the population in a country. Work hours per worker is defined as total hours worked divided by the number of workers in a country. Source: OECD.Stat Productivity, sample year 2019. [14−15]Labor force participation rate is the number of (employed + unemployed) divided by number of working-age population. Employment rate is the number of employees divided by the number of working age population. Source: OECD.Stat Labour, sample year 2019.[16]Fraction of total employment that consists of workers employed in the public sector. Sample year 2021, Source: OECD (2023a)

2.2 Key pillars of the Nordic model

2.2.1 The Welfare State

The Nordic countries are a paradigmatic example of a social democratic welfare system (Esping-Andersen, 1990). A defining feature of this welfare model is that the government offers a wide range of social services and benefits to citizens, such as universal rights, regardless of individual needs, education, or occupational background. These services and benefits are not only universally available but also widely used. Spending levels per user tend to be relatively high, with the goal of achieving high and homogeneous standards of services and benefits, independently of where people live and their income and family background.

In the following, we outline key characteristics of the social democratic welfare system,

focusing on how it provides services and benefits at various stages of life: before entering the workforce, during working years, and after experiencing unemployment or health-related setbacks.[4] However, before delving into these characteristics, we first present a timeline of the main developments in the Nordic welfare states.

Time-line for the development of core elements of the Nordic Welfare states

In Figure 1, we present a timeline showing a few key institutions that shape the Nordic welfare states. The emphasis is on the universal scope of these services, especially in social security, healthcare and core family policies like daycare and maternity leave.

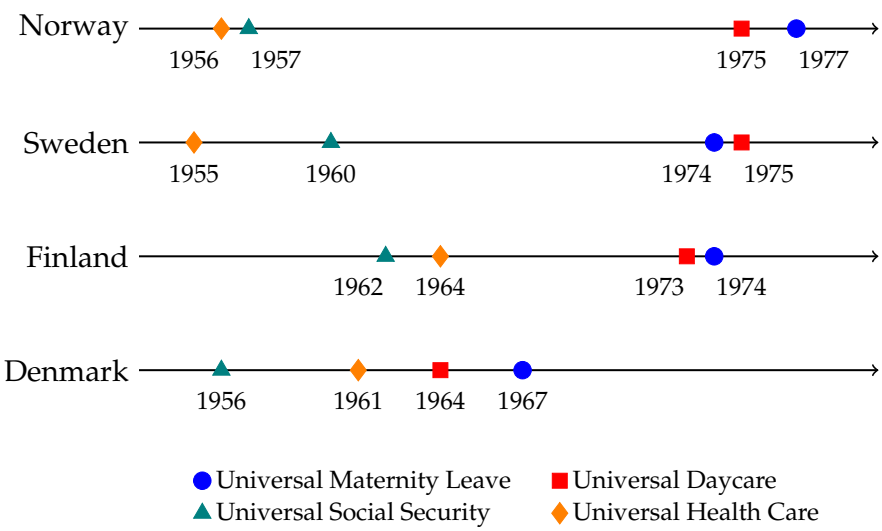


Figure 1: Timeline of Introduction of Social Policies in Nordic Countries (1950-2000)

Notes: This timeline represents the introduction of key social policies in the Nordic countries. Each point reflects the year a policy was enacted.

The foundations of the Nordic welfare state as we know it were established in the 1930s, coinciding with the rise of social democratic parties.[5] However, the most significant progress came during the "Golden Age" of the welfare state, beginning in the 1950s. As shown in the timeline, key elements, such as universal social security and health care, were in place in the Nordic countries in the late 1950s or early 1960s.

This timeline in Figure 1 focuses on the initial establishment of universal programs funded by federal taxes, However, versions of these programs have an earlier history (Christiansen et al., 2006). For example, the foundation for universal health care — particularly infant care — was laid as early as the 1930s in Sweden, Denmark, and Norway, forming the basis for more comprehensive health programs later on (Wüst, 2022). Social security programs were also initiated during the 1920s and 1930s, although they were often means tested and

[4]This description is admittedly cursory, for the sake of brevity. For more detailed accounts of institutions across Nordic countries, we refer the readers to Nomesco-Nososco (2024).

[5]For a broader description and discussion of the historical development and evolution of the Nordic welfare model, we refer to Christiansen et al. (2006).

funded through local taxation.[6]

The next major development in the Nordic welfare states was the introduction of universal daycare access and family leave policies. As shown in the timeline, Denmark led the way in providing universal access to daycare and paid maternity leave (Datta Gupta and Simonsen, 2010; Rönsen and Sundström, 2002), with the other Nordic countries following suit in the 1970s (Huttunen and Troccoli, 2024; Datta Gupta et al., 2008; Havnes and Mogstad, 2011a; Carneiro et al., 2015; Liu and Skans, 2010). A key feature of parental leave reforms was the legal guarantee of paid maternity leave for a set period, typically around 10 weeks. Although maternity leave existed earlier, it was unpaid or provided through employer schemes, voluntary sickness leave, or union negotiations. In the 1970s and 1980s, daycare services were subsidized, but access was limited. It was not until the 1990s, and in some cases the early 2000s, that daycare achieved near-universal availability. Initially, parents covered a large portion of daycare fees, with government subsidies accounting for about 50% or less of the costs. Paternity leave was first introduced in Denmark in the mid-1980s and gradually expanded to other Nordic countries during the 1990s.

The expansion of publicly provided (primary, secondary, and higher) education is not included in the timeline in Figure 1, as it is difficult to trace back to an exact year. It typically expanded gradually over time, often in different years in different areas. The origins of the system can be traced back to the 1930s when pioneering primary education initiatives were launched. In the post-war period, comprehensive plans were formulated to overhaul the education system in all three countries. These plans were gradually put into action, beginning in the 1950s (Rust, 1989; Acemoglu et al., 2021). The reforms included the extension of mandatory schooling, the improvement of access to higher education, and the expansion of the education system at all levels. Initially, scholarships were means tested, but over time the system shifted to a universal model, ensuring wide access to education for all citizens.

Current status of universal family policies, education, and health services

Equality of opportunity is a core motivation behind the wide range of universal programs that support people from the cradle to the grave. In Table 2 we provide an overview of some notable characteristics of current programs.

[6]In Sweden, most unemployment insurances are administrated by labor unions. However, it is typically possible to sign up for unemployment insurance without being member of a labor union.

Table 2: A brief summary of key features of Scandinavian welfare policies.

	Health care		Family Policy		Education Policy			Transfers	
	Child	Family	Parental leave	Daycare	Primary	Secondary	Higher	Unemployment	Disability
Denmark									
Eligibility/Coverage	Universal	Universal	Universal	97% age 2-5, 92% age 1-2	Mandatory	Universal	Universal	Universal	Universal
Costs/Replacement	Free	Free	100% 50 weeks	75% subsidy	Free	Free	Free	80%	60-80%
Finland									
Eligibility/Coverage	Universal	Universal	Universal	86% age 2-5, 74% age 1-2	Mandatory	Universal	Universal	Universal	Universal
Costs/Replacement	Free	Free	70% 56 weeks	80-90% subsidy	Free	Free	Free	67%	55-70%
Norway									
Eligibility/Coverage	Universal	Universal	Universal	97% age 2-5, 91% age 1-2	Mandatory	Universal	Universal	Universal	Universal
Costs/Replacement	Free	Free	100% 49 weeks, or 80% 59 w.	80-90% subsidy	Free	Free	Free	67%	66%
Sweden									
Eligibility/Coverage	Universal	Universal	Universal	95% age 2-5, 85% age 1-2.	Mandatory	Universal	Universal	Universal	Universal
Costs/Replacement	Free	Free	80% 52 weeks, flat 12 w.	90-92% subsidy	Free	Free	Free	70%	64.7%

Notes: Sources Health Policies: OECD (2022). Sources Family Policies: OECD (2023a). Sources Education Policies: OECD (2020), Fredriksson et al. (2005). Sources Transfers : OECD (2020).

Family policy. A cornerstone of the Nordic welfare model is an expansive family policy, characterized by two key components: publicly funded parental leave and highly subsidized daycare services. The primary objective of this family policy is to establish a so-called earner-carer family model, in which both men and women are income earners and caregivers. Another key motivation is to improve the childhood environment for children in all families by providing parents more time with their children and ensuring access to high-quality daycare services. Today, Nordic countries feature some of the most generous parental leave schemes in the OECD area, and nearly all 4 and 5-year-olds use subsidized daycare services. Among 1-year-olds, more than 70% now attend such daycare facilities.[7]

Daycare is heavily subsidized in the Nordic countries. Daycare includes both public and private centers, but all daycare centers are subsidized by the public. Both private and public centers must comply with national regulations with regard to various aspects of care quality.

Health policy. Another essential component of public policy aimed at promoting equal opportunities involves ensuring the universal availability of reasonably high-quality healthcare services. The healthcare systems in the Nordic countries are primarily funded through taxation, with the large majority of healthcare costs being funded through taxes at both the local and federal levels.

General practitioners (GPs) play a pivotal role in the delivery of primary care, offering services to all citizens without significant co-payment as their practices receive government funding. Despite the option of running private practices, GPs must comply with national care regulations and rely on government funding for their operations. Most hospitals are publicly owned and managed, reflecting a universal standardized approach that underscores a commitment to providing high-quality healthcare services to all citizens, regardless of income, employment or place of living.

Child healthcare is prioritized in the Nordic welfare system, starting with "in utero" health checks for pregnant mothers and extending through the early years after birth. The emphasis on early childhood health aligns with the focus of family policies on early childhood investment, offering substantial potential to improve childhood well-being and ensure equal access to care for all.

Education policy. In the Nordic countries, education is free and publicly funded, and there are generally no tuition fees, even in higher education. The overarching objective of the Nordic education system is to foster equal opportunities across all segments of society, addressing both socio-demographic and regional considerations (Sejersted, 2011). This is achieved through centralized school funding and the regulation of curriculum and teacher qualifications at all levels.

The centralized funding model weakens the direct link between the income levels of residents in a school district and the school's financial resources that may arise if schools are financed locally. This aspect is underscored by Herrington (2015), who explores the relationship between household income and public expenditure per pupil in various primary school

[7] As shown in Table 2 daycare utilization is slightly lower in Finland compared to the Scandinavian countries.

districts in Norway and the U.S. His study reveals a noteworthy contrast: Norway directs more public funds per pupil to districts with lower household incomes, whereas affluent neighborhoods in the U.S. tend to have better-funded schools.

After compulsory schooling, ending with middle school at age 16, students choose to enroll in an academic or vocational track in high school. Although every student is guaranteed a spot in some high school, it may not necessarily be in their preferred school or program. Academic high schools prepare students for future university enrollment, while vocational high schools typically offer a combination of educational coursework and apprenticeship experiences (Bertrand et al., 2021).

The mechanism for assigning students to high schools and colleges in the Nordic countries is highly meritocratic. Admission is largely determined by grades and can be highly competitive, especially for the most sought-after programs and universities. The underlying principle is that admission should be based on merits rather than family background and income. Higher education is typically free, and students have the opportunity to receive financial support for living expenses, usually a combination of loans and grants, from government institutions.

Progressive income taxation and work subsidies

The tax level in the Nordic countries has been and is still relatively high compared to many other OECD countries and especially the U.S. The relatively high tax level is the result of the large Nordic welfare state, as discussed above. In 2022, the average tax-to-GDP ratio for the OECD countries was 34% (OECD, 2023b). In particular, all Nordic countries exhibited tax-to-GDP ratios exceeding 40%, with Norway ranking second highest at 44.3%, surpassed only by France. In contrast, the U.S. has a relatively low tax-to-GDP ratio among the OECD countries, at 27 7%.

In the Nordic countries, labor income taxes are relatively high and have a progressive structure. OECD (2023c) measures marginal labor income tax rates for both high and low earnings, with high earnings set at 167% of the average earnings and low wages set at 67% of the average. In 2022 the marginal tax rates in Sweden for high earnings were 66% and 46% for low earnings. Finland taxed high income at a rate 50% and low income at 37%. The corresponding tax rates for Denmark (Norway) are 56 (53) for high earnings and 39 (32) for low earnings. For comparison, the OECD average had marginal tax rates of 46% for high earnings and 41% for low earnings. The marginal tax rate is lower in the U.S., 42.7% for high earnings and 31.5% for low earnings.

Another key tax rate that affects labor supply is the participation tax rate. This rate is relevant for the extensive labor supply margin, determining whether an individual chooses to participate in the labor market or not. The participation tax rate quantifies the share of pretax earnings lost to either taxes or reduced benefits when an unemployed individual finds work. In the Nordic countries, the participation tax rates are relatively high, driven in part by high taxes, but also by relatively generous cash benefits for the unemployed.

