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The Nordic model of economic development: shocks, reforms and future prospects

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Roberto Iacono

Abstract
The aim of this research is to provide novel evidence regarding the functioning of the Nordic model of economic development and the robustness of its institutions. At first, the paper defines a conceptual analytical framework identifying the key features of the model for the Nordic economies (Denmark, Finland, Norway, and Sweden), by synthesizing relevant background literature. Secondly, this framework is used to interpret a set of shocks, reforms and ongoing trends: the effect of resource revenues on the labor market and income inequality in Norway compared to the other Nordic countries; the design of a novel minimum income scheme in Finland and its effects on preferences for social insurance; and the implications of population ageing and increased automation for indicators of sustainability for the Nordic welfare states.

Keywords: Nordic model, Income inequality, Welfare states, Ageing, Automation

JEL classification: H53, I38, J31, P47, P51

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1. Introduction

How has the Nordic model of economic development evolved in the last decades, and how are its key features affected by country-specific shocks and reforms? The research question of this study lies at the intersection between the fields of political economy and institutional economics. In order to provide a conceptual framework for the different shocks and trends at hand, the paper starts by analytically defining the key elements and mechanisms of the Nordic economies, as presented in a chosen segment of the recent economic and political economy literature (mostly relying on Barth et al., 2014). The three distinct but interrelated features of the Nordic model are a high degree of compression of wage differentials, a dynamic process of creative destruction and innovation, and a high level of public welfare spending. The core of the paper is then constituted by three distinct parts, each of them showing how an external shock, a policy reform or ongoing trends with respect to ageing and automation interact with the conceptual framework.

The first of these three parts focuses on the Nordic model from "within", by looking at the comparative effect of the resource windfall in Norway, as compared to the other Nordic countries. How did the key features of the Nordic model react to the shock to the Norwegian economy, compared to its Nordic neighbors? Recent research on this issue is briefly reviewed (Dyrstad, 2016; Iacono, 2016) and some novel empirical evidence is presented. This first part is not only relevant as a case study, but it also provides insights about the robustness of the institutions of the Nordic model when subjected to substantial macroeconomic shocks.

The second part continues analyzing the Nordic model institutions from "within", by focusing on a social insurance policy reform in Finland. How would the introduction of a minimum (basic) income scheme, with which Finland is currently experimenting, affect individual preferences for redistribution and social insurance (which is an important determinant of public welfare spending)? This part utilizes a slightly modified version of the model in Moene and Wallerstein (2001) to provide a tentative answer to this question, which might determine important changes in the structure and functioning of the Nordic model for the case of Finland.

The third part focuses on ongoing trends and future prospects for the Nordic model as seen from "outside", without necessarily focusing on one of the Nordic countries. This is done by presenting stylized empirical evidence on indicators related to the future sustainability of the Nordic welfare states, and by highlighting a subset of the recent economic research on the effect of population aging on automation and in turn on wage inequality (Acemoglu and Restrepo, 2017; Asplund et al.,

2011). Summarizing, the three parts of the paper identify developments that have triggered or might trigger future changes in the mechanisms described in the conceptual framework based on Barth et al. (2014). This research contributes to the literature by providing an up-to-date estimation of the robustness of the institutions of the Nordic model of economic development and welfare.

The paper proceeds as follows: Section 2 lays out the conceptual framework; Section 3 looks at the effect of the resource windfall in Norway; Section 4 analyzes the novel minimum income scheme in Finland; Section 5 focuses on the recent trends related to automation and demographic ageing. Section 6 concludes the paper.

2. The conceptual framework

This section introduces and explains the conceptual framework that will be adopted in the core of the paper, in order to disentangle how country-specific shocks and policy reforms affect the functioning of the Nordic model. The current paper defines the Nordic model by borrowing the main lines of the framework presented in Barth et al. (2014). This choice is based on analytical tractability, and should not be interpreted as a claim of the superiority of the chosen framework with respect to alternative frameworks of the Nordic model in the economic and political economy literature (Andersen et al., 2007; Calmfors, 1993; Erixon, 2010, 2016; Esping-Andersen, 1990; Lindbeck, 1997; Moene, 2008). Analytical tractability is given by the three distinct but interconnected features listed in Barth et al. (2014), which can be summarized as follows:

(I) **Compression of wage differentials**. Centralized wage bargaining leads to high wage compression in the labor market and hence to low pre-tax labor income inequality (Barth et al., 2014; Barth and Moene, 2012; Salverda and Checchi, 2014).

(II) **Creative destruction**. High wage compression from (I) fosters creative destruction leading to a higher share of highly productive enterprises and in turn higher average labor productivity (Barth et al., 2014; Moene and Wallerstein, 1997; Vona and Zamparelli, 2014; Stiglitz, 2015).

(III) **Public welfare spending**. High wage compression from (I) leads to individual preferences for high public welfare spending, creating a sort of "equality multiplier" (Barth et al., 2014; Barth et al., 2015; Barth and Moene, 2016).

The conceptual framework of the Nordic model given by (I-II-III) fits the scope of this paper by permitting isolation of the effects of external shocks and policy changes on each of the three mechanisms. Let us start by explaining the mechanism described in (I) with the support of stylized empirical evidence. Figure 1 presents the 1970-2013 annual series for income inequality (Gini index, pre-tax, pre-transfer) for each of the four Nordic countries, based on data from the Standardized World Income Inequality Database (Solt, 2016).

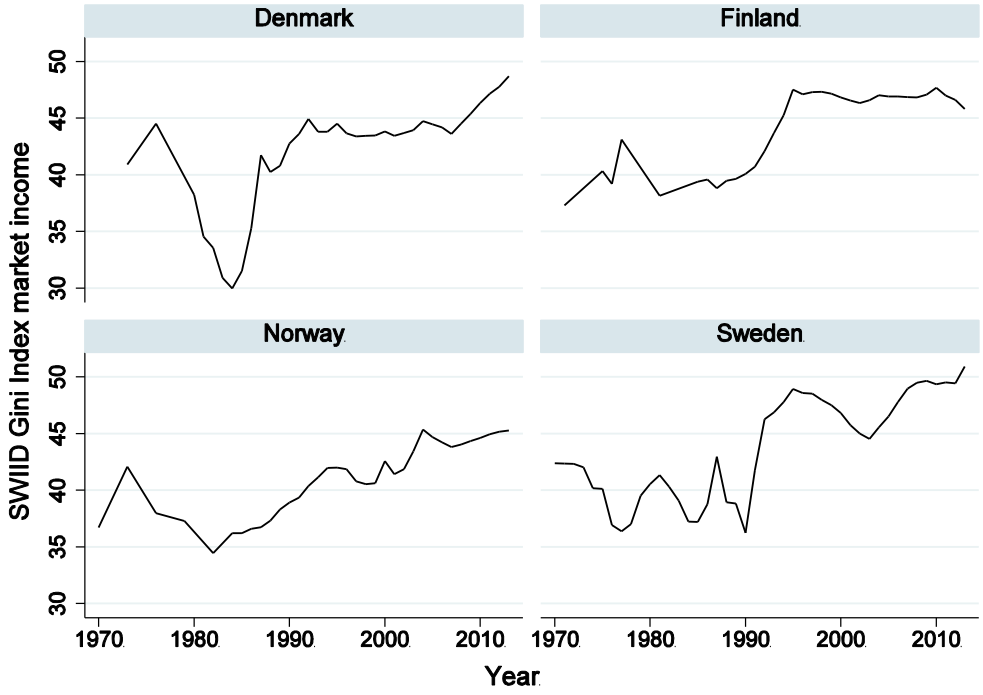

FIGURE 1. SWIID GINI INDEX MARKET INCOME, 1970-2013.

Notes: Figure 1 shows the 1970-2013 annual series for the variable gini_market contained in the SWIID 5.1 (Solt, 2016). gini_market: estimate of Gini index of inequality in equivalized (square root scale) household market (pre-tax, pre-transfer) income, using Luxembourg Income Study (LIS) data as the standard.

Figure 1 shows the similarities of the Nordic economies as regards aggregate pre-tax income inequality. For all four, the SWIID Gini index for market income was roughly comprised between 0.3 and 0.5 throughout the series (lowest, Denmark in 1984: 0.2996; highest, Sweden in 2013: 0.5092). However, because the SWIID Gini index for market income aggregates both capital and labor income inequality, the evidence in Figure 1 does not allow identification of the relationship between collective bargaining and pre-tax labor income inequality (also labeled as pre-tax wage dispersion). This is taken care of in Figure 2, in which the average of the ICTWSS index of coordination of wage setting is plotted against the average of the OECD gross earnings interdecile ratio P90/P10, for all OECD countries in the period 1970-2013.

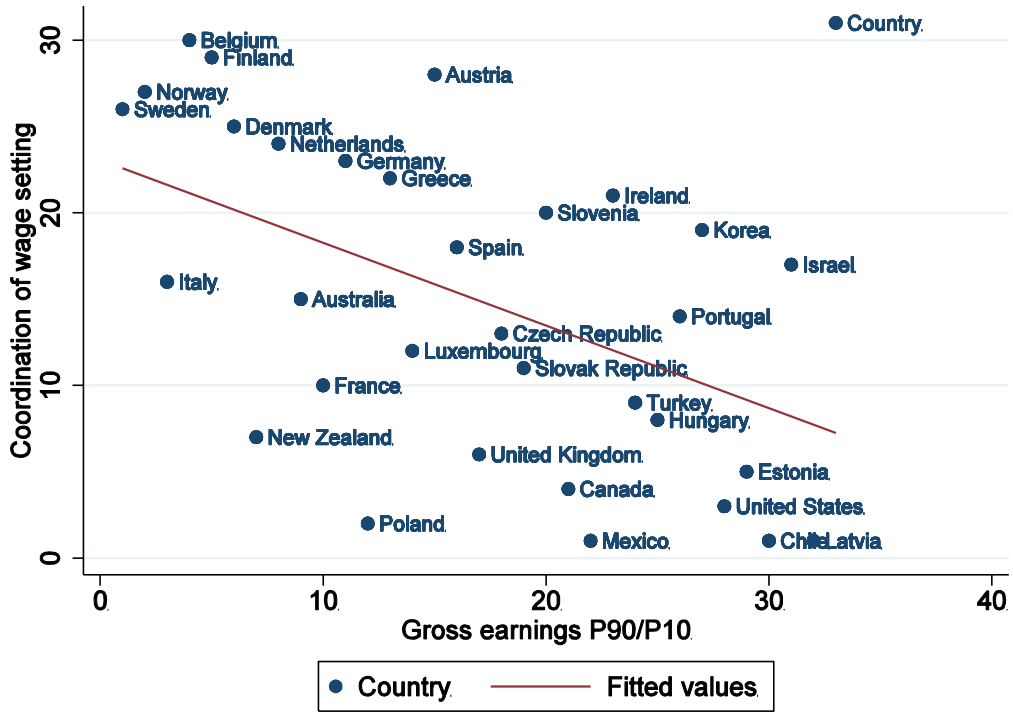

FIGURE 2. COORDINATION OF WAGE-SETTING AND WAGE DISPERSION

Notes: Figure 2 plots the average of the ICTWSS index of coordination of wage setting (ICTWSS version 5.0, variable name: "Coord"), against the average OECD gross earnings interdecile ratio P90/P10, for all OECD countries in the period 1970-2013. Extract from Visser (2015), ICTWSS Codebook: "Coord" ranges from [0, 5]. 1 = fragmented wage bargaining, confined largely to individual firms or plants. 2 = mixed industry and firm-level bargaining, with no or little pattern bargaining and relatively weak elements of government coordination through the setting of minimum wage or wage indexation. 3 = negotiation guidelines based on (a) centralized bargaining by peak associations with or without government involvement; (b) informal centralization of industry-level bargaining; (c) government arbitration or intervention. 4 = wage norms or guidelines (recommendations) based on (a) centralized bargaining by peak associations with or without government involvement; (b) informal centralization of industry-level bargaining by a powerful and monopolistic union confederation; (c) extensive, regularized pattern setting coupled with high degree of union concentration. 5 = maximum or minimum wage rates/increases based on (a) centralized bargaining by peak association(s), with or without government involvement, and/or government imposition of wage schedule/freeze, with peace obligation; (b) informal centralization of industry-level bargaining by a powerful and monopolistic union confederation; (c) extensive, regularized pattern setting and highly synchronized bargaining coupled with coordination of bargaining by influential large firms.

In Figure 2, the Nordic countries appear in the upper left, indicating low pre-tax wage dispersion and a high average index of centralized wage bargaining. Only Belgium, Germany and the Netherlands obtain a combined score that can be described as the "Nordic type", whilst Italy and Austria can be associated with the Nordic countries for one only dimension each, low wage dispersion in Italy and high degree of centralized wage setting in Austria. In other words, Figure 2 conveys a static picture of mechanism (I), showing that a higher degree of wage coordination through collective bargaining correlates with a more compressed wage distribution for the Nordic countries. This stylized fact is a rather conventional result of economic theory, confirming that

whenever unions negotiate wages at the national level, this leads to a lower overall degree of pre-tax wage dispersion (Barth and Moene, 2012). It has to be pointed out that establishing or testing more in detail the detailed shape of the causal cross-country relationship between coordination of wage setting and wage dispersion lies outside the scope of the paper (for an overview, see the survey of labor market institutions by Salverda and Checchi, 2014).

Mechanism (II) of the Nordic model is explained as follows. Barth et al. (2014) develop a theory of creative destruction and wage compression, based in essence on the Rehn-Meidner model (often labeled the Swedish model, as in Erixon, 2010, 2016). Briefly, this theory emphasizes that a high initial level of wage compression functions as a "tax" on low-productivity enterprises (raising the bar for access to low-skilled human capital), whilst high-productivity enterprises receive an indirect "subsidy" (due to the lower wages for high-skilled human capital). Ceteris paribus, this translates into increased investments and higher expected profits for the most productive firms, leaving behind the least productive firms. In other words, wage compression fosters a dynamic process of "constructive" creative destruction, leading to higher demand for labor, which in turn leads to a higher average level of labor productivity and correspondingly higher wages (for a constant employment level). The essence of the Rehn-Meidner model is purely dynamic and its outcomes are mostly country-specific; however, Figure 3 gives an overall static view of the long-run correlation between wage compression and productivity.