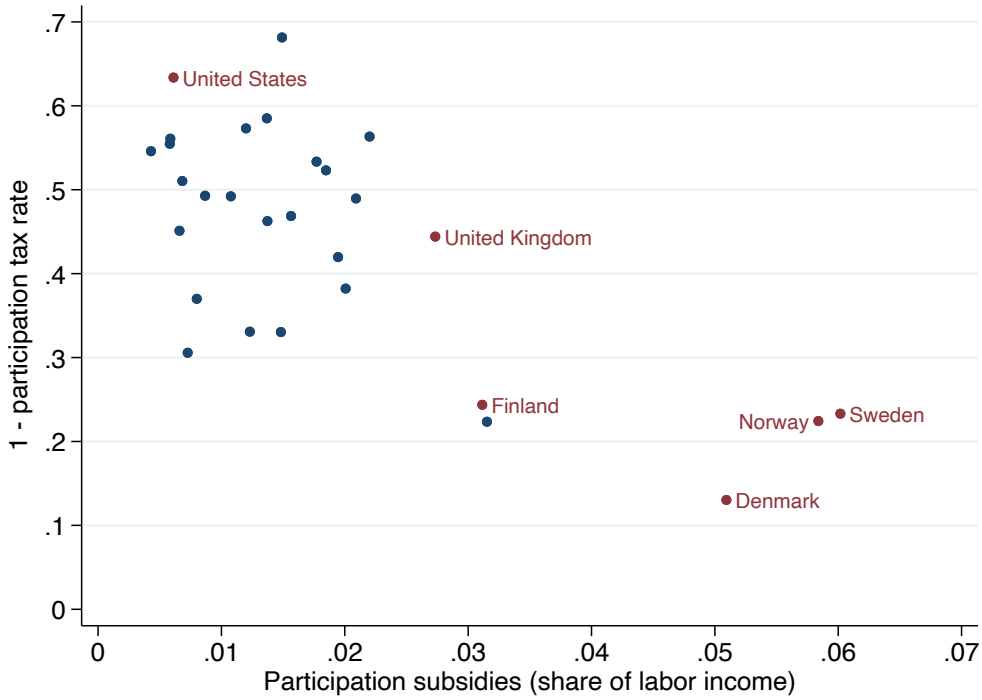


Figure 2: Participation taxes and subsidies

Notes: This figure shows the participation tax rates and participation subsidies for OECD countries, using data from Kleven (2014), which focuses on the Scandinavian countries. Participation subsidy is defined as public expenditures on child-care, pre-school, and elderly. Participation tax rate is a single tax rate that combines income tax rates, payroll tax rates on employees and employers, consumption tax rates and also benefits provided to those not working.

However, as pointed out by Kleven (2014), the total or effective participation tax rates should also include in-kind benefits such as subsidized child care. These policies represent subsidies to the costs of market work, especially at the extensive margin. In Figure 2, we reproduce the estimates of Kleven (2014) of participation tax rates and participation subsidies across countries. It is evident that the high participation tax rates the Nordic countries are accompanied by public subsidies to goods that are complementary to working. Participation subsidies may both increase labor force participation and reduce inequality in hourly wages.

Social insurance against the loss of income due to unemployment and health shocks

The Nordic model includes tax-financed social insurance programs that provide significant financial support to people facing unemployment, temporary illness, and permanent health issues that affect their earning capacity. According to the latest OECD statistics, public spending on work incapacity – due to illness, disability, and occupational injury – constituted approximately 4.5% of GDP in Denmark and Norway, 3.5% in Sweden and 3.2% in Finland. In contrast, the OECD average is around 2%, while the U.S. allocates less than 1% of its GDP to incapacity support.

Although these programs are known as social insurance, they involve a significant amount

of redistribution. The employee's contribution to social insurance comes via the tax bill, is proportional to income, and is not related to the predicted risk of losing jobs or capacity to work. An additional element of redistribution comes from the fact that, although benefits are typically tied to prior earnings, there is a ceiling on the maximum amount one can receive. In the case of unemployment benefits, the after-tax replacement rate for individuals who were previously earning an average income hovers around 65 percent. It is about the same replacement rate for an average earner who receives disability benefits.

As a last resort, the Nordic welfare states provide need based and means tested social benefits, designed to provide a safety net for individuals who are unable to support themselves through employment or other means. Social benefits typically come into play when other forms of support, such as unemployment or health-related benefits, are exhausted or insufficient. The purpose of social benefits is to prevent individuals and families from falling into extreme poverty and to ensure a basic standard of living for all citizens. These benefits may include financial assistance, housing support, and other forms of aid aimed at those facing severe economic hardship. However, social benefits in the Nordics make up a very small share of total government expenditure on cash transfers and social insurance (Ko and Moffitt, 2022).

2.2.2 Functioning of the labor market

We now discuss the key characteristics of work organization and wage-setting practices in the Nordic countries. Much of the information in this section is based on a recent review article by Bhuller et al. (2022), which offers a more in-depth analysis of wage-setting practices across developed countries.

Wage bargaining and unions

The Nordic countries are known for a two-tier collective bargaining system, with sectoral bargaining of wage floors or base wages followed by local bargaining at the firm level. The setting of wages is coordinated, both within and across industries.

The coordinated wage-setting system came largely as a response to the world crisis in the 1930s. It started with a conflict over wage cuts within the union movement. The conflict was between unions in exporting firms that experienced a large fall in foreign demand, and unions in the non-tradable sector that only indirectly were affected by the foreign demand shock, through sales of inputs to the exporting firms. During the 1930s, workers in the exporting firms had to accept large wage cuts to stem the decline in employment. To convince the unions in the non-tradable sector to take wage cuts to prevent high input prices for exporting industries, employers provided a helping hand: The National Association of Employers intervened with threats of lockout if the workers in the non-tradable sector did not follow the wage moderation of workers in the exporting firms. This was an important step in the process of centralization of authority within the union movement in the Nordic

countries, a process that was encouraged and supported by both employers and the government.

Although the wage-setting practices differ in some respects across the Nordic countries, they all have high union density and a strong degree of coordination in wage bargaining. In a recent review article, Bhuller et al. (2022) argue that a taxonomy of wage-setting practices across countries can be organized around two important dimensions: the extent to which the wage setting is decentralized or collective, and the degree and nature of coordination in the collective wage bargaining. Although the U.K., the U.S., and the Nordic countries are advanced market economies with relatively high GDP, they differ distinctly in both these dimensions.

In Figure 3 (reproduced from Bhuller et al. (2022)), we focus on the first dimension by reporting the share of workers in an economy that are union members (panel a) and the share covered by collective bargaining agreements (panel b). We present trends over time in these measures for various developed countries, including the U.S., the U.K., and the Nordic countries. Unionization varies widely across advanced economies, as shown in Panel (a) of Figure 1, with the highest density rates in the Nordic countries reaching several times the lowest density rates in the U.S. These differences expand from 1980 to 2018, as the share of U.S. and U.K. workers that are union members has steadily declined over time. Indeed, Farber et al. (2021) show that the decline in U.S. union density started in the 1950s. As Figure 1 shows, more than half of the U.K. workforce was unionized in 1980, while about one-fourth of American workers were members of a union. By 2018, the union density is below 20 percent in the United Kingdom and about 10 percent in the U.S.

The decline in union density may seem to suggest that advanced economies have become increasingly decentralized in wage settings. However, such a conclusion would ignore that the share of workers covered by the terms of collective bargaining agreements may greatly exceed union membership. This distinction matters little in the U.S. In contrast, in many Continental European countries and, to some extent in the Nordic countries, the share of workers covered by collective bargaining (including nonunion jobs, firms, and sectors) can substantially exceed union membership. This distinction is rooted in statutes and practices for the extension of collective bargaining agreements to workers or employers who are not themselves members of unions or employer federations. The result of these extensions is that collective bargaining agreements directly influence and coordinate the wage setting for a larger share of the workforce in these countries than the estimates of union density suggest.

In Figure 4 (reproduced from Bhuller et al. (2022)), we focus on the other dimension of wage-setting practices by examining the degree and nature of coordination in the collective wage bargaining systems of 24 advanced economies, again for 1980 (panel a) and 2018 (panel b). The figure shows that even economies with similar shares of unionized workers' bargaining coverage can differ widely in the centralization and coordination of the collective bargaining system. The prevalence of vertical coordination is shown along the y-axis, ranging from predominantly local bargaining (at the firm level) to predominantly central-

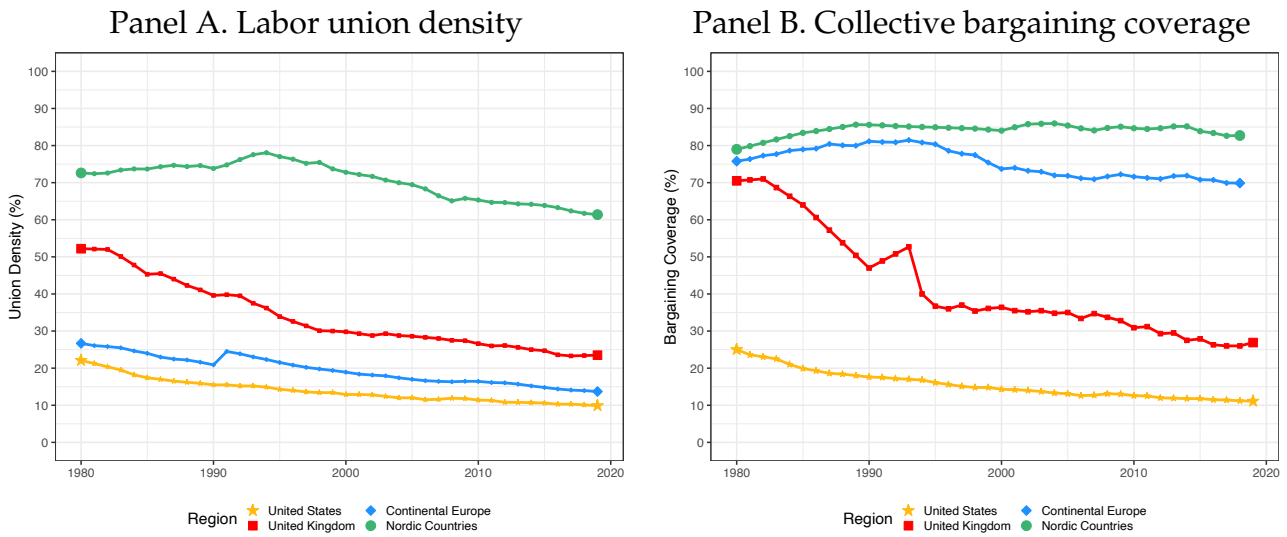


Figure 3: Trends in Union Density and Bargaining Coverage

Notes: This figure shows the fraction of union members (left panel) and the fraction of workers covered by collective bargaining agreements (right panel) between 1980 and 2020 for the United States and selected European countries. "Continental Europe" includes France, Germany, Spain, and Portugal, and "Nordic Countries" includes Norway, Sweden, Denmark, and Finland. Source: Bhuller et al. (2022)

ized bargaining. The degree of horizontal coordination is shown along the x-axis, ranging from little to no coordination to very high coordination across different types of workers. These two types of coordination both represent a centralization of the wage setting, but their implications for the structure and outcomes of the collective bargaining system are not necessarily the same (Bhuller et al., 2022).

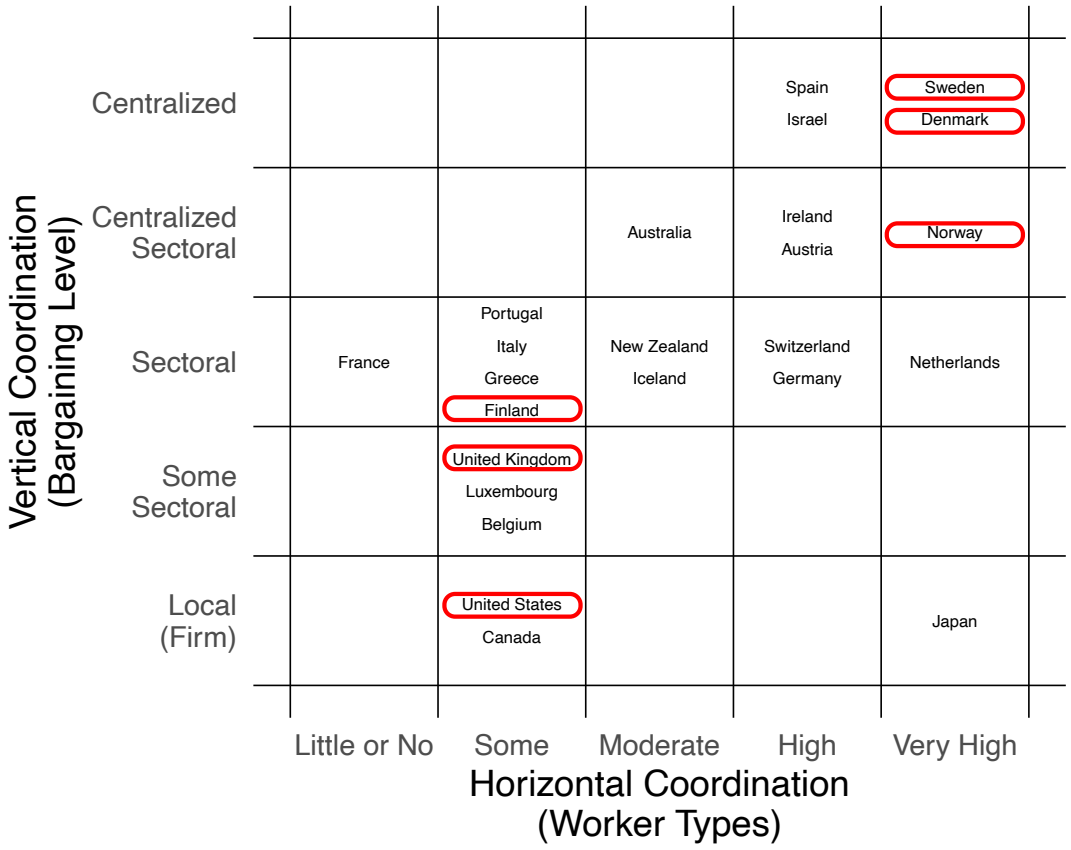
In 1980, most of the countries were located along the diagonal in Figure 4. For instance, in 1980, the Scandinavian trio of the Nordic countries was at one extreme with high degrees of both horizontal and vertical coordination. At another extreme, the U.S. had little coordination, especially horizontally.