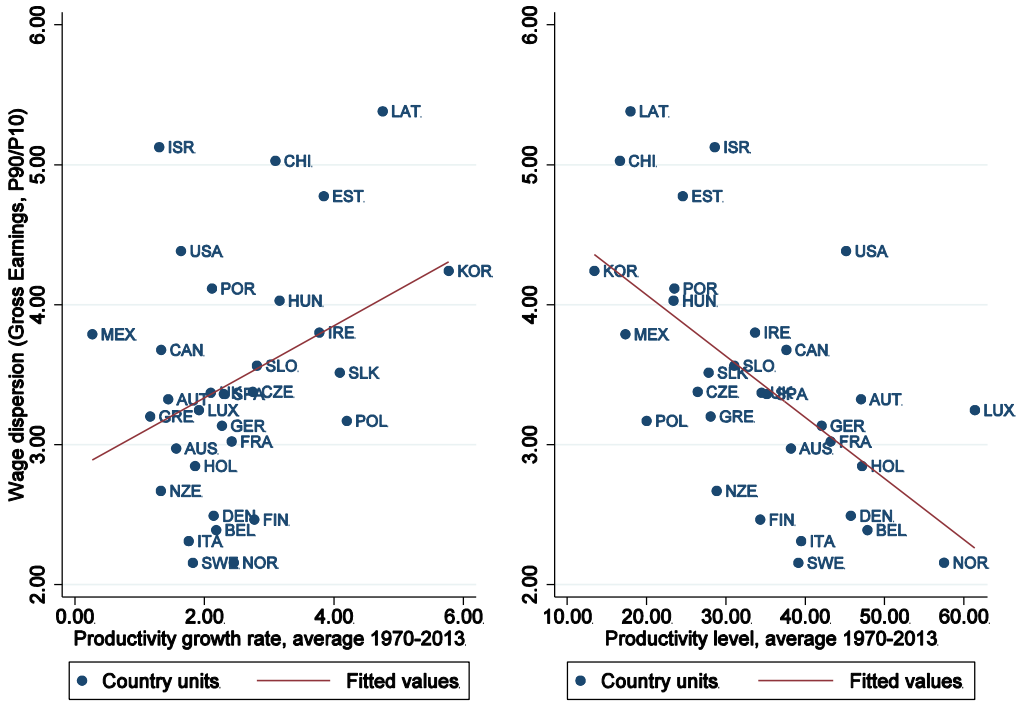

FIGURE 3. WAGE DISPERSION AND LABOR PRODUCTIVITY

Notes: The left-hand side of Figure 3 plots the country average for wage dispersion (the average OECD gross earnings interdecile ratio P90/P10, for all OECD countries in the period 1970-2013) against the country average of the growth rates of GDP per hour worked (constant prices, 1970-2013; source OECD). On the right-hand side, wage dispersion is plotted against the country average of GDP per hour worked in levels (as well in constant prices, 1970-2013; source OECD).

The left-hand side of Figure 3 plots wage dispersion (using the same variable as for Figure 2) against the average of the *growth rates* of GDP per hour worked (constant prices, 1970-2013; source OECD). The right-hand side of Figure 3 instead plots wage dispersion against the average in *levels* of the same labor productivity measure, for the same countries and the same period. Figure 3 shows some interesting stylized facts. At first, the Nordic countries confirm their similarities by appearing in the same areas in both plots, jointly with Italy and Belgium. Secondly and more importantly, the mechanism mentioned in (II) does not appear to be fully supported by the evidence provided in both sides of Figure 3, when focusing on the cluster of the Nordic countries. When it comes to the country average of *levels* of GDP per hour worked (right-hand side), higher compression of wage differentials correlates with higher labor productivity for the Nordic countries as compared to the rest of the OECD economies, in line with the theory of creative destruction in Barth et al. (2014). On the other hand, when labor productivity is measured by the average of the *growth rates* for GDP per hour worked in the period 1970-2013 (left-hand side), the Nordic

countries (with growth rates of slightly above 2%) perform neither better nor worse than the large majority of the other OECD economies. This puzzling empirical evidence for the Nordic countries as compared to the other OECD economies calls for a deeper analysis at the country-level (or by clusters of countries) of the comparative causal effect of wage compression on innovation, productivity dynamics and economic growth, which have been only partly addressed in Acemoglu et al. (2014) and Stiglitz (2015).

The third feature of the conceptual framework concerns the explanation of why the Nordic economies, on top of the high equality in labor market outcomes, also redistribute extensively via high public welfare spending. For instance, how can high-skilled human capital agents have preferences for a model in which their labor incomes are lower than they would be with higher wage dispersion (namely, with a wage distribution resembling more closely the skewed distribution of skills), and in which their tax wedge is higher than in countries with lower welfare spending? It has to be pointed out that, in the current paper, redistribution and public welfare spending focus solely on provision of social insurance programs like unemployment benefits, sickness pay and pension schemes. Barth et al. (2014) emphasize that, if social insurance goods are normal goods and the skill distribution entails a majority of low-skilled workers, higher wage compression will then imply a jump in wages for the majority of workers, who will in turn demand more social insurance goods because they can now afford more of them (for a given distribution of risk of income loss). Specifically, as workers receive higher wages, the income loss associated with a less generous welfare state gets larger, whilst the utility cost (or disutility) necessary to finance social insurance programs shrinks. Hence, the more equal the pre-tax wage distribution, the higher the amount of social insurance goods demanded by the median voter. This implies that already equal allocations will determine higher public welfare spending which reduces inequality even further, whilst unequal allocation of wages call for less redistribution and in turn more inequality; and is therefore labeled as the "equality multiplier". This multiplier is shown in Figure 4, in which wage dispersion is plotted against the average value of the combined welfare generosity index from the Comparative Welfare Entitlements Data Set (CWED) in Scruggs et al. (2014). The CWED contains annual country data (1971-2010) on the replacement rates, program coverage and overall program generosity for each of the three main social insurance programs: unemployment insurance, sickness insurance and public pensions. Scruggs (2014) computes the combined welfare generosity index by summing up the three single program indices (each of them with a numerical score from 0 to 25). Hence, the maximum theoretical score for the combined generosity index is

75. Additional details on calculation of replacement rates and program generosity indices can be found in Scruggs (2014).

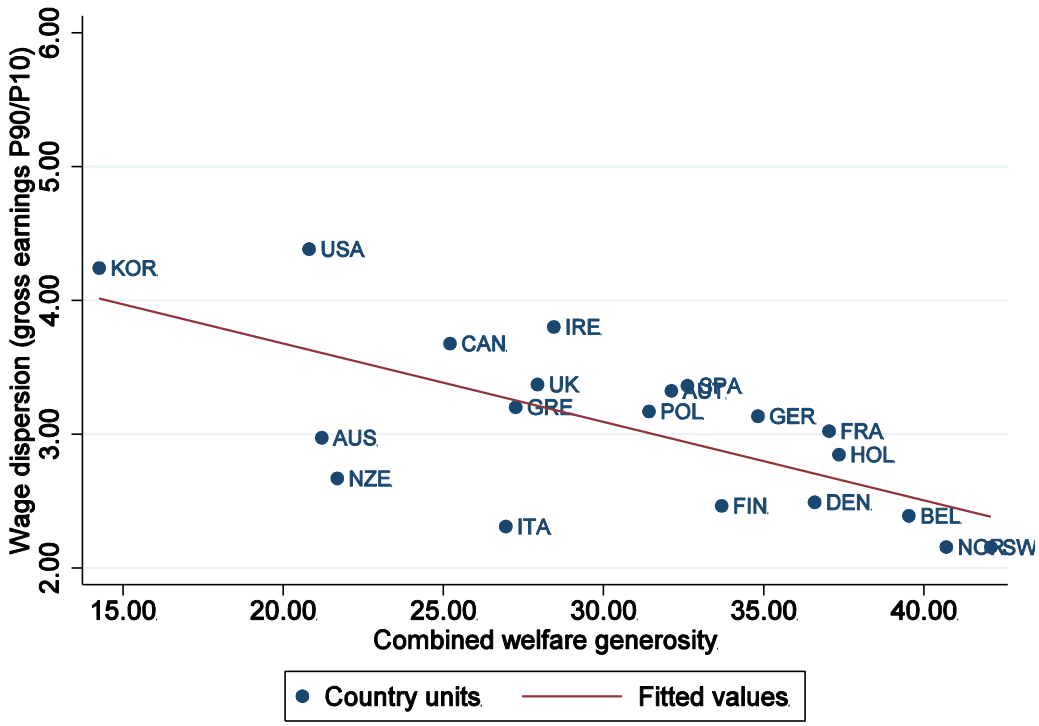

FIGURE 4. WAGE DISPERSION AND COMBINED WELFARE GENEROSITY

Notes: This figure plots the country average for wage dispersion (the average of the OECD gross earnings interdecile ratio P90/P10, for all OECD countries in the period 1970-2013), against the average value of the combined welfare generosity index from the Comparative Welfare Entitlements Data Set (CWED) in Scruggs et al. (2014). CWED contains annual country data (1971-2010) on the replacement rates, program coverage and overall program generosity index for each of the three main social insurance programs: unemployment insurance, sick pay insurance and public pensions. As explained in the CWED codebook in Scruggs et al. (2014), "replacement rates are calculated for a fictive average production worker in the manufacturing sector who is 40 years old, has been working for the 20 years preceding the loss of income or the benefit period". Scruggs (2014): "Program coverage represents percentage of the labor force insured for unemployment risk, percentage of the labor force with sick pay insurance, and the fraction of those above official retirement age who are in receipt of a public pension". Scruggs (2014) computes then the combined welfare generosity index by summing up the three single program indices (each of them with a numerical score [0, 25]. Hence, the maximum theoretical score for the combined index is 75. Additional details on calculation of replacement rates and program generosity indices can be found in Scruggs (2014).