A comparison of wage-setting systems in 1980 and 2018 reveals a clear shift toward a decentralization of collective wage bargaining in the Scandinavian countries, marked by a reduction in vertical coordination. Over time, coordination is increasingly occurring through a pattern bargaining system, where manufacturing, as a representative of the trading sector, concludes the first agreement, which determines the norm for wage increases for other sectors to follow (Calmfors, 2025). Although this appears to have reduced vertical coordination, horizontal coordination between worker types remains relatively high in all Nordic countries, including Finland, which experienced an increase in this coordination.

Government involvement in the labor market

Since 1954, the Nordic countries have had a common labor market in which citizens of any Nordic country can work freely within the region. Today, all Nordic countries participate in the common labor market of the European Union and the European Economic Area. Nordic workers have the right to fairly generous unemployment benefits after losing their jobs, and

Panel A. 1980



Panel B. 2018

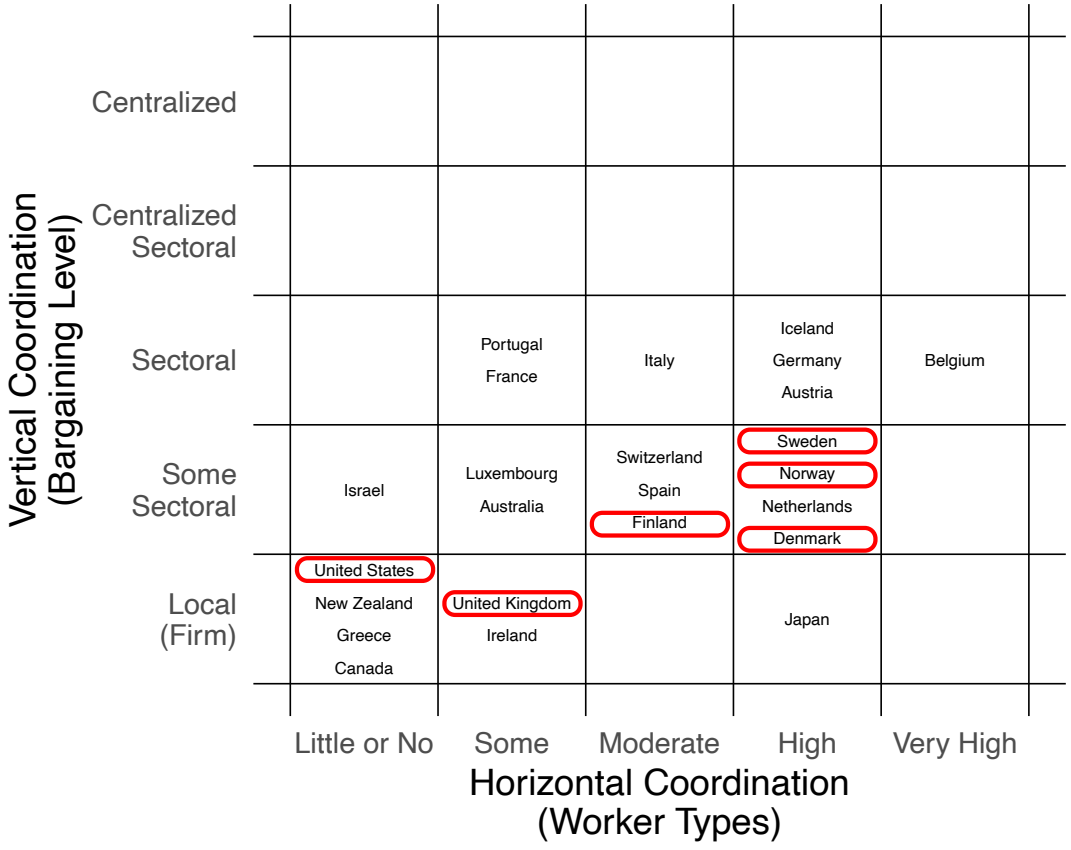


Figure 4: Overview of Wage Setting Systems

Notes: This figure provides an overview of wage setting systems in selected countries as measured in 1980 (panel A) and 2018 (panel B). The prevalence of vertical coordination is shown along the y-axis, and the degree of horizontal coordination is shown along the x-axis. Source: Bhuller et al. (2022)

the government offers education and retraining programs to get unemployed people back to work as quickly as possible.

However, there are some noticeable differences between the Nordic countries in terms of labor market regulations. In Denmark, often associated with the flexicurity model, employers can essentially hire and fire at will, without excessive costs for dismissing employees. In Norway, Sweden, and Finland, regulations surrounding individual and collective dismissals, as well as flexibility in utilizing temporary hiring and subcontractors, play a more important role in employment protection for workers and adjustment costs for firms.

Another relevant feature of the Nordic model is the extensive use of active labor market policies (Card et al., 2010, 2018). These policies are based on the view that the government should take an active role in the labor market, providing employment subsidies, job training programs, and job search assistance to help the unemployed quickly return to work.

The incentive aspect of these programs is particularly relevant in the context of the Nordic welfare state. To manage the costs of generous welfare benefits, it becomes crucial to try to distinguish between those unwilling to seek work and those genuinely unable to support themselves. Mandatory activation requirements could reduce the appeal of welfare, helping to address selection and moral hazard issues associated with generous benefits (Besley and Coate, 1992; Kreiner and Svarer, 2022).

3 Statistical decomposition of the sources of income equality in the Nordic countries

We will now establish key facts and address some myths and misconceptions about income equality in the Nordic countries. Our analysis quantifies the relative importance of various sources of income (in)equality. It is best understood as a descriptive accounting analysis that excludes significant behavioral responses (e.g., labor supply responses to taxes and transfers) and equilibrium considerations (e.g., the simultaneous determination of investments in and returns to skills). In Section 4, we will turn our attention to the underlying economic causes of income equality in the Nordic countries.

3.1 Income Inequality: Predistribution vs. Redistribution

On average, the Nordic countries have a per capita income that is slightly lower but comparable to that of Americans. What stands out, however, is the relatively low income inequality as compared to not only the U.S. but also the U.K. and the OECD average. This is evident from Table 3, showing statistics on income inequality in 2019.[8]

[8]For brevity, we focus on income inequality in a given year. This is because the levels of inequality differ dramatically, not the time trends. Both the Nordic countries, the U.K. and the U.S. have experienced a substantial increase in income inequality over time (OECD, 2015). We chose to focus on 2019 as it is the last year of data before the pandemic.

The first column of this table reports the Gini coefficient for each country, reflecting the distribution of individual disposable income (after taxes and cash transfers) among the working-age population, aged 18-64. The Nordic countries have an average Gini coefficient of 0.27, whereas the Gini coefficient is as high as 0.39 in the U.S. and 0.36 in the U.K. In other words, the Gini coefficient is 12 percentage points (or 30 percent) lower in the Nordics compared to the U.S. This represents a substantial difference in inequality: a 30 percent reduction in the Gini coefficient is equivalent to implementing a 30 percent proportional tax on market income and redistributing the revenue equally among all individuals (Aaberge, 1997).

The second column of Table 3 shows the Gini coefficient for the distribution of individual market income (before redistribution through taxes and cash transfers) among the working-age population. Market income includes labor earnings, self-employment income, and capital income. Inequality in market income is significantly higher than in disposable income in each country, demonstrating that the tax-transfer system plays a substantial role in reducing income inequality. The reduction is the largest in the Nordic countries, reducing the Gini coefficient by 12 percentage points. By comparison, accounting for taxes and transfers reduces the Gini coefficient by 8-10 percentage points in the U.K., the U.S., and the OECD average. This means that taxes and transfers account for about one-third of the differences in inequality between the Nordic countries and the UK. and the U.S. The remainder is due to differences in the distribution of pre-tax market income. Thus, we conclude that while taxes and transfers contribute to the relatively low income inequality in the Nordic countries, the key factor is that the distribution of pre-tax market income is much more equal in the Nordics.[9]

This finding is consistent with previous studies that compare the inequality in disposable income and market income between countries. For example, Blanchet et al. (2022) analyzes economic equality in several European countries and the U.S. using data from the World Inequality Database. Their results suggest that Europe is more equal than the U.S. not primarily due to extensive redistribution, as often argued, but because Europe has a more equitable distribution of market incomes.

A possible concern with these cross-country comparisons of inequality is that the measure of disposable income does not take into account public services that provide in-kind benefits. Aaberge et al. (2017) examine the distributional effects of such in-kind benefits across European countries.[10] For each country, they calculate the Gini coefficient in the distribution of extended income, defined as disposable income plus the value of in-kind benefits, such as subsidized health care and education. By replacing disposable income with

[9]Calmfors (2014) makes a similar observation. He suggests that a likely explanation for the surprisingly low level of redistribution in the Nordic countries is that these countries have high labor force participation rates. Our analysis demonstrates that high labor force participation is not the primary driver of labor income equality in the Nordic countries.

[10]This is a difficult exercise for several reasons. One challenge is that we do not always observe who receives the in-kind benefits. Another challenge is that the unobserved value of these benefits may not be equal to the observed public expenditure. See Aaberge et al. (2019) for a discussion.

extended income, the estimates of inequality become significantly smaller in all countries. However, the reduction in inequality from in-kind benefits is fairly comparable across countries. For example, the Gini coefficient falls by about 5-6 percentage points both in the Nordic countries and the U.K. when in-kind benefits are included in the measure of income.

Another possible concern with cross-country comparisons of income inequality is that it abstracts from how taxes and transfers influence pre-tax market outcomes. For example, income taxation will affect wages, and the extent of this impact depends on labor supply and demand elasticities. To fully understand the effects of a progressive tax and transfer system on income inequality across countries, an analysis of tax incidence across the wage distribution would be very useful. Unfortunately, we are not aware of such an analysis in the study of cross-country income inequality.

Table 3: Inequality in income before and after redistribution

	Gini of disposable income (after redistribution)	Gini of market income (before redistribution)	Difference in Gini	Gini of earnings	Variance of log earnings
Nordic Countries	0.27	0.39	-0.12	0.23	0.23
Denmark	0.27	0.40	-0.13	0.23	0.23
Finland	0.28	0.43	-0.15	0.24	0.22
Norway	0.27	0.39	-0.11	0.25	0.29
Sweden	0.27	0.36	-0.09	0.22	0.20
United Kingdom	0.36	0.45	-0.09	0.37	0.55
United States	0.39	0.47	-0.08	0.38	0.58
OECD Average	0.31	0.41	-0.10	0.31	0.37

Notes: The table presents income inequalities measured by Gini index and variance of log earnings. The sample for gini of income (first three columns) includes populations aged between 18 and 65, year 2019. Redistribution is defined as taxes on income and wealth and transfers from public social security schemes. Market income includes earnings from labor market, self-employed income, capital income, and employment-related social insurance transfers. Disposable income is defined as market income excluding employment-related social insurance transfers and also minus taxes and transfers. The "Nordic countries" values are an average of the four country-level values, weighted by population size of each country. Source: OECD income distribution database. The sample for earnings (last two columns) is from workers aged between 25 and 64 with non-zero earnings in PIAAC data. Earnings are labor market earnings imputed by work hour per week times hourly wages, including bonuses, in PPP corrected USD value. For each country, workers beyond 1st and 99th percentile in earnings are trimmed out of the sample. All values are weighted by sampling weight. Results are not sensitive to changing earnings sample to workers aged between 18 and 65.

3.2 Labor market inequality

Inequality in market income has several distinct sources. One important source is that capital income is highly concentrated at the top of the income distribution. As a result, a large share of national income accrues to the top percentile of individuals. Although this phenomenon is widely studied and undeniably important,[11] inequality in the labor market is

[11]See for example Piketty and Saez (2003); Aaberge et al. (2020)

most consequential for the other 99 percent of people whose market income is mainly derived from paid employment. According to Office (2022), labor income accounts for the majority (approximately 70%) of total income for households outside the top 1%. Similar figures are observed in Norway (Aaberge et al., 2021).

To study the sources of inequality in the labor market, we will use micro-data from the 2012 PIAAC study by the OECD.[12] The study includes data on approximately 4000 adults in each country, chosen as a representative sample of the resident population aged 16-65 years. PIAAC assesses individuals' skills through test results that cover numeracy, literacy, and problem solving. The survey also collects information on the employment and hourly wages of individuals, including bonuses, hours of work, education, gender, and family background.

In Table 3, the two last columns present statistics on the inequality of the labor market using data from PIAAC 2012. Column four reports the Gini coefficient in weekly earnings for individuals of working age.[13] In each country, the inequality in earnings is substantially lower than the inequality in market income, reflecting the strong concentration of capital income. However, the difference in inequality between the Nordics, the U.S., and the U.K. becomes even more pronounced when we focus on labor market inequality. The last two columns show that earnings inequality is much higher in the U.S. and the U.K. compared to the Nordic countries, regardless of whether we measure inequality by the variance of log earnings or the Gini coefficient.

The variance of log earnings is a useful measure of inequality because it simplifies the statistical decomposition of income inequality sources. This measure enables us to assess the relative impact of three factors on the lower inequality of earnings in the Nordics: reduced inequality in working hours, lower inequality in hourly wages, and a weaker correlation between wages and hours worked. In the next subsection, we will empirically analyze the significance of these three factors.

Contribution of hours and hourly wages to earnings inequality

We begin by considering the inequality in hours of work. In Table 4, we compare the inequality in work hours in the Nordic countries, the U.S., and the U.K.. We find that both labor force participation and employment rates are relatively high in the Nordics, especially among women. There is also considerably less variation in hours worked, conditional on working, in the Nordic countries compared to other countries. In particular, there is a lot more variability in hours of work among female workers in the U.S. as compared to the Nordic countries. Taken together, the statistics in Table 4 suggest that both the relatively high employment rate and the low variability in hours of work among those who are em-

[12]See OECD (2013) for a description and documentation of the PIAAC study. The data are widely used to study skills, labor markets, and inequality across countries (see e.g. (Hanushek et al., 2015; Kankaraš et al., 2016).

[13]Our measures of earnings inequality based on the PIAAC data align closely with measures of earnings inequality based on administrative data or tax records (see e.g. Criscuolo et al. (2023)).

ployed contribute to less inequality in work hours in the Nordics compared to the U.S. and the UK.

Table 4: Labor force participation and work hours

	Labor Force Participation	Employment	Work Hours per Person		Work Hours per Worker			Log Work Hours per Worker
	Rate	Rate	Mean	Variance	Mean	Variance	P90/P10	Variance
Nordic Countries								
All	0.85	0.81	30.7	298.5	37.7	71.1	1.63	0.10
Males	0.87	0.83	33.7	294.6	39.9	60.0	1.44	0.08
Females	0.82	0.78	27.8	284.2	35.6	72.6	1.79	0.12
Denmark								
All	0.83	0.78	29.3	313.8	37.0	75.7	1.61	0.11
Males	0.86	0.82	32.6	315.4	39.3	69.8	1.43	0.09
Females	0.80	0.75	25.9	289.8	34.7	71.0	1.79	0.13
Finland								
All	0.81	0.77	29.7	326.2	38.1	58.6	1.50	0.08
Males	0.82	0.78	31.5	352.5	39.9	53.6	1.43	0.05
Females	0.80	0.77	27.9	293.1	36.4	57.5	1.38	0.11
Norway								
All	0.86	0.84	30.8	267.3	36.7	85.3	1.96	0.14
Males	0.88	0.86	34.0	259.8	39.5	64.5	1.47	0.09
Females	0.84	0.82	27.4	253.3	33.8	89.9	2.21	0.16
Sweden								
All	0.87	0.82	32.1	291.1	38.5	67.8	1.53	0.09
Males	0.91	0.86	35.3	269.8	40.4	55.6	1.43	0.07
Females	0.83	0.79	28.9	292.3	36.6	72.7	1.80	0.11
United Kingdom								
All	0.81	0.76	27.7	376.5	36.7	146.2	2.78	0.21
Males	0.88	0.82	33.9	352.2	41.4	101.6	1.57	0.13
Females	0.73	0.69	21.6	326.0	31.7	146.0	2.81	0.24
United States								
All	0.83	0.77	31.0	414.2	41.3	119.2	1.90	0.15
Males	0.89	0.83	36.0	377.6	44.0	97.3	1.71	0.09
Females	0.77	0.71	26.4	403.8	38.7	127.0	2.17	0.20
OECD Average								
All	0.79	0.73	28.7	401.4	39.2	104.3	2.01	0.14
Males	0.86	0.80	33.9	370.7	41.9	81.3	1.54	0.09
Females	0.72	0.66	23.6	368.6	36.1	108.7	2.28	0.18

Notes: The "per person" samples include all individuals aged 25 -64. The "per worker" samples include employed individuals aged 25 - 64, and workers with earnings beyond 1st and 99th percentiles are trimmed out of the samples. Labor force participation rates are calculated as the number of (employed + unemployed) divided by number of (employed + unemployed + out of labor force) individuals. Employment rates are calculated as the number of employed divided by (employed + unemployed + out of labor force) individuals. The "Nordic countries" values are an average of the four country-level values, weighted by population size of each country. All values are weighted by sampling weights.

Next, we consider the inequality in hourly wages. In Table 5, we use the same PIAAC data to compare the inequality in hourly wages (including bonuses) in the Nordics, the U.S., and the U.K. In each country, the measure of wages is converted to purchasing power parity dollars. The level of wages is relatively high in the Nordic countries, consistent with their

high labor productivity. To avoid conflating differences in the levels of wages with inequality in wages, it is useful to focus on the coefficient of variation and the variance of log hourly wages. Both these measures show that the Nordic countries have much less inequality in hourly wages than the U.K. and the U.S.. For example, the variance of log hourly wages is three times higher in the U.S. as compared to the Nordics. This large difference in wage inequality is also evident if we exclude the lowest and highest paid in each country. While the 90th percentile in the hourly wage distribution is about twice as high as the 10th percentile in the Nordics, it is five times as high in the U.S.

Table 5: Wage inequality

	Wages				Log Wages		
	Mean	Standard Dev	Coeff of Variation	P90/P10	Total Variance	Within-Gender Variance	Gender Wage Gap
Nordic Countries	22.1	7.5	0.34	2.29	0.100	0.096	0.13
Denmark	25.4	8.6	0.34	2.20	0.101	0.099	0.09
Finland	19.7	7.2	0.37	2.44	0.117	0.111	0.16
Norway	25.6	9.2	0.36	2.26	0.109	0.103	0.16
Sweden	19.6	6.2	0.32	2.27	0.086	0.081	0.13
United Kingdom	19.5	12.0	0.62	3.51	0.239	0.230	0.19
United States	23.9	15.3	0.64	5.10	0.354	0.345	0.19
OECD Average	16.0	8.7	0.59	3.76	0.257	0.248	0.16

Notes: The sample includes workers aged between 25 and 64. Wages are hourly wages including bonuses, in PPP corrected USD values. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample, except for Sweden and the United States, where only decile means are available and not individual wages. By Law of Total Variance $Var\left(\text{Log Wages}\right) = E\left(Var\left(\text{Log Wages} \mid \text{Gender}\right)\right) + Var\left(E\left(\text{Log Wages} \mid \text{Gender}\right)\right)$, we derive total variance, within-gender variance, and between-gender variance. Gender wage gap is defined as the difference in mean of log wages. The "Nordic countries" values are an average of the four country-level values, weighted by population size of each country. All values are weighted by sampling weights.

So far, we have shown that the Nordics have less inequality than the U.S. and the U.K. in both hours worked and hourly wages. To quantify the contributions of these factors to earnings inequality, we now perform a statistical decomposition. This decomposition expresses the variance of log earnings as the sum of the variance of hourly wages, the variance of hours worked, and the covariance between hours worked and hourly wages.

The results from this decomposition are reported in Table 6. Qualitatively, the earnings inequality is relatively low in the Nordics both because of a compression of the hourly wage distribution, a lower dispersion in hours of work, and a smaller covariance between hours of work and hourly wages. Quantitatively, the compression of hourly wages matters the most, explaining a large majority of the difference in earnings inequality between the Nordic countries and the U.S. and the U.K. For example, over 70% of the difference in the variance in log earnings between the Nordics and the U.S. is explained by the relatively low variance of log hourly wages in the Nordic countries.

Table 6: Contribution of hours and hourly wages to earnings inequality

	Log earnings		Contribution to difference		
	Variance	Difference from variance of United States	Variance of log wage	Variance of log hours	Covariance of log wage and log hours
Nordic Countries					
Workers with positive earnings	.229	-.353	-.254	-.045	-.055
Male workers	.197	-.312	-.243	-.014	-.055
Female workers	.226	-.370	-.256	-.072	-.042
Denmark					
Workers with positive earnings	.227	-.355	-.253	-.038	-.065
Male workers	.213	-.296	-.239	-.004	-.052
Female workers	.216	-.379	-.252	-.068	-.059
Finland					
Workers with positive earnings	.224	-.359	-.237	-.064	-.058
Male workers	.193	-.316	-.231	-.035	-.051
Female workers	.218	-.377	-.237	-.089	-.051
Norway					
Workers with positive earnings	.287	-.295	-.245	-.013	-.038
Male workers	.229	-.280	-.230	.003	-.052
Female workers	.288	-.308	-.253	-.032	-.022
Sweden					
Workers with positive earnings	.203	-.379	-.268	-.055	-.057
Male workers	.174	-.335	-.257	-.018	-.060
Female workers	.203	-.393	-.270	-.085	-.037
United Kingdom					
Workers with positive earnings	.550	-.033	-.113	.058	.023
Male workers	.405	-.103	-.096	.037	-.044
Female workers	.569	-.027	-.133	.046	.061
OECD Average					
Workers with positive earnings	.373	-.210	-.096	-.006	-.108
Male workers	.308	-.200	-.095	.000	-.105
Female workers	.370	-.225	-.097	-.013	-.115

Notes: The decomposition uses the fact that log earnings = log wage + log hours, and thus Var(log earnings) = Var(log wage) + Var(log hours) + 2Cov(log wage, log hours). Earnings are imputed by work hours per week times hourly wages including bonuses, in PPP corrected USD values. The sample includes workers with positive earnings and age between 25 and 64. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample. The "Nordic countries" values are an average of the four country-level values, weighted by population size of each country. All values are weighted by sampling weights.

Comparing the wage structure: Gender wage gaps and firm effects

The strong compression of the hourly wage distribution in the Nordics raises the question of whether the wage structure is systematically different in these countries compared to the U.S. and the U.K.

The gender wage gap is one dimension of the wage structure that receives a lot of atten-

tion in popular and academic discussions of income inequality. In the last two columns of Table 5, we examine the importance of income inequality within and between genders. We find that the gender gap in hourly wages is about 30 percent lower in the Nordics than in the U.S.. By comparison, the within-gender component of inequality is nearly three times larger in the U.S. as compared to the Nordic countries. In Table 7, we show that the differences in the within gender component of inequality are much more consequential than the difference in the gender wage gap. Only 2 percent (or, equivalently, 0.005 percentage points) of the differences in the variance of log hourly wages between the U.S. and the Nordic countries is explained by the gender wage gap. The remaining 98 percent (or, equivalently, 0.24 percentage points) is accounted for by the inequality in hourly wages within gender.

Table 7: Within- and between-gender variations of wages, difference from the U.S.

	Log Wages		Contribution to Difference	
	Total Variance	Difference from Variance of United States	Within-Gender Variance	Between-Gender Variance
Nordic Countries	0.100	-0.254	-0.249	-0.004
Denmark	0.101	-0.253	-0.246	-0.007
Finland	0.117	-0.237	-0.234	-0.003
Norway	0.109	-0.245	-0.242	-0.003
Sweden	0.086	-0.268	-0.264	-0.004
United Kingdom	0.239	-0.115	-0.115	0.000
OECD Average	0.257	-0.097	-0.098	0.000

Notes: The sample includes workers aged between 25 and 64. Wages are hourly wages including bonuses, in PPP corrected USD values. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample. The "Nordic countries" values are an average of the four country-level values, weighted by population size of each country. All values are weighted by sampling weights.

Another dimension of the wage structure that has received a lot of attention in labor economics is inequality in hourly wages between and within firms. For example, a recent OECD report found that around half of the variance of log wages in the U.K. and the U.S. is explained by differences in average wages across firms. By comparison, this between-firm variance component explains about 40% of the variance of log wages in the Nordics (Criscuolo et al., 2023).

Although the between-firm component of wage inequality is broadly similar between the Nordic countries, the U.S., and the U.K., it is difficult to interpret this finding. The reason is that the between-firm component may reflect that some firms (or industries) pay more to workers of the same quality, or that higher paying firms (or industries) employ workers of higher quality. To disentangle these two components and properly describe and compare the wage structure, a large body of work has applied the two-way fixed effect estimator

of Abowd et al. (1999) to matched employer-employee data. This panel data estimator expresses log wages as a sum of worker fixed effects, firm fixed effects, and an idiosyncratic error term. The resulting estimates can then be used to decompose the variance of log wages into the contributions of worker effects (reflecting worker heterogeneity), firm effects (reflecting firm heterogeneity), and the covariance between worker and firm effects (reflecting sorting of high-wage workers to high-paying firms).

A recent study by Bonhomme et al. (2023) applies this method to compare the wage structure in several developed countries.[14] A key finding is that while the overall variance of log wages is much smaller in the Nordic countries compared to the U.S., the wage structure is quite similar. Most wage inequality appears to be driven by differences in worker quality, rather than systematic pay differences across firms or industries (as measured by firm fixed effects). In fact, the contribution of firm effects to wage inequality is relatively modest and similar across countries, ranging from 5-6 percent in the U.S. to around 10 percent in Sweden and Norway. This observation leads to the following question: Why does worker heterogeneity result in significantly higher inequality in hourly wages in the U.K. and the U.S. compared to the Nordics?

4 What explains the economic equality in the Nordic countries?

Motivated and guided by the above findings, we now critically examine three popular economic explanations for low income inequality in the Nordics. This discussion moves beyond the descriptive analysis and accounting exercises of the previous section. Here, we confront economic theory and hypotheses with both causal evidence and rich micro-data.

The first hypothesis is that substantial investments in children's human capital and health have led to a compression of labor skills and productivity in the Nordic countries. According to this view, Nordic workers experience more equal pay compared to their U.S. counterparts because there is less dispersion in worker productivity.

The second hypothesis is that investments in work-complementary services, such as childcare and elderly care, increase labor participation and equalize work experience, thereby making the earnings distribution more equal.

The third hypothesis is that the Nordic wage-setting process, characterized by centralized and coordinated wage bargaining, plays a crucial role in promoting income equality in these countries.

[14] An important contribution of the study of Bonhomme et al. (2023) is that they adjust for the estimation bias that comes from relatively few movers across firms, the so-called limited mobility bias. Otherwise, the estimates of firm effects will be overstated.

4.1 Equalization of skills through public spending on healthcare, child care, and education

The evidence presented above suggests that income equality in the Nordic countries is primarily due to a significant compression of hourly wages. One possible explanation is that the distributions of worker skills and education are relatively equal in these countries. The Nordic countries invest heavily in children and families through subsidized child care, education, and health programs. While these programs are generally universal, they have the potential to reduce inequalities in the pre-labor market distribution of human capital if their uptake or benefits are particularly concentrated among children from poorer or disadvantaged families. Alternatively, the key difference may not lie in the dispersion of skills and productivity but rather in how labor market skills are valued, with the wage premium for skills being relatively low in Nordic countries.