Figure 4 shows that, for the Nordic countries as compared to the other OECD economies, low wage dispersion correlates with a high index of combined welfare generosity, regardless of the underlying direction of causality. In conclusion, this justifies the choice of mechanism (III) as one of the key characteristics of the Nordic model of economic development and welfare.

The next sections, constituting the core of the paper, will evaluate how the three mechanisms (I-II-III) have reacted (or might react) to a chosen set of shocks, policy reforms and ongoing trends.

3. The impact from resource revenues: the case of Norway

This section analyzes the Nordic model from "within", by focusing on the comparative effect on the Norwegian economy of the huge inflow of resource revenues that started approximately around 1975 (as documented in Larsen, 2006). Results from recent research will be reviewed, in addition to novel empirical evidence. This evidence will be confronted with the conceptual framework of the Nordic model presented in Section 2.

Mideksa (2013) estimates the macroeconomic effect of natural resource endowment on the Norwegian GDP per capita, showing that about 20% of the per capita GDP increase in the post-windfall years 1971-2007 can be attributed to the resource windfall. Iacono (2016) builds methodologically on Mideksa (2013) by applying the Synthetic Control Method (of which the most cited application in the economic literature is by Abadie et al., 2015) in order to discern how the resource windfall impacted the key features of the Nordic model. This section will draw only partially on the results of the broader empirical analysis in Iacono (2016), in that it will apply a different set of data - namely, the SWIID Gini index for market income rather than the top income shares of the World Wealth and Income Database (WID) as in Iacono (2016).

Let us start with the impact of the resource revenues on mechanism (I), namely the low level of wage dispersion. The within-country analysis by Dyrstad (2016) studies how the shift from uncoordinated wage bargaining in the Norwegian petroleum sector to higher coordination (due to government intervention from 1982 onward), had the effect of curbing the pre-1982 high wage premium for petroleum workers with respect to the rest of the economy. From 1983 onward, the relative wages for employees in the Norwegian petroleum sector with respect to manufacturing workers started to decline. In other words, Dyrstad (2016) attributes the partial maintenance of a high level of wage compression (mechanism I) for the case study of Norway to sound institutions. Can we conclude that the huge inflow of resource revenues in Norway did not imply a substantial and significant effect on the wage dispersion in Norway relative to the other Nordic economies? In order to complement Dyrstad (2016) with cross-country evidence, let us use the pre-tax income inequality index given by the SWIID Gini index for market income as a proxy for wage dispersion. How has Norway performed as regards pre-tax income inequality in the post-windfall period, namely from 1975 onward?

To answer this counterfactual question, let us conduct a synthetic control method exercise (as in Abadie et al., 2015; Mideksa, 2013; Iacono, 2016) to construct a synthetic control unit for Norway

based on the donor pool constituted from the other Nordic countries (regarded as similar economies that did not develop a huge resource sector). The first step is to select the weights of the synthetic control unit based on the pre-windfall matching of a set of macroeconomic predictors. The convex combination of weights $W^* = (w_2, w_3, w_4)$ with $w_2 + w_3 + w_4 = 1$ employed in the synthetic control unit were estimated to be Denmark=0.572; Sweden=0.036; Finland=0.392. Following Iacono (2016), the following set of labor market and macroeconomic predictors of income inequality were used in the estimation exercise: UTIP-UNIDO industrial pay-inequality; top 5% and top 1% income share excluding capital gains; unemployment rate as a percentage of labor force; trade union density; and real GDP per capita in constant 2005 USD.

Once the synthetic control unit has been constructed, it can be plotted against the actual series of the SWIID Gini index for market income for Norway, in order to estimate the effect of the shock of resource revenues on income inequality. Figure 5 shows both the actual pre-tax income inequality series in Norway (solid line) and the synthetic control unit (dashed line). In a nutshell, Figure 5 conveys that the actual pre-tax income inequality series in Norway has not significantly deviated from the main trend for the Nordic economies (namely, decreasing overall income inequality until 1985, increasing from then on) represented by the synthetic control unit.

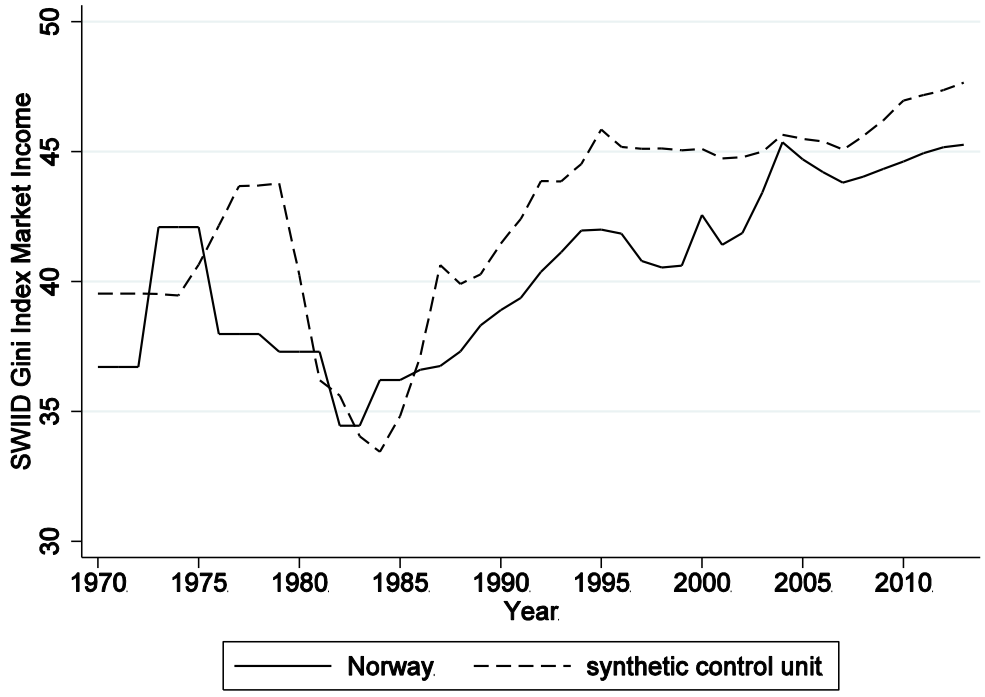

FIGURE 5. THE POST-1975 COMPARATIVE EFFECT OF RESOURCE REVENUES ON INCOME INEQUALITY IN NORWAY

Notes: Treatment year = 1975. The weights estimated by the Synthetic Control algorithm were given by Denmark=0.572; Sweden=0.036; Finland=0.392. The following set of labor market and macroeconomic predictors were used for the estimation: UTIP-UNIDO industrial pay-inequality (indicator of industrial wage dispersion); top 5% and top 1% income share excluding capital gains (WID); unemployment rate as a % of labor force (OECD); trade union density (the ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners, 1960-2013, OECD Labor Force Statistics); GDP per capita constant 2005 USD, 1960-2014, from the World Bank's World Development Indicators (WDI).