To explore the empirical relevance of these alternative explanations, we conduct two sets of analyses. First, we examine the relative importance of differences between countries in the distribution of education and skills versus the returns to skills in explaining the observed differences in hourly wage inequalities. Next, we critically review existing evidence on the effects of Nordic policies that subsidized child care, education, and health programs, with a particular focus on their equalizing effects on education, skills, and labor market outcomes.

4.1.1 The importance of inequalities in skills versus the returns to skills

In Table 8, we use PIAAC data to present the level and variability of cognitive and labor market skills among individuals aged 25-64. We observe relatively high skill levels in the Nordic countries, which aligns with their high labor productivity. To avoid conflating differences in levels with dispersion, it is useful to focus on the coefficient of variation. This measure indicates that the distribution of cognitive and workplace skills is more unequal in the working-age populations of the U.K. and the U.S. compared to the Nordic countries, although the difference is relatively small when contrasted with wage dispersion. Specifically, the coefficient of variation in work-relevant skills is about 30% higher in the U.S. than the average in the Nordic countries, while the coefficient of variation in hourly wages is nearly twice as large in the U.S. compared to the Nordic countries, as reported in Table 5

If the dispersion in the distribution of productive skills in the Nordics, the U.K., and the U.S. is much more comparable than the dispersion in wages, then it is likely the returns to skills are lower in the Nordic countries. Table 9 confirms this conjecture, showing that the skill premium is about twice as large in the U.S. and the U.K. as compared to the Nordics. In this table, we follow Hanushek et al. (2015) and estimate the following regression model separately for each country using the PIAAC sample of workers aged between 25 and 64.

$$w_i = \alpha + \gamma C_i + \beta \mathbf{X_i} + \varepsilon_i,$$

where w_i is the log of hourly wages, C_i is standardized PIAAC score with mean zero and

Table 8: PIAAC numeracy skills

	Mean	Standard Dev	Coeff of Variation	10th Percentile	90th Percentile	P90/P10
Nordic Countries	288	50	0.17	225	348	1.54
Denmark	287	48	0.17	226	345	1.53
Finland	292	48	0.16	232	351	1.52
Norway	287	51	0.18	224	347	1.55
Sweden	288	51	0.18	222	348	1.57
United Kingdom	272	52	0.19	206	337	1.64
United States	261	58	0.22	185	330	1.79
OECD Average	269	50	0.19	205	330	1.62

Notes: The sample includes workers aged between 25 and 64. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample. We take the full set of plausible values into account.The term 'plausible values' refers to a statistical technique used to estimate individuals' performance on various cognitive skills or competencies when they only complete a subset of tasks on a test (Yamamoto et al., 2013). Following the literature, we report results from the numeracy test of PIAAC (Hanushek et al., 2015). However, we have verified that we find the same pattern in the literacy test and the problem-solving test. The "Nordic countries" values are an average of the four country-level values, weighted by population size of each country. All values are weighted by sampling weights.

variance of one, and $\mathbf{X_i}$ is a vector of individual characteristics, including age, age squared, and indicator variables for immigrant status and females. Table 9 presents two panels: one without controls and one with controls. The association between log wages and skills remains largely consistent between the two panels. In the absence of controls, a one-standard-deviation increase in the PIAAC score corresponds to a 10–12% increase in hourly wages in the Nordics, compared to a 23% and 24% increase in the U.K. and the U.S., respectively. Including controls reduces the skill slope by approximately one percentage point across all countries.

Table 9: Wage regression and skill premium

	Denmark	Finland	Norway	Sweden	United Kingdom	United States
Panel A: without controls						
Skill	0.11***	0.13***	0.13***	0.11***	0.23***	0.25***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Panel B: with controls						
Skill	0.10***	0.12***	0.11***	0.10***	0.22***	0.24***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Is female	-0.08***	-0.15***	-0.13***	-0.12***	-0.14***	-0.14***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.03)
Is immigrant	-0.06***	-0.09**	-0.07***	-0.02	0.10***	0.04
	(0.02)	(0.04)	(0.02)	(0.01)	(0.03)	(0.04)
Has highly educated parent	0.03**	0.04**	0.03**	0.00	0.01	0.07***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.03)
Possess books above median	0.05***	0.07***	0.06***	0.05***	0.03	0.04
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.03)
Observations	3893	2918	2997	2608	4206	2437
R2	0.18	0.23	0.24	0.21	0.25	0.24
Partial R2: Skill	0.08	0.11	0.09	0.09	0.18	0.15

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Notes: The table presents the results of regressing log wages on skills. The sample includes workers with positive earnings and age between 25 and 64. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample. Wages include bonuses, in PPP corrected USD values. Skill is defined as PIAAC numeracy scores standardized within nations, so that each nation has mean zero and variance of one for the scores. We take the full set of plausible values of numeracy scores into account. A worker has a highly educated parent if at least one parent has attained tertiary education. A worker possesses books above median if the number of books at home exceeds the national median. In panel B, we also control for age and square of age. All values are weighted by sampling weights.

In Table 10, we perform a decomposition analysis showing that almost all of the differences in the inequality of hourly wages between the Nordic countries and the U.S. can be accounted for by differences in the skill premium (and other characteristics). In contrast, differences in the composition of the workforce by skills and other characteristics explain little, if anything, in this regard.[15]

Our decomposition mirrors the canonical Oaxaca-Blinder decomposition of differences in means, except that we decompose differences in variances. To briefly explain the decomposition method, some notation is needed.[16] Let Y denote the outcome variable (such as log wages), $\mathbf{X}$ denote the worker characteristics of interest (such as skills), and T be a categorical variable of countries. The cumulative distribution of Y conditional on country k can be

[15]In a comparable analysis, Blau and Kahn (2005) uses microdata from the 1994–1998 International Adult Literacy Survey. Although this data set has smaller samples compared to PIAAC and Blau and Kahn (2005) employs a slightly different decomposition method than the one used in our study, their findings are consistent with ours. They also observed that the high wage disparity in the U,S. is mainly attributed to higher returns to skills

[16]We refer to Firpo et al. (2018) and Rios-Avila (2020) for a detailed explanation of the decomposition method.

written as

$$F_{Y|T=k} = \int F_{Y|X,T=k} dF_{X|T=k},$$

which can be used to calculate distributional statistics $v(F_{Y|T=k})$, such as variance. Denote a given Nordic country by $T = 1$, and we choose U.S. to be the reference country $T = 0$. The difference in variance v between the two countries is

$$\Delta v = v_1 - v_0 = v\left(\int F_{Y|X,T=1} dF_{X|T=1}\right) - v\left(\int F_{Y|X,T=0} dF_{X|T=0}\right).$$

From the above equation, we can see that Δv can arise due to differences in the distribution of $\mathbf{X}$ (that is, $dF_{X|T=1} \neq dF_{X|T=0}$) or differences in the relationships between Y and $\mathbf{X}$ (that is, $F_{Y|X,T=1} \neq F_{Y|X,T=0}$). This mirrors the standard Oaxaca-Blinder decomposition, which compares differences in average characteristics (composition effect) and differences in coefficients (wage structure effect).

To estimate the composition and wage structure effects, we need a counterfactual scenario that incorporates the characteristics of country $T = 1$ and the wage structure of the reference country $T = 0$:

$$v_c = v\left(\int F_{Y|X,T=0} dF_{X|T=1}\right).$$

We follow Fortin et al. (2011) and use the re-centered influence functions method to estimate v_1, v_0, and v_c. Then, the difference in variances of log wages (Y) is decomposed into two components:

$$\Delta v = \underbrace{v_1 - v_c}_{\text{wage structure effect}} + \underbrace{v_c - v_0}_{\text{composition effect}}.$$

The results of the decomposition are reported in Table 10. Panel A reports results when $\mathbf{X}$ only includes skills, corresponding to the first panel of Table 9. Panel B reports results when $\mathbf{X}$ includes the other individual characteristics that we used in the second panel of Table 9. We find that nearly all of the differences in the inequality of hourly wages between the Nordic countries and the U.S. can be accounted for by differences in the wage structure, whereas differences in the composition of the workforce (by skills and other characteristics) explain little if anything. In other words, the compressed distribution of hourly wages in the Nordic countries is primarily because the wage premium associated with observed measures of cognitive and workplace skills is relatively modest, not because of equality in the distribution of these skills in the working age population.

Educational attainment as measures of pre-market skills

A potential concern with the analysis above is that PIAAC test scores for workers aged 25 to 64 reflect both pre-market skills and on-the-job learning. An alternative approach to measuring the variation in skills at the beginning of the labor market is to examine differences in educational attainment. Table 11 compares educational achievements in the Nordic countries and in the U.K. and U.S.. The completion rates for secondary and tertiary education in

Table 10: Oaxaca-Blinder decomposition of variance of log wages

	Denmark	Finland	Norway	Sweden
Variance of log wages	0.101	0.117	0.109	0.086
Difference in variance from United States	-0.252	-0.237	-0.244	-0.268
Panel A: Difference explained by skills				
Wage structure effects	-0.253	-0.237	-0.245	-0.268
Composition effects	0.000	-0.000	0.000	-0.000
Panel B: Difference explained by skills and controls				
Wage structure effects	-0.246	-0.217	-0.241	-0.270
Composition effects	-0.007	-0.019	-0.004	0.003

Notes: The sample includes workers with positive earnings and age between 25 and 64. Wages include bonuses. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample. The skill distribution in a given country is measured by the country's distribution of PIAAC scores; we subtract the scores with country-level means so that each country has a mean of zero. We take the full set of plausible values of numeracy scores into account. Control variables include age, age square, gender, immigrant status, and family background as in Table 9. All values are weighted by sampling weights.

the Nordics and the U.S. are comparable, both notably exceeding the OECD average. Similarly, when assessing average years of schooling, the Nordic countries rank just below the U.S. but exceed the OECD average. When it comes to inequalities in education, we can see that the variation in years of schooling, as measured by the coefficient of variation, is a bit higher in the Nordic countries than in the U.K. but slightly lower than in the U.S.

The PIAAC data enable us to perform a similar decomposition analysis for education as the one we conducted for labor market skills. Specifically, we can estimate and compare wage returns to education and, through a decomposition analysis, identify which factors that contribute the most to the low inequality in the Nordic countries.

Table 12 presents results from regression of individuals' wages on their educational attainment and other characteristics.[17] One year of additional schooling is associated with around 3 to 5% increases in wages in the Nordic countries, while the education premium is at least twice as high in the U.S.[18]

Table 13 reports the results of the decomposition analysis for education, similar to the one we did for the test scores in PIAAC above. The pattern is the same; almost all differences in the inequality of hourly wages between the Nordic countries and the U.S. can be accounted for by differences in the returns to years of schooling, whereas differences in the composition of the workforce by education level and other characteristics explain little of

[17]See Hanushek et al. (2015) for a similar analysis.

[18]Bhuller et al. (2017) make an attempt to identify the causal returns to education by controlling for IQ and using school reforms as instruments. They use data from Norway and find a slightly lower causal effect of schooling on yearly earnings than the association observed in the PIAAC data; 4.5% versus 5%.

Table 11: Inequality in education

	Completion Rate		Years of Schooling		
	Upper Secondary	Tertiary	Mean	Standard Dev	Coeff of Variation
Nordic Countries	91%	44%	13.34	2.54	0.19
Denmark	90%	46%	13.30	2.56	0.19
Finland	91%	52%	13.23	2.92	0.22
Norway	92%	46%	14.71	2.37	0.16
Sweden	90%	37%	12.71	2.40	0.19
United Kingdom	93%	45%	13.33	2.31	0.17
United States	92%	45%	14.01	3.02	0.22
OECD Average	84%	39%	13.10	2.86	0.22

Notes: The sample includes workers with positive earnings and age between 25 and 64. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample. Wages include bonuses, in PPP corrected USD values. Workers without information on International Standard Classification of Education (ISCED) equivalent level are dropped out of the sample as well. Upper secondary completion rate is defined as the percentage of workers whose highest qualification is ISCED level 3 or above. Tertiary completion rate is defined as the percentage of workers whose highest qualification is ISCED level 5 or above. The "Nordic countries" values are an average of the four country-level values, weighted by population size of each country. All values are weighted by sampling weights.

the wage inequality.

There are several possible reasons for the low returns to skills and schooling in the Nordic countries. One possibility is that skills are less rewarded in the labor market because of how wages are set. We discuss this reason in greater detail in the next section. Another explanation could be that higher education is free in the Nordics, reducing the need for firms to offer higher wages to incentivize individuals to invest in education. However, even in the U.S., tuition costs typically constitute a small fraction of lifetime earnings. Furthermore, as we will show in the next section, wages in the Nordic countries are strongly compressed relative to labor productivity, even conditional on observables such as education and age.