The synthetic control method evidence of Figure 5 is also complemented by a more standard difference-in-difference estimation of a linear fixed effects model (with country and time fixed effects), as shown in (1). In the estimation of (1), the post-windfall treatment year was set to 1975 as for the synthetic control method exercise:

$$(1)\ \ \mathrm{SWIID}_{j,t} = \alpha_j + \beta_t + \gamma \mathrm{T}_{j,t} + \theta'_{j,t}\varphi + \epsilon_{j,t}.$$

In (1), $\mathrm{SWIID}_{j,t}$ stands for the SWIID Gini index for market income of country j; α_j is a country fixed effect; β_t represents a dummy variable estimating time fixed effects; $\mathrm{T}_{j,t}$ is a dummy variable which equals one when the country under observation is the treated country (i.e., Norway) and the time of observation is within the post-treatment period 1976-2013; $\theta'_{j,t}$ represents the same set of controls as above; and $\epsilon_{j,t}$ are country-clustered error terms. Estimation results are summarized in

Table 1, confirming the synthetic control method result of a non-significant comparative effect of the resource revenues shock on the post-revenues Norwegian SWIID Gini index.

TABLE 1 – The post-1975 comparative effect of resource revenues on income inequality in Norway (Difference-in-Difference)

	(1) SWIID Gini
Diff-in-Diff	-2.672
	(1.237)
UTIP-UNIDO industrial pay-inequality	-61.63
	(351.9)
Trade Union Density	-0.180
	(0.0859)
Unemployment as % of labor force	0.405*
	(0.149)
Constant	49.97***
	(7.941)
Country FE	YES
Time FE	YES
Observations	152
Number of countries	4
R-squared	0.757

Notes: Country-clustered robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Summing up, Dyrstad (2016) and the estimation results of this section point in the same direction of rejecting the hypothesis that the huge inflow of resource revenues had a significant effect on the level of overall pre-tax income inequality (and, hence, on its sub-element given by labor income inequality) in Norway, with respect to the other Nordic economies. Notice that this does not exclude the possibility of significant and positive effects on the fraction given by the very top of the income distribution, as shown for instance in Iacono (2016). Income inequality has indeed been increasing in Norway and in the other Nordic countries since 1985 (as shown in both Figures 1 and 5), but its causes will have to be found elsewhere, and not in the development of the Norwegian resource sector.

We have assumed that preferences for high public spending in the Nordic model rely on high wage compression, as explained in the conceptual framework in Section 2. What does the evidence of Figure 5 (namely, absolute increase in inequality in Norway but not due to the resource sector) imply for public welfare spending and overall welfare generosity? Figure 6 plots the time series of the combined welfare generosity index for the Nordic countries, obtained from the Comparative Welfare Entitlements Data Set in Scruggs et al. (2014).

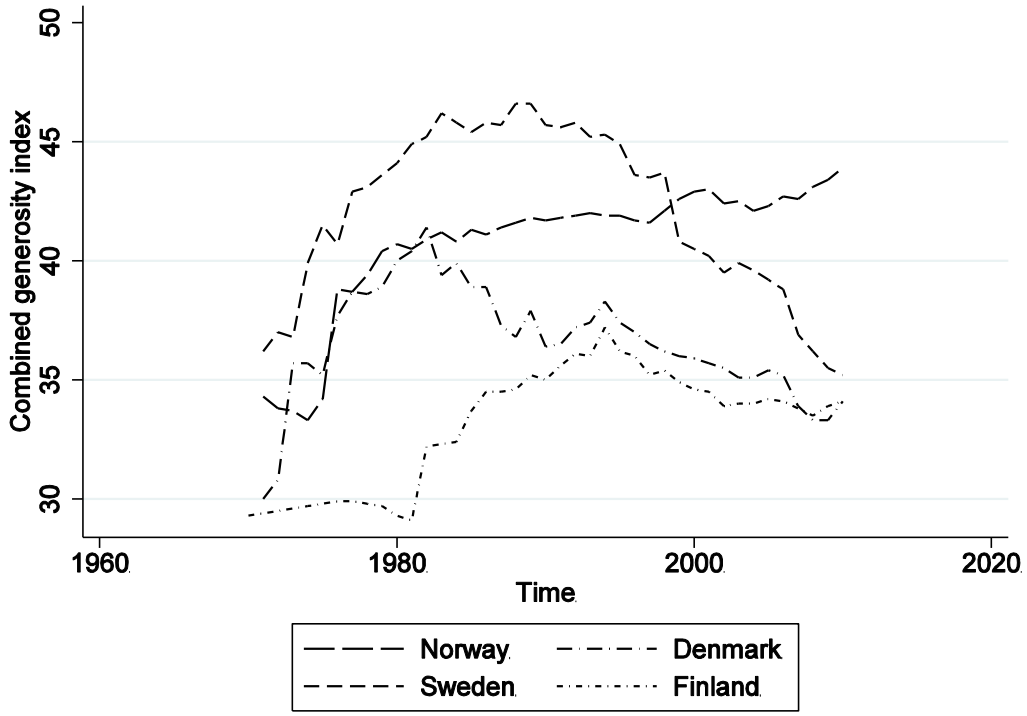

FIGURE 6. COMBINED GENEROSITY INDEX (CWED), 1971-2010

Notes: this figure plots the annual time series 1971-2010 for the combined welfare generosity index from the Comparative Welfare Entitlements Data Set (CWED) in Scruggs et al. (2014). Scruggs (2014) computes then the combined welfare generosity index by summing up the three single social insurance program indices (unemployment, sickness and pensions, each of them with a numerical score [0, 25]. Hence, the maximum theoretical score for the combined index is 75.

Figure 6 indicates that only Norway, from 1995 onward, has experienced positive growth rates for the combined generosity index (which summarizes the magnitude and coverage of social insurance programs). Several explanations based on either microeconomic preferences or macroeconomic factors, might lie behind such a development (for instance, the financial crisis of the 1990s and the subsequent retrenchment of the welfare states in Finland and Sweden, covered by Englund, 1999, and Honkapohja, 2009). Focusing on the fiscal revenue side, a candidate hypothesis is that resource revenues since the 1980s have enlarged the tax base throughout the

post-windfall years in Norway, allowing the Norwegian government to finance a non-decreasing level of overall welfare spending. More research on this specific relationship should be conducted at the within-country level.

In conclusion, according to the empirical evidence and the summary of the literature from this section, the external shock of resource revenues that accrued to the Norwegian economy has implied some ad-hoc internal developments when it comes to public welfare spending (mechanism III), but these do not seem to have determined crucial changes in labor market institutions and pre-tax wage inequality (mechanism I). The next section will introduce a new case study, focusing on a policy reform in Finland.

4. The design of a new minimum income scheme: the case of Finland

This section focuses on the issue of minimum income and unemployment insurance, which has implications related to mechanism (III), namely the demand for social insurance goods and the overall public welfare spending in the Nordic countries. As of 2017-2018, the government of Finland is conducting an experiment to evaluate a new social insurance/social assistance scheme, labeled in the following as the Basic Income (BI, hereafter) scheme. This section aims at pinning down the functioning of a stylized version of the BI scheme and its possible implications for individual preferences for social insurance.

As far as the experimental design of the scheme and microsimulations of the different BI models are concerned, more details can be found in Kangas (2016). Kangas (2016) is a working paper version of the official report that a selected group of Finnish economists delivered to the Finnish government before the experiment started. For simplicity, this section will assume the following: a BI scheme is introduced in Finland (for instance, after the experiment is concluded) at the flat level of 560 net Euros per month per single adult (e.g., individuals aged over 24, excluding pensioners), fully replacing the previous unemployment insurance scheme (where the transfer is a fraction of the wage earned during employment). The key difference between the two schemes is that the BI targets the entire adult population regardless of employment status, whilst the unemployment insurance targets exclusively wage earners temporarily without employment. Notice that 560 net Euros per month per single adult corresponds to the actual ongoing experiment in Finland, for a representative sample of approximately 2000 unemployed individuals randomly chosen throughout the country (Kangas, 2016). How does this reform modify individual preferences for

public welfare spending? Will a BI scheme imply a higher or lower level of public welfare spending than the previous unemployment insurance scheme?