Test scores for young individuals

Evaluating knowledge levels and disparities by comparing educational attainments across countries comes with its own problems, mainly due to significant cross-border variations in education quality and systems (Leuven et al., 2004). An alternative approach to gauge the distribution of skills in the labor market is to use internationally standardized tests conducted *before* individuals enter the labor market. For younger individuals, conducting a cross-country comparison of the dispersion in skills relative to the dispersion in returns to skills is infeasible, as they have yet to enter the labor market. However, it is still interesting and relevant for the hypothesis we are examining to compare inequalities in test scores. Table 14 reports PIAAC results for young individuals (aged 16 to 25) and the test results from the PISA test in 2018. The test results for young adults in PIAAC and adolescents in

Table 12: Returns to schooling

	Denmark	Finland	Norway	Sweden	United Kingdom	United States
Panel A: without controls						
Schooling	0.04***	0.05***	0.05***	0.03***	0.07***	0.10***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)
Panel B: with controls						
Schooling	0.05***	0.06***	0.05***	0.04***	0.08***	0.10***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)
Female	-0.12***	-0.22***	-0.17***	-0.16***	-0.22***	-0.23***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Immigrant	-0.14***	-0.20***	-0.17***	-0.08***	-0.09***	-0.04
	(0.02)	(0.03)	(0.02)	(0.01)	(0.02)	(0.03)
High education parent	0.01	0.01	0.01	-0.01	0.00	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Possess books above median	0.04***	0.04***	0.05***	0.06***	0.07***	0.04
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)
Observations	3891	2918	2996	2608	3882	2142
R2	0.23	0.34	0.28	0.20	0.21	0.31
Partial R2: Schooling	0.13	0.23	0.13	0.08	0.14	0.22

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Notes: The table presents the results of regressing log wages on years of schooling. The sample includes workers with positive earnings and age between 25 and 64. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample. Wages include bonuses, in PPP corrected USD values. A worker has a highly educated parent if at least one parent has attained tertiary education. A worker possesses books above median if the number of books at home exceeds the national median. In panel B, we also control for age and square of age. All values are weighted by sampling weights.

PISA show a similar pattern as observed in older workers: the Nordic countries have higher average scores and slightly less variability in test results.

4.1.2 The limited effect of early interventions for inequality

The analyses above strongly suggest that equality in the Nordic countries is predominantly due to the modest wage premiums of educational attainment and skills, rather than an equal distribution of education and skills. A possible concern is that the observed measures of skills and education may not adequately reflect individuals' actual productivity in the labor market. Therefore, we cannot rule out the possibility that public spending on healthcare, daycare, and education also contributes to income equality by equalizing the distribution of *unobserved* skills in Nordic countries. Unfortunately, we lack comparable measures of non-cognitive or social skills across countries to explore this possibility comprehensively.

An alternative, though admittedly imperfect, approach is to assess the existing evidence on the effects of these pre-market policies, with a particular focus on their equalizing effects. There is a rich body of research from Nordic countries, especially Denmark, Norway,

Table 13: Decomposition of differences in variance of log wages

	Denmark	Finland	Norway	Sweden
Variance of log wages	0.101	0.117	0.109	0.086
Difference in variance from United States	-0.268	-0.252	-0.260	-0.283
Panel A: Difference explained by schooling				
Wage structure effects	-0.258	-0.242	-0.264	-0.260
Composition effects	-0.010	-0.010	0.005	-0.023
Panel B: Difference explained by schooling and controls				
Wage structure effects	-0.250	-0.219	-0.258	-0.265
Composition effects	-0.018	-0.033	-0.001	-0.018

Notes: The sample includes workers with positive earnings and age between 25 and 64. Wages include bonuses, in PPP corrected USD values. Workers with wages beyond 1st and 99th percentiles are trimmed out of the sample. Schooling is measured as years of schooling. Control variables include age, age square, gender, immigrant status, and family background as in Table 12. All values are weighted by sampling weights.

Table 14: Test scores before entering the labor market

	PIAAC, age 25 and below				PISA, age 15 - 17			
	Mean	Std Dev	Coeff of Var	P90/P10	Mean	Std Dev	Coeff of Var	P90/P10
Nordic Countries	285	45	0.16	1.47	505	87	0.17	1.58
Denmark	278	46	0.16	1.50	509	82	0.16	1.53
Finland	291	43	0.15	1.45	507	82	0.16	1.53
Norway	279	46	0.16	1.52	501	90	0.18	1.62
Sweden	289	44	0.15	1.45	502	91	0.18	1.62
United Kingdom	266	48	0.18	1.58	502	93	0.19	1.63
United States	256	48	0.19	1.64	478	92	0.19	1.68
OECD Average	267	45	0.17	1.56	488	90	0.19	1.64

Notes: We look at scores of numeracy skills in PIAAC and math scores in PISA. We take the full set of plausible values of scores into account. The PIAAC, workers with wages beyond 1st and 99th percentiles are trimmed out of the sample, and then we select the age groups. The PISA sample includes every student in the data, whose birth years range from 2001 to 2003. The "Nordic countries" values are an average of the four country-level values, weighted by population size of each country. All values are weighted by sampling weights.

and Sweden, analyzing the causal impacts of various health, child care, and education policies. This research combines high-quality register data with modern econometric techniques combined with natural experiments in an attempt to credibly identify causal policy effects on child outcomes in both the short and long(er) run. Our review of this literature focuses on discerning whether children of low-income families are the primary beneficiaries of these policies.

Parental leave and daycare policies

There is a growing recognition within the field of economics that events in the early stages of life can significantly influence later outcomes (Cunha and Heckman, 2009). Cunha et al. (2010) develop and estimate a model of human development that spans multiple stages of interaction and investments. Their analysis demonstrates that early investments exert considerable influence on future outcomes. The cognitive skills a child develops later in life depend on the cognitive and non-cognitive skill foundation established during the early stages. With dynamic complementarities, even modest policy interventions in early childhood can produce notable and lasting accumulated effects.[19]

Parental leave. A key premise behind instituting tax-funded parental leave is that such programs can positively influence child development by giving parents more time to spend with their children. Multiple studies, utilizing comprehensive panel data and advanced econometric methods, have investigated the effects of introducing or extending family leave policies in Scandinavia on children's outcomes. The overarching finding from this body of research is that family and health policies in the Nordic countries do have an effect on the educational and labor market outcomes of children, especially for children with a low SES background. However, these effects do not appear to be large enough to affect income inequality to a large extent.

Rasmussen (2010) study the long-term educational effects on children of increasing parental leave from 14 to 20 weeks. To identify the causal effect of the reform, the study employs a regression discontinuity design. This approach involves comparing a population sample of children born just before and shortly after the reform, which was implemented in 1984. The study does not find a measurable effect on long-term educational outcomes of children. A parallel study conducted in Sweden, which examined the extension of parental leave from 12 to 15 months, similarly finds no discernible effect on children (Liu and Skans, 2010). Dahl et al. (2014) utilizes several policy reforms that extended parental leave in Norway after its main introduction. They find no effect on child outcomes. These results align with the findings of a wide range of settings and countries on how parental leave impacts later outcomes for children (Dustmann and Schönberg, 2012). An exception is Carneiro et al. (2015). They study the introduction of up to 18 weeks of paid leave in Norway and find a significant decrease in high school dropout rates, especially among poorly educated mothers. A possible explanation for their positive findings is that they investigate parental leave in the first weeks after the child is born, while the other studies focus on extensions of leave.[20]

Daycare. Universal daycare or preschool programs are a key element of the Nordic model. These programs have also been extensively evaluated in the literature. The primary conclusion is that universal access to high-quality daycare services has played a role

[19] A substantial body of evidence highlights that adverse events experienced early in life can have enduring and detrimental effects on health, the accumulation of human capital, and later-life economic outcomes (Almond et al., 2018; Barker, 1992; Heckman, 2006; Black et al., 2007).

[20] Lillebo et al. (2023) question the findings in this study. One of the issues they raise is that it overlooks that a transitional leave arrangement for some women was already in place before the reform. See Carneiro et al. (2023) for a response to the critique.

in achieving equal opportunities between socioeconomic groups. Numerous studies consistently report favorable outcomes for low socioeconomic status (SES) children, including improvements in school readiness, test scores, education, and labor market outcomes.

Bingley and Westergaard-Nielsen (2012) examine the impacts of preschool expansions in Denmark, revealing positive outcomes in terms of adult education and earnings between the ages of 22 and 30. In particular, these effects are more pronounced in children of the disadvantaged or middle class.

Havnes and Mogstad (2011b) study the effects of the expansion of publicly subsidized high-quality formal daycare in Norway, initiated in the mid-1970s. The reform unfolded gradually across 400 municipalities, leading to temporal and spatial variations in daycare expansion. The paper employs a difference-in-differences approach to assess the impact of access to formal daycare. The findings reveal significant positive effects on children's adult outcomes, measured in their early 30s. These effects extend to both educational attainment and labor market engagement, as well as a reduction in welfare dependency. The study further conducts a sub-sample analysis, indicating that the majority of the educational impact is observed among children with low-educated mothers.

A follow-up study conducted by Havnes and Mogstad (2015) confirms that attending daycare positively impacts future earnings of children of low socioeconomic status (SES) backgrounds. In contrast, for children from high-SES backgrounds, the study finds a decline in future earnings associated with daycare attendance. The authors suggest that children from economically disadvantaged families derive more benefits from the introduction of formal daycare, attributed to the inferior quality of informal daycare alternatives. Another study by Black et al. (2014) concentrates on daycare subsidies for low-income parents, revealing positive impacts on children's performance in middle school.

Health care. Universal access to high-quality health care services is a crucial component of Nordic public policy aimed at promoting equal opportunities. Numerous studies have leveraged the implementation of child health care programs in Scandinavia during the 1930s to examine their effects on life outcomes, particularly for children from disadvantaged backgrounds.

Bhalotra et al. (2017) find that an infant care program in Sweden in the 1930s significantly reduced the risk of infant mortality and death rates at age 75. Expanding on this, Bhalotra et al. (2022) found that exposure to the program improved test scores in primary school. The study also identified lasting effects on secondary schooling, employment, and earnings, contributing to the reduction of health and skill gaps. A notable finding was the positive impact on children born to unmarried mothers, who initially faced health challenges. Following the intervention, there was a substantial improvement in childhood survival rates and fourth-grade school performance for this group.

Several studies examine a Danish home visit program implemented in the 1930s to evaluate its impact on various life outcomes (Wüst, 2012; Hjort et al., 2017). These studies uncover short- and long-term effects on health outcomes, but find no significant impacts on educa-

tional attainment or income. These studies lack the data necessary to analyze heterogeneity in effects across different family backgrounds. In a related study, Bütikofer et al. (2019) investigated the influence of the roll-out of mother-child health centers in Norway. Their findings indicate that access to well-child visits led to a statistically significant increase in school attainment for children from low socioeconomic status (SES) families, but had no discernible effect for children from high SES backgrounds. The study estimates that the program contributed to a 10 percent reduction in intergenerational persistence in educational attainment across generations.

In summary, several of the studies reviewed above find positive effects of expanding daycare and universal health programs, particularly benefiting children of low-income and low-education families. However, the effects appear relatively modest and are unlikely to generate material equalization in the distribution of skill and earnings in Scandinavia. This conclusion is supported by a recent government white paper from Norway. In this paper, Bhuller and Fleisje (2024) uses the surrogate method of Athey et al. (2019) to extrapolate the estimated effects of daycare and preschool policies on children's short- and medium-run outcomes (e.g. test scores and educational attainment) to long-term earnings impacts. The findings suggest that the impact on earnings inequality is minimal. For example, Bhuller and Fleisje (2024) estimate that access to high-quality highly subsidized daycare reduced long-term earnings inequality, as measured by the Gini coefficient, by as little as 0.0005 percentage points. Although the extrapolation method used by Bhuller and Fleisje (2024) relies on some questionable assumptions, their finding underscores that both researchers and policymakers may overestimate the role of universal daycare and preschool policies for economic equality.

4.2 Public Provision of Services that Complement Working

Korpi (2000) and Kleven (2014) argue that although the Nordic countries have relatively high and progressive income taxes, which might discourage labor supply, they also subsidize services that are arguably complementary to working, such as daycare and other family-friendly policies. These policies act as subsidies to the costs of market work, particularly at the extensive margin, which may both increase labor force participation and reduce inequality in hourly wages by decreasing dispersion in learning and experience within the labor market.

Kleven (2014) offer some empirical evidence consistent with this argument. He shows that even with high participation tax rates, Nordic countries maintain high labor force participation by subsidizing services that support working families. His analysis finds a positive correlation between subsidization rates for child and elderly care and female labor force participation in a broader sample of OECD countries, with Nordic countries showing high levels of subsidization and participation.

Although these correlations are intriguing, they should be interpreted with caution, as they may reflect omitted variables or reverse causality rather than strong employment ef-

fects of the work subsidies. A large body of work attempts to address these issues by combining high-quality register data with modern econometric techniques and natural experiments. The key finding from this work is that work subsidies were not a primary driver of the increase in female labor force participation, but rather a response to it.

Parental leave. Researchers have used the introduction and extension of maternity leave to estimate how this policy affects female labor supply. From a theoretical point of view, the impact of extended maternity leave on female labor market outcomes is uncertain. Paid leave could improve work-family balance, potentially increasing women's labor participation. However, employers may be reluctant to hire young women or offer them advanced positions due to longer absences associated with extended maternity leave. This could impede the progress of young female workers in a competitive labor market.

Empirical investigations of Nordic parental leave reforms find no effect of maternity leave on female labor supply (Wüst, 2012; Carneiro et al., 2015; Dahl et al., 2014). This result aligns with findings from other countries that have utilized similar expansions of paid parental leave to estimate the effects on female labor supply (Schönberg and Ludsteck, 2014; Lalive and Zweimüller, 2009; Lalive et al., 2013).

In pursuit of gender equality, the Nordic countries pioneered allocating parental leave exclusively to fathers. Studies on "daddy quotas" reveal a notable increase in fathers taking leave. In Norway, the introduction of a "daddy quota" in 1993 saw the fraction of fathers taking leave rise from 3% to above 30%. Kotsadam and Finseraas (2011) find some weak evidence supporting a positive causal effect of paternity leave on fathers' participation in household tasks. Similarly, Rege et al. (2011) estimate a negative impact on fathers' future earnings, suggesting a shift in their attention from work to home. They find no impact on mother's earnings while Cools et al. (2015), using a regression discontinuity design, estimate that extended paternity leave actually led to a small reduction in mothers' earnings.