In order to give a tentative answer to this question, this paper draws on a slightly modified version of the model in Moene and Wallerstein (2001). Assume the entire population of agents (or voters, excluding pensioners) is divided into three groups (heterogeneous with respect to income and employment status), normalized to one and given by $\sigma_0 + \sigma_L + \sigma_H = 1$. σ_0 is the share of agents who are permanently outside the labor market (and, hence, are not eligible for unemployment insurance, although they will receive the new BI transfer). $\sigma_L + \sigma_H = \sigma_e$ is instead the share of agents who are employed or have been recently employed, and are therefore eligible for the unemployment insurance scheme (assume $\sigma_e > \frac{1}{2}$, implying that the employed agents are the median voters). Within the share of agents σ_e, the large majority of agents is given by workers with low wages σ_L, whilst the minority σ_H have high wages (this assumption will play a role when a shock to wage dispersion is introduced below). The welfare policy is determined by the following balanced budget constraint:

$$(2)\ \mathrm{T(t)} = \tau(\mathrm{t})\sigma_e\overline{\mathrm{w}}.$$

in which $\mathrm{T(t)}$ is the aggregate welfare spending per capita (initially, unemployment insurance), $\tau(\mathrm{t})$ is the deadweight cost of taxation, and $\overline{w}$ is the average wage of employed agents, as in Moene and Wallerstein (2001). The crucial welfare policy parameter is then given by γ, which represents the share of total welfare spending allocated to the share of employed (or recently employed) agents σ_e, with $1 - \gamma$ going to the share of permanently out-of-work individuals σ_0. The consumption function for the two types of agents is given by:

$$(3)\ \ C_e(\mathrm{w}) = (1 - \mathrm{t})\mathrm{w} + \frac{\gamma \mathrm{T(t)}}{\sigma_e};\ \ C_0 = \frac{(1-\gamma)\mathrm{T(t)}}{1-\sigma_e}.$$

Moene and Wallerstein (2001) show that, under the standard assumption for the utility functions, the expected lifetime utility of an agent is given by the weighted average of the two possible states. More interestingly for this section, Moene and Wallerstein (2001) analyze the choice of the level of welfare benefits, for a given γ, when pre-tax wage inequality increases. For a high γ (e.g., close to 1, with benefits allocated mostly to σ_e), a mean-preserving spread in pre-tax income distribution implies that the median voters (σ_L) prefer higher benefits. In other words, when the median voter receives a lower wage, and benefits are mostly allocated to the employed,

the median voter supports a higher level of welfare benefits. This is motivated by the fact that, when the ratio between the low wages and the median wage drops, the cost of paying for additional welfare benefits through taxation is also reduced. Hence, the willingness of low-wage agents to finance higher benefit levels increases. On the contrary, for a low γ (close to 0, with benefits allocated mostly to σ_0), the median voter will demand a reduction in public welfare spending in response to higher wage dispersion.

Let us now implement the welfare policy reform based on the experiment carried out in Finland, and observe how it influences the setting and results of the model. At $t = 0$, when the welfare policy consists of an unemployment insurance scheme (and other transfers strictly depending on previous employment status), $\gamma = 1$ and no welfare spending is allocated to σ_0. At $t = 1$, the universal BI policy providing the same transfer to all agents regardless of employment status replaces the unemployment insurance scheme, implying a reduction in γ , to a level within $0 < \gamma < 1$. More precisely, a universal welfare policy implies $\gamma = \sigma_L$, which determines the following modified consumption functions:

$$(4)\ C_e(\mathrm{w}) = (1 - \mathrm{t})\mathrm{w} + \mathrm{T(t)};\ \ C_0 = \mathrm{T(t)}\ .$$

If the assumption that the median voter is among the share of employed agents still holds (as a result of $\sigma_e > \frac{1}{2}$), then the main result of Moene and Wallerstein (2001) is equally valid in the current setting as well. This result can be summarized as follows. A reduction in γ, as a consequence of the welfare policy reform that replaces the unemployment insurance scheme with a BI scheme, implies that the median voter will demand less public welfare spending at $t = 1$ (in response to a change in wage dispersion), as compared to the demand before the policy reform. Because eligibility criteria for the universal BI scheme are not modifiable (by definition), the reduction in public welfare spending most likely translates into a reduction in the flat level of the BI transfer. Notice that this result will no longer hold if the out-of-work individual becomes the median voter, a hypothesis that can imply difficulties for the revenue side of the welfare policy budget given in (2). Let us relate this result to mechanism (III) of Section 2, the "equality multiplier" of Barth et al. (2015). A sudden change (either an increase or a decrease in the level of pre-tax inequality) will imply in any case lower support for public welfare spending for the case of the BI scheme, as compared to the previous unemployment insurance scheme. In other words, the result

of this section predicts that the BI policy reform in Finland will weaken the "equality multiplier" feature of the Nordic model, as described in Section 2.

5. Ageing, automation and the sustainability of welfare states

This section concludes the core of the paper by focusing on the issue of the sustainability of the Nordic welfare states, in light of the recent trends related to population ageing and automation technologies. As in the other sections, these trends will be related to the conceptual framework of the Nordic model, mostly as regards mechanism (I) (compression of wage differentials). The debate on the sustainability of the generous Nordic welfare states is summarized by the dichotomy between the more and less "optimistic" views. The more optimistic authors highlight the redistribution of the productivity gains from technological change and the Nordic electorates' sustained willingness to finance public expenditures through taxation. A recent contribution that can be roughly defined to fall under this categorization is the Statistics Norway empirical study by Holmøy and Strøm (2014). In their work, Holmøy and Strøm (2014) analyze the long run macroeconomic performances of the Norwegian economy, stating that the present welfare schemes can be maintained throughout the next decades and up to 2060, at the cost of a slight increase (from 37% to 40%) of the overall fraction of gross income devoted by households to taxes on income and wealth, and regardless of a significant reduction in daily working hours (from 7.5 to 6). In Holmøy and Strøm (2014), this is made possible by simulating annual labor productivity growth of 2 % in private industries and of 0.5 % in government sectors. In addition, recent theoretical studies have shown that the observed empirical tendency in industrialized economies leading to a higher share of the labor force employed in the provision of services (one of the consequences of Baumol's effect, as in Baumol, 1967, 1993) might not be at all detrimental to the sustainability of large welfare states. In more detail, taking into account individual responses to tax-financed service provision, Andersen (2016) and Andersen and Kreiner (2016) show that, under standard assumptions on preferences and labor supply, Baumol's effect will neither lead to a higher share of GDP devoted to public expenditure, nor to a higher optimal tax rate.

On the other hand, less "optimistic" contributions by Lindbeck (2006) and van der Ploeg (2007) claim that an ever-increasing share of GDP devoted to public spending will lead either to unsustainable welfare states (for given tax rates), or to necessarily higher tax rates in conflict with the Laffer bound. In addition, authors who advocate for a retrenchment of the welfare states in the

Nordic countries due to the ageing population often refer to the projected increases of the old-age dependency ratios in the Nordic countries - for instance, an increase in the ratio of population aged 70+ years to population aged 25-69 years. Let us look more closely at this ratio for the four Nordic countries in Figure 7, by plotting probabilistic projections of the old-age dependency ratios (source: UNDESA).