Abrahamsen (2018) examines a more recent expansion of the reserved paternity quota in Norway, finding no significant labor market effects for fathers and mothers. Similarly, Ekberg et al. (2013) use data from the paternity quota in Sweden and find no effect on long-term labor market outcomes for mothers. Paternity leave has been introduced more recently in various countries beyond Scandinavia, with findings indicating a positive impact on uptake. There is some evidence suggesting an increase in male participation in domestic responsibilities, although no significant effects have been observed on labor market outcomes for mothers (Patnaik, 2019; Kluve and Tamm, 2013; Tamm, 2019).

Daycare. The expansion of daycare in the Nordic countries in the mid-1970s was used to understand the impact access to daycare has on maternal employment and earnings. The general conclusion from this literature is that the expansion of publicly provided daycare services had only modest effects on the labor supply of mothers.

Havnes and Mogstad (2011a) analyze the expansion of Norwegian daycare (discussed earlier in Section 4.1.2) and report a minimal effect on maternal employment: a 1-percentage point increase in daycare coverage resulted in only a 0.06-percentage point increase in la-

bor supply. The large expansion of daycare centers mainly displaces informal childcare arrangements. Lundin et al. (2008) explores the impact of daycare price variation resulting from policy reforms on mothers' labor supply. They find precise estimates around zero. Viitanen (2011) analyze a daycare voucher experiment in Finland, finding no discernible effect on mothers' labor supply.

Building on these studies, a large and growing empirical literature has explored how increased availability (or lower prices) of daycare affects mothers' work. Andresen (2017) performs a careful meta-analysis of studies using quasi-experimental methods to estimate how increased availability of daycare affects maternal employment and earnings. The main insight from this analysis is that most studies find little if any impact on maternal labor supply. On average, estimates suggest that the addition of 100 new daycare slots results in 7 mothers starting or returning to work. However, it is important to recognize that these estimates may not fully capture potential long-term changes in employment. Although the short-term effects appear modest, the long-term impact could be more substantial. For example, without the expansion of subsidized daycare, the supply of informal childcare arrangements may have declined over time, making it more challenging for both parents to participate in the workforce.

4.3 Wage Setting and Collective Bargaining

Our analyses thus far suggest that equality in the Nordic countries is predominantly due to the modest wage premiums of educational attainment and skills. To understand why, it is useful to return to how wages are set in the Nordic countries. In Section 2, we described how labor unions' collective bargaining plays a more prominent role in wage setting in the Nordic countries than in the U.S. and the U.K.

Do labor unions and collective bargaining necessarily lead to a more equal wage distribution? Empirically, this is a difficult question to answer because it requires ceteris paribus variation in wage-setting regimes, which is hard to find. Theoretically, the issue is also contested since it depends on several factors, including the types of workers that are unionized (high-skilled or low-skilled) and, more generally, the unions' objective functions and organization.

Card et al. (2017) argues that before Freeman's seminal work on unionism and wage dispersion Freeman (1980), the consensus was that labor unions led to greater wage inequality. Freeman presented evidence to the contrary, showing that unions, by standardizing wages within and across establishments, reduced wage inequalities, including those between blue-collar and white-collar workers. Several recent empirical studies argue that unions reduce wage dispersion (Card et al., 2017; Farber et al., 2021; Dodini et al., 2024).

To understand how unions can reduce wage dispersion in the Nordic countries, it is useful to describe the wage-setting practices in these countries in more detail. Bhuller et al. (2022) argue that wage setting in the Nordic countries could be described as a two-tier bargaining system: the determination of the base wage q is captured by union wage aspirations,

while supplementary bargaining at the local level provides wage drift d, implying that the local wage is $w = q + d$.[21] Nominal wages and wage floors are (almost) never adjusted downwards, possibly reflecting downward rigidity in nominal wages.

The wage drift is best understood as a form of negotiated revenue sharing at the level of the firm or the plant. However, at this local level, there are restrictions on the degree and type of industrial conflict. The restriction on the local use of industrial conflicts in a two-tier system has two major implications. First, it ties wages to local productivity, but with a lower elasticity than in the pure local bargaining case, in which strikes are permitted. However, a link between local wages and firm profits can create some incentives for good work performance and participation at the firm level. Second, pure local bargaining runs the risk of subsidizing old and inefficient firms with lower wages while imposing an implicit tax in the form of higher wages on firms that make productive new investments. Two-tier bargaining can therefore strike a balance between the concerns for work incentives and investment incentives.

The centralized collective bargaining in Scandinavia is likely to affect the extent of wage dispersion, both across and within industries. Due to strong horizontal coordination in wage setting across industries, one would expect inter-industry wage differentials for observationally similar workers to be limited. Vertical coordination, on the other hand, should imply limited dispersion in wages between firms within the same industry. However, the two-tier bargaining structure allows for local wage supplements. This could lead to differences in wages across firms within the same industry, depending on firm-specific productivity, as well as systematic inter-industry wage differentials, depending on industry-specific productivity.

Figure 5 uses data from Norway to empirically explore the relationship between wages and labor productivity within and between industries. Firm average labor productivity is defined as firm revenues minus input costs and changes in the value of stock of produced goods. Wage floors and drifts are measured net of observable worker characteristics (such as age and education). Workers are sorted by labor productivity, with workers employed in the most productive firms to the left and workers employed in the least productive firms to the right. Panel A shows intra-industry differences in labor productivity, wage floors, and wage drift for all collective bargaining agreements covered by our sample (net of average differences across agreements). Note that both labor productivity (blue line) and wage floor (green line) are indexed in Norwegian Krone (NOK) along the left y-axis, while wage drift (red line) is shown along the right y-axis.

This figure illustrates two key features of a collective wage-setting system with two-tier

[21] It is best to think of q and d as jointly determined. The expected d is typically an important factor in negotiations on q. Therefore, the share of increases in w attributed to d versus q could be a poor proxy for the role of coordination and centralization. For example, in Sweden, d typically accounts for a relatively small part of the increases in w. In Norway, on the other hand, d generally makes up a relatively large part of the increases in w. However, in Norway, unions and employer federations generally agree on the expected d as part of centralized negotiation. As a result, although d represents a relatively large share of w increases in Norway, it varies relatively little between firms, especially within a given sector (Bhuller et al., 2022).

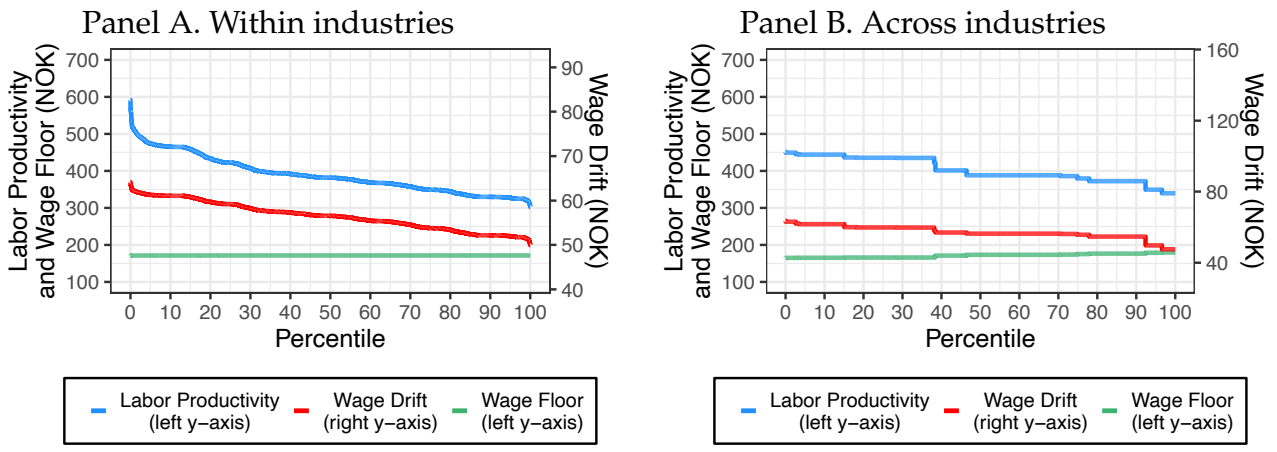


Figure 5: Labor Productivity, Wage Floors, and Wage Drift

Notes: The figure shows average labor productivity, wage floors, and wage drift by percentiles in the worker-weighted distribution of labor productivity, ranked in descending order, with wage floors and drifts measured net of observable worker characteristics. The lines are estimates from kernel (local constant) regressions of labor productivity, wage floors, and wage drift, respectively, on percentile group indicators. Panel A shows firm/worker level measures (net of differences across collective bargaining agreements) for firms and workers covered by any of the 18 collective bargaining agreements in our sample. Panel B shows agreement level average labor productivity, wage floors, and wage drifts. Labor productivity, wage floors, and wage drifts are measured for each even year in the period 2010–2018 (net of differences across years), and for each of these years, the sample includes firms with at least five workers in the relevant year and positive value added in the surrounding five-year period. The sample of firms is truncated at the fifth and ninety-fifth percentile in the distribution of labor productivity. Wage floors and drifts are measured for all full-time workers between the ages of 25 and 60 who did not change jobs in the relevant year, and wages are winsorized at the 2.5th and 97.5th percentiles. Source: Bhuller et al. (2022)

bargaining. First, the centrally negotiated base wage establishes a common wage floor in each industry. Second, locally negotiated wage drifts creates some variation in wages between workers within the same industry, depending on the productivity of the firm they are employed in. The least productive firms pay wages that are approximately equal to their labor productivity, while the most productive firms pay wages that are much lower than labor productivity, earning positive (quasi-)rents on the workers. This evidence is consistent with how two-tier bargaining can reflect a compromise between work and investment incentives, as discussed above.

Panel B of Figure 5 shows the relationship between average wages and average labor productivity between industries. There is little evidence of a systematic relationship between the wage floors and the average productivity of the industries. If anything, moving from high- to low-productivity industries, we see a decline in average wage drifts and a slight increase in wage floors. This pattern is consistent with a wage-setting system in which the base wage is set slightly higher in industries where one expects a lower average drift. In general, the relatively small differences in wage floors in high- and low-productivity industries can be interpreted as evidence of strong horizontal coordination between industries in Norway's collective bargaining system.

A concern with Figure 5 is that it only uses cross-sectional data, which means that wage differences may reflect unobserved differences in worker quality or non-wage amenities of firms. However, to minimize this concern, wages and wage drift are measured net of observable worker characteristics, such as age and education. Furthermore, when Bhuller et al. (2022) instead uses panel data from Norway to study the relationship between wages and changes in productivity within and between industries, they find similar patterns.

Taken together, both cross-sectional and panel data suggest that centralized bargaining and wage coordination in the Nordic countries strongly compress the distribution of wages compared to the distribution of labor productivity. It is useful to note that this conclusion is based on data for the period 2010-2018. As discussed in Section 2, there was a shift in the 1980s toward a decentralization of collective bargaining in the Scandinavian countries. Thus, it could be that the wage-setting system had an even stronger impact on wage inequality prior to the decentralization. The empirical analysis of Dahl et al. (2013) supports this conjecture.[22] The authors use panel data on workers and firms covering a period of decentralization in the Danish labor market. The decentralization process provides variation over time within firms in how wages are set. The authors use this variation to document that when a firm shifts from sector-level bargaining to firm-level bargaining, both the return to skills and the wage dispersion in the firm increase.

The economic implications of the observed wage compression for the firms' behavior and aggregate output and allocation efficiency are an interesting and largely unresolved question. In the textbook model of a frictionless, competitive labor market, the law of one

[22]See also Skans et al. (2009), who use panel data on workers and firms to study wage inequality in Sweden. They document an increase in wage inequality between firms since the mid-1980s, which could be due to the stronger classification of workers by skill levels or the increased importance of local wage negotiations.

price holds, and there should exist a single market compensation (including wages and non-wage job attributes) for a given quality of a worker, no matter which firm she works for. More productive firms should hire more workers, but not pay their workers more. However, if there are frictions or the labor markets are imperfectly competitive, wage compression can be related to inefficiencies, rents, and misallocation of workers across firms, both between and within industries (see, for example, Manning 2011, Lamadon et al. 2022). Alternatively, wage compression could improve efficiency, as discussed in greater detail in the next section.

5 Nordic exceptionalism?

Above, we argued that income equality in Scandinavia is primarily a result of wage compression attained through highly coordinated wage-setting. This argument begs the questions: What's the impact on productivity and growth? Why can't we all be more like Nordic countries? Or can we?

5.1 The free-rider hypothesis

In an influential contribution to modern political economy, Hall and Soskice (2001) discuss various forms of capitalism. They draw a distinction between so-called coordinated market economies, exemplified by the Nordic region, and so-called liberal market economies, with the U.S. as a leading example. The authors argue both types of economies include countries with high income per capita and strong growth, but the coordinated market solution has more social insurance and income equality. They assert that different societies develop these different modes of social and economic organization for historical reasons and, once set up, institutional complementarities could make it difficult to switch from one model to the other.[23] However, Hall and Soskice (2001) also conjecture that a liberal market economy could transform itself into a coordinated market economy without losing too much in terms of income per capita and growth, and with significant gains in terms of economic equality.

Acemoglu et al. (2017) challenge this hypothesis, arguing that in an interconnected global context, a transition for the U.S. from a liberal to a coordinated market economy would be costly and difficult. It would impede innovation and hinder growth in the global economy. The basic argument of Acemoglu et al. (2017) is that the egalitarian coordinated market economy's ability to sustain high income and growth depends inherently on other countries choosing a liberal market economy with higher inequality giving stronger incentives to innovate.