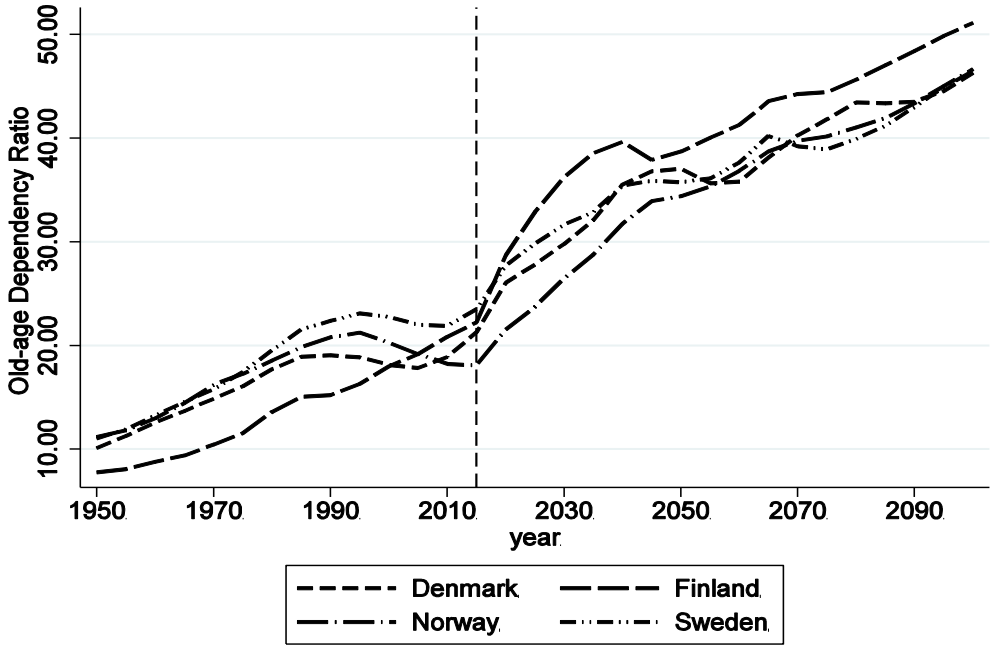

FIGURE 7. OLD-AGE DEPENDENCY RATIOS, 1950-2100

Notes: This figure plots the Nordic countries' 1950-2100 projection series of the old-age dependency ratio (70+)/(25-69), in other words the ratio of population 70+ per 100 population 25-69. A reference x-line for the year 2015 marks the end of actual data and the start of projections. Data are obtained from the United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision. UNDESA: "The projections are based on the probabilistic projections of total fertility and life expectancy at birth, based on estimates of the 2015 Revision of the World Population Prospects. These probabilistic projections of total fertility and life expectancy at birth were carried out with a Bayesian Hierarchical Model."

Figure 7 shows the exponentially increasing series of the old-age dependency ratios for all four Nordic countries, which indeed calls for a more detailed analysis of the possible consequences for the revenue side of public finances. The old-age dependency ratios rose by approximately 100% (from approximately 10 to 20) in the Nordic countries in the last 60 years (the reference year is 2015), whilst the data predict another 100% increase (from 20 to approximately 40) in the next 60 years. However, the current study aims at contributing to this debate by showing descriptive empirical evidence from an alternative ratio.

Define the Welfare State Sustainability (WSS) ratio for country i at time t as follows:

$$(5)\ \mathrm{WSS_{i,t}(PSR, SE)} = \mathrm{f}\left(\frac{\mathrm{PSR_{i,t}}}{\mathrm{SE_{i,t}}}\right).$$

in which $PSR_{i,t}$ is the potential support ratio for country i at time t, given by the ratio between the 25-69 year old population and the population 70+ years old (e.g., the inverse of the old-age dependency ratio shown above); and $SE_{i,t}$ is the aggregate public social expenditure as a percentage of GDP, for country i at time t. The WSS ratio increases when the demographic trends summarized in the PSRs signal an increase in the proportion of the working-age population, but it decreases when a higher denominator (public social expenditure as a percentage of GDP) implies that a given amount of working-age agents will have to finance a higher share of aggregate public social expenditure. The WSS ratio for the four Nordic countries in the period 1980-2100 is plotted in Figure 8, by relying on actual data for the period 1980-2015 and on two different projection series for the period 2020-2100.

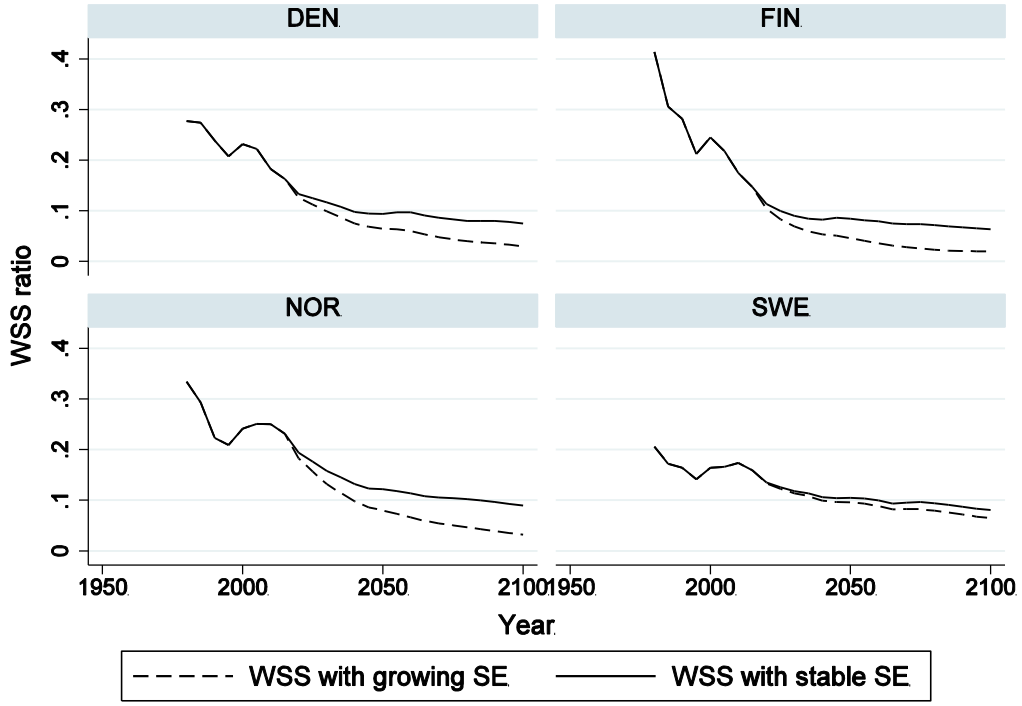

FIGURE 8. WELFARE STATE SUSTAINABILITY (WSS) RATIOS, 1950-2100

Notes: The solid line (WSS with stable SE) shows the 1980-2100 series of the WSS ratio by assuming a stable aggregate public social expenditure level as a percentage of GDP in each of the Nordic countries, more precisely at the 2015 level. The dashed line (WSS with growing SE) shows the 1980-2100 series for the WSS in which the growth rate of the public social expenditure as a fraction of GDP in the period 2020-2100 equals the average growth rate for each of the Nordic countries in the 1980-2015 period. Data on the potential support ratios (the 25-69 years population divided by the population 70+ years) are obtained from the United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision. Data on the public social expenditures as a share of GDP were obtained from the OECD Social Expenditure Database (SOCX).

In Figure 8, the solid line (WSS with stable SE) shows the series of the WSS ratio by assuming that the aggregate public social expenditure level as a percentage of GDP in each of the Nordic countries stays constant at the 2015 level for the period 2020-2100. The dashed line (WSS with growing SE) shows instead a scenario in which the growth rate of public social expenditure as a fraction of GDP in the period 2020-2100 equals the average growth rate for each of the Nordic countries in the 1980-2015 period. Regardless of which of the two WSS ratios is chosen, the predictions in Figure 8 imply a steady reduction in the post-2015 value of the WSS ratios for each of the four Nordic countries (with the exception of a slightly growing WSS with stable SE in Denmark and Finland in the period 2050-2060). The economic interpretation of the evidence of Figure 8 is unambiguous: the financing prospects of the welfare states in the Nordic countries, when only demographics and public social expenditure trends are taken into account, do not indicate a path of higher sustainability. An external factor that might foster sustainability of the Nordic welfare states is, of course, future higher productivity growth (reducing the proportion of working-age individuals needed to finance public social expenditure), which was not taken into account in the evidence provided by Figures 7 and 8.