Acemoglu et al. (2017) formalize this argument in a growth model where countries (represented by a benevolent social planner) can either choose to be technology adapters or innovators. On the one hand, countries opting for innovation must, to incentivize entrepreneurs, adopt a cutthroat capitalism model resulting in significant income inequality. On the other

[23] For more detailed discussions and analyses of specific aspects of the political economy of a Nordic-style comprehensive welfare state, readers may refer to Hassler et al. (2003) and Barth and Moene (2016).

hand, countries choosing to be technology followers may adopt a cuddly alternative to capitalism with weaker incentives for entrepreneurs and stronger redistribution or insurance against risk. The model predicts that cutthroat-capitalism countries, with a higher innovation rate, experience initially greater growth than their cuddly-capitalism counterparts. However, in the long run, the spillovers of technological advances lead to a convergence in the rates of growth. Despite the higher average income in cutthroat-capitalism countries due to the initial innovation burst, the average well-being is higher in cuddly-capitalism nations due to a more equal income distribution.

The key insight of the model is the emergence of an asymmetric equilibrium, where some countries opt for a cuddly-capitalism, while others choose cutthroat-capitalism. Despite the lower welfare in equilibrium for cutthroat-capitalism nations, a switch to the cuddly alternative is not their best response, as it would diminish innovations in new technology, global growth and ultimately their own welfare.

As Acemoglu et al. (2017) point out, their theory is highly speculative. They propose a model that is consistent with the observation that the U.S. and the Nordic countries have different capitalist systems. While this is interesting, there are, however, many other explanations that are consistent with the U.S. being more cutthroat-capitalist than the Nordics. One possible explanation lies in different societal attitudes towards inequality. U.S. citizens might have a higher tolerance for inequality compared to Scandinavians, making the coordinated capitalism model less attractive or politically feasible in the U.S. Alesina et al. (2001) illustrate this by showing that initial beliefs about whether luck or hard work explains economic success can lead to an equilibrium where the U.S. has a system with low taxes and high income inequalities, while Scandinavia adopts a more egalitarian model.

5.2 Complementarity between effiency and equality hypothesis

The work of Acemoglu et al. (2017) is certainly not the only theoretical contribution relevant to the question of deriving lessons, if any, from the Nordic model for other economies aspiring to promote equality. In fact, other theoretical work supports the view of Hall and Soskice (2001) that it could be possible for a liberal market economy to transform itself into a coordinated market economy without sacrificing significant productivity, and with substantial gains in terms of economic equality.

One such theory is centered around wage compression as a mechanism for equality and productivity. The core argument is that wage compression—whether for the same jobs across firms with varying productivity levels or across workers with different skills—can boost productivity and growth by favoring more efficient firms and encouraging the adoption of modern technologies. The argument can be traced back to the work of the Swedish trade union economists Gösta Rehn and Rudolf Meidner from the 1940s and 50s. The argument was later formalized in economic models by Agell and Lommerud (1993) and Moene and Wallerstein (1997).

In both these models, there are externalities associated with moving capital and work-

ers from the stagnant to the advanced sector of the economy. If not, a competitive market where wages and prices reflect the true costs and gains of alternative uses of labor and capital would assure efficient allocation. Agell and Lommerud (1993) incorporates the Rehn and Meidner argument in a model of endogenous growth. In their model, the advanced, high-productivity sector of the economy exhibits increasing returns to scale and positive externalities.

Since these external returns are not reflected in prices, structural adjustment will be too slow in the competitive market equilibrium. Agell and Lommerud (1993) demonstrates that one way to facilitate the transfer of resources to the high-productivity sector is to implement an egalitarian wage policy. Pay compression, in contrast to the competitive solution, lowers marginal labor costs for high-productivity firms, motivating them to expand their activities. Concurrently, firms in stagnant sectors may face closure and exit the market, releasing workers who can then transition to the high-productivity sector.

Moene and Wallerstein (1997) develop a different model with vintage capital. In this model, a plant's productivity depends on its age, where newer plants are more productive than older ones. Due to the investment expenses associated with establishing a new plant, the economy comprises plants of varying ages, each with distinct productivity levels. Once new plants are operational, costs become sunk, prompting companies to keep plants running as long as they cover variable costs. Wages represent a substantial portion of these costs. A mean-preserving compression of wages lowers variable costs for new plants but raises them for older plants, and this speeds up technological progress and growth in a vintage capital economy.[24]

A related literature argues that labor unions and government policies elevating the wage floor can incentivize firms to invest in workers and technology, generating more quality jobs with higher job protection and wages. Acemoglu (2001) suggests that in competitive labor markets, firms tend to supply too few good jobs. The expenses associated with creating such jobs are borne by the firms, while the benefits are shared with the workers. Therefore, Acemoglu (2001) argues, setting a wage floor through unions and labor market regulations can prompt firms to transition from offering low-wage low-quality jobs to providing high-wage, high-quality jobs.[25]

Another theory or hypothesis is that wage compression and social insurance are effective mechanisms for sharing risk and compensating workers suffering from negative effects of structural change, which may reduce the social and political barriers to new technology, international trade, and competition in domestic markets. Andersen et al. (2007) make this argument in their review of the Nordic model. While the authors do not formalize the ar-

[24]Moene and Wallerstein (1997) extends the model in several interesting ways. One extension is to allow for heterogenity in worker quality and production complementarities between the quality of plants and the quality workers. A decentralized wage setting will then give underinvestment in new plants, whereas a centralized wage setting may result in overinvestment.

[25]A related theory is that unions may counterbalance wage-setting power of employers that otherwise would lead to markdown of wages and allocative inefficiency. Dodini et al. (2021) provide evidence from Norway in support of this theory.

gument with a model, the mechanism they allude to is simple and plausible. Workers with robust social safety nets feel more confident in adapting to shifts in the labor market, such as transitioning between jobs, acquiring new skills, or embracing globalization and technological advancements.

5.3 Lack of evidence

Unfortunately, empirical research to date has been limited in its ability to distinguish between the different views about what broader lessons one may draw from the Nordic model and experience. Indeed, most of what we know comes from examples, anecdotes, and cross-country comparisons, subject to the usual criticism of representativeness, omitted variables, and endogeneity.

For example, Hibbs Jr and Locking (2000) use time series data from Sweden to document that periods of centralized wage setting and wage compression across plants and industries correlate with periods of high industrial productivity. Although interesting, it is, of course, difficult to give this correlation a causal interpretation.

6 Conclusion

Both policymakers, public commentators, and researchers often point to the Nordic countries for a social and economic model that combines low income inequality with prosperity and growth. The goal of this article was to critically examine this claim by combining theory and evidence to characterize how the Nordic model works and to explain why these countries have low inequality.

Our main conclusion is that income equality in the Nordic countries is primarily a result of a severe compression of hourly wages, which reduces the returns to labor market skills. This compression appears to be achieved through a wage bargaining system with strong coordination within and between industries. We also argued that the data suggest that other popular explanations for income equality in the Nordic countries are empirically less relevant, including redistribution through the tax-transfer system, public spending on goods that are complementary to working, and public policy aimed at equalizing the distribution of skills and human capital.

The assertion that income equality in the Nordic countries is largely due to wage compression achieved through highly coordinated wage-setting raises important questions: What are the implications for productivity and growth? And why aren't all economies adopting the Nordic model? We discussed two polar opposite views on these questions. One view is that the ability of the Nordic model to sustain high income and growth inherently depends on other countries choosing an economic system with higher inequality, giving stronger incentives to innovate. The other view is that wage compression and social insurance stimulate innovation, productivity, and growth for reasons that are not necessarily specific to

the Nordic countries. Unfortunately, empirical research to date has been limited in its ability to distinguish between these two views, and most of what we know is correlational or circumstantial.

The scarcity of credible evidence may be surprising given that the study of the causes and consequences of different wage-setting practices and work organization has a long history in labor economics. However, these questions have, over time, become less fashionable. Instead, many labor economists have taken advantage of the increased availability of micro data and empirical methods to study the causal effects of various types of changes or interventions, such as reforms of health care, family, and education policy. While it is undeniably important to understand the costs and benefits of such policies, they appear to explain little of the observed inequality in skills, education, and income. Another popular line of research in labor economics is the study of individual determinants (such as education or union membership) of wages, given the wage-setting practice in the economy of study. Although these studies are also interesting and useful, they do not tell us the causes and consequences of different wage-setting practices and work organization.

For example, numerous studies have sought to identify a causal effect of the union wage premium, that is, how much more an otherwise identical worker is paid as a result of union membership. However, the results of these kinds of quasi-experimental studies are only informative about how a marginal increase in union membership, given the wage-setting practices in the economy, would benefit the workers entering a union.

More generally, a study focused on changing an individual determinant of wages, while keeping the overall system of wage setting fixed, cannot tell us about the systemic effects of broader changes in wage setting practices and work organization. We suspect that real progress on these systemic effects requires a shift in research towards developing, identifying, and estimating economic models of the actual institutional settings. This requires a tighter connection between data, econometrics, and theory than is currently common in much of labor economics. Only then can we hope to get closer to understanding the impacts on efficiency and equality of alternative forms of wage setting practices and work organization.

Such a shift in research is arguably essential to make real progress on several important and underexplored questions and issues:

– The Rehn-Meidner model suggests that compressed market wages can enhance economic productivity and growth by favoring efficient firms and encouraging the adoption of modern technologies. Low-productivity firms are pushed to either upgrade their technology or shut down. This model, particularly in its extension and formalization by Moene and Wallerstein (1997), provides a framework for understanding how a compressed wage structure can generate positive productivity effects.

However, the Rehn-Meidner framework ignores the supply side of the labor market, assuming a fixed distribution of skills and inelastic labor supply. As a result, it misses the point that a compressed wage distribution and high marginal tax rates may reduce individuals'

incentives to invest in education, acquire skills, and supply labor. The empirical analyses and facts in our paper also fail to fully account for these issues. A tractable empirical model with supply side responses (e.g. labor supply responses to taxes and transfers) and equilibrium considerations (e.g., the simultaneous determination of investments in and returns to skills) would be important both to better understand the sources of inequality and to credibly quantify the impacts of the wage setting practices as well as the tax-transfer system on productivity, growth, and equality.

Such an analysis could also help to understand why the Nordic countries have a highly educated population when the wage premium of education and skills are relatively low. Although higher education is typically free in Nordic countries, strong wage compression and progressive income taxation could both reduce the incentives to invest in schooling and distort the types of education, occupation, industry, and firm that individuals choose.

— Our paper has focused on inequality in the cross-sectional distribution of income, emphasizing the importance of the wage-setting system for economic equality in the Nordic countries. An important next step is to study the link between the wage-setting system and intergenerational mobility, and how this link affects and is affected by parental investments, market forces, and public policy.

For example, previous research suggests that income mobility is higher in the Nordic countries than in the U.K. and the U.S., while education mobility is fairly comparable across these countries. These patterns could be related to the strong wage compression in the Nordic countries, which may both lower the incentives for parents to invest in children's human capital and reduce the incentives for assortative mating. For example, Fernandez et al. (2005) propose a model in which prospective parents select partners based on both match quality (love) and expected income, with higher returns to skills increasing assortative mating.

— In recent years, it has been increasingly argued that many aspects of labor markets are best analyzed from the perspective that there is some degree of imperfect competition. The workhorse models of imperfect competition (including monopsony and search and matching) assume a decentralized wage setting where individual firms and workers determine wages. In contrast, in most advanced economies, it is common for firms or employer associations to bargain with unions over wages, producing collective bargaining systems. However, these bargaining systems differ between developed countries in potentially important ways. Even economies with the same share of unionized workers can negotiate their wages rather differently.

Drawing meaningful inferences about imperfect competition and its implications requires closing the gap between how economists tend to model wage setting and how wages are actually set. Otherwise, it is not possible to credibly identify the economic quantities of interest, including marginal products, wedges, misallocation, rents, and rent sharing. Another benefit of developing and estimating a model of the labor market that can reasonably explain the observed equilibrium is that it may also be used to analyze the impacts of coun-

terfactual forms of wage settings or changes in market structure. Only then can one answer questions about the economy-wide effects of changes in market forces or the wage-setting system.

– We have focused on inequality in the labor market, arguing that it is most consequential for the 99 percent of people whose market income is mainly derived from paid employment. However, it is important to recognize that inequality in market income has several distinct but related sources. One key source to which we pay little attention is the high concentration of capital income at the top of the income distribution, which results in a large share of national income accruing to the top percentile of individuals.

In recent decades, wealth concentration has increased in many developed countries, including both the U.S. and the Nordic countries (Roine and Waldenström, 2008; Søgaard, 2018; Aaberge et al., 2018). Although the Nordic countries have relatively low inequality in the labor market, the capital income and wealth in these countries are highly concentrated. For example, the 2023 OECD Wealth Inequality Report considers three data sets tracking wealth distribution within countries, all suggesting that Scandinavian countries have a more unequal wealth distribution than most of the OECD countries (OECD, 2023). These findings raise an important question: Is the Nordic wage-setting system that compresses workers' wages causing a stronger concentration of wealth? As Moene (2016) emphasizes, all else being equal, suppressing the wages of high-skilled workers will increase profits and thus benefit the wealth of capital owners. However, assuming that all else remains constant is unsatisfactory. To make real progress, it is necessary to identify and estimate a model in which skills, labor supply, capital investments, wages, and profits are determined simultaneously. Modeling international migration (of both investors and high-income workers) could also be important to understand the changes over time in bargaining and profit sharing between workers and capital owners (Kleven et al., 2020).

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