Before concluding, the last part of this section aims at complementing the above evidence by introducing some insights related to the potential effects of demographic trends on automation and, in turn, on a key feature of the Nordic model, namely mechanism (I) (wage compression). The stylized evidence of Figures 7 and 8 points in the same direction: the ageing process of the population in the Nordic countries is bound to continue and eventually increase its pace. However, what does ageing imply for the dynamics of technological progress and more precisely automation, which in turn might have significant effects on the pre-tax wage distribution?

By analyzing novel data from the International Federation of Robotics (IFR) across 49 industrialized countries, Acemoglu and Restrepo (2017) provide one possible answer to the first part of this question: how ageing affects the adoption of robotic technology and automation. Their results are striking, showing a strong positive correlation between the increase in old-age dependency ratios and the change in the number of robots at work (per millions of labor hours) in the industrialized economies observed. Acemoglu and Restrepo (2017) further explain this evidence with a model whose intuition can be summarized as follows: it is precisely the scarcity of younger workers in ageing countries that fosters higher adoption of robots and automation technologies. Acemoglu and Restrepo (2017) proceed to identify the channels through which

ageing and increased automation affect economic growth, which lies outside the focus of the current paper.

The line of reasoning in which we are interested goes instead as follows: if ageing (documented in the Nordic countries by Figures 7 and 8) triggers automation as shown by Acemoglu and Restrepo (2017), then the Nordic countries will experience an increase in automation technology in production in the next decades. How will this in turn affect the distribution of pre-tax wages and hence the degree of wage compression highlighted as a key feature of the Nordic model in (I)? Asplund et al. (2011) provide a tentative answer to this question based on data on occupational employment patterns from 1995 to 2006, showing that, for the Nordic countries, a shift from skill-biased to routine-biased technological change has led to a skills-polarizing effect on the employment structure (as surveyed for other European countries as well in Fernández-Macias and Hurley, 2016). In turn, Asplund et al. (2011) claim that this process of job polarization has gone hand in hand with a slight reduction in the pre-tax wage compression for the Nordic countries (with most of the increase in wage dispersion coming from the half of the distribution above the median wage). Notice that Asplund et al. (2011) carefully claim that their results need a deeper causal analysis (possibly at the within-country level). In any case, the evidence from Asplund et al. (2011) of increasing income inequality in all of the Nordic countries is in line with the stylized facts of Figures 1 and 5 (which were commented upon in the previous sections of this paper), which show that income inequality has indeed been increasing in each of the Nordic countries since approximately 1985. It remains to see whether and how this evidence of higher income inequality for the Nordic countries will further affect the institutions and functioning of the Nordic model in the longer run (recall that both mechanisms II and III rely on I, namely compression of wage differentials). In conclusion, this section has shown the need for future research on the chain of reasoning that goes from ageing trends to increased automation (as in Acemoglu and Restrepo, 2017), and on the final effect of automation on the degree of wage compression in the Nordic countries (estimated to be negative by Asplund et al., 2011).

6. Concluding remarks

The aim of this research was to provide an up-to-date overview on the robustness of the various institutions that constitute the bulk of the Nordic model of economic development and welfare, analyzed both from "within" (through the country case studies of Norway and Finland) and from

"outside" (in the third and last section on future prospects and sustainability). The findings of the core of the paper can be summarized as follows.

At first, the results of the empirical analysis on the effect of the resource windfall in Norway have shown that, although the country has experienced higher income inequality since around 1985, this cannot be causally explained by the resource windfall. This has been shown by estimating the comparative effect of the windfall on income inequality for Norway as compared to the other Nordic countries, which was shown not to be significant. In other words, the causes of the increase of income inequality in Norway and in the rest of the Nordic countries since the mid-1980s have to be found elsewhere. The interesting intuition drawn from this result is that Norwegian labor market institutions proved to be robust to the shock of the resource windfall. In addition, descriptive evidence on the combined index of generosity of the welfare system indicated that the resource windfall has most likely played a role on the revenue side of public finances, allowing Norway to sustain public social expenditure whilst the neighboring Nordic countries have experienced a retrenchment of the welfare states.

The second case study on Finland focused on another crucial element of the Nordic model, namely social insurance and individual preferences for redistribution. Finland is currently experimenting with a new minimum income scheme labeled as Basic Income. The results of this section have shown theoretically that, under the Basic Income scheme, an increase in income inequality reduces the demand for social insurance goods, as compared to the demand for such goods under the initial unemployment insurance scheme, hence weakening the "equality multiplier". This was explained by the fact that, when the median voter is an employed agent, a higher share of public social expenditure devoted to out-of-work individuals under the Basic Income scheme reduces the willingness of the employed agents to finance government expenditures. It has to be pointed out that the assumption used in the current paper (with the Basic Income scheme fully replacing unemployment insurance) was purely speculative, in the sense that the debate in Finland is not at this stage. However, several authors advocating introduction of different Basic Income schemes have proposed a partial or full replacement of existing social insurance schemes; hence, the current paper is intended to provide some theoretical evidence on this hypothesis.

The third and last section of the core of the paper focused on the sustainability of Nordic welfare states, and the recent trends as regards population ageing and automation technologies. The stylized evidence from the old-age dependency ratios and the Welfare State Sustainability (WSS)

ratios shown in this section point in the same direction of a lower degree of future sustainability of public welfare spending in the Nordic countries. However, external productivity shocks enhancing sustainability can come from automation technologies, whose relationship with population ageing was shown to be positive in the most recent research on the issue. If ageing fosters automation, which in turn fosters higher productivity growth, then the sustainability picture might change. Automation might, however, have effects on the level of wage compression in Nordic countries, which is one of the key elements of the Nordic model. Indeed, recent research presented in this section confirmed the stylized evidence from the previous sections on higher pre-tax wage dispersion, in parallel to increased automation (and job polarization).

In conclusion, this paper has attempted to contribute to the political economy and institutional economics literature on Northern European economies by providing an overview of the ongoing trends and changes that the Nordic model of economic development and welfare is currently undergoing. Future research on the issue can complement the current study by adopting a within-country focus on each of the issues analyzed in this paper, in addition to further analyzing the robustness of the Nordic model from "outside".

Appendix: Data sources

- The Standardized World Income Inequality Database (SWIID). The SWIID Version 5.1 is available at http://fsolt.org/swiid/. Dataset accessed: 8/1/2017.
- Data Base on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2014 (ICTWSS). Version 5.0. Accessed 9/1/2017.
- OECD.Stat, available at http://stats.oecd.org/ Accessed 9/1/2017.
- The Comparative Welfare Entitlements Dataset 2 (CWED2). Version 2014-03. University of Connecticut & University of Greifswald. Methodological guidelines for the correct use of the dataset are available from Scruggs L. (2004). Available at: http://cwed2.org/ Accessed 11/1/2017.
- UTIP-UNIDO industrial pay inequality: industrial pay-inequality data (1963-2008) are available from the University of Texas Inequality Project (UTIP) at http://utip.gov.utexas.edu/data.html
- Top income shares excluding capital gains for the four Nordic countries (1960-2011) were retrieved from the World Wealth and Income Database (WID): http://wid.world/ .
- United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision. https://esa.un.org/unpd/wpp/ Accessed 14/1/2017.

References

Abadie A., Diamond A. and Hainmueller J. (2015). Comparative Politics and the Synthetic Control Method, *American Journal of Political Science*, 59: 495-510. http://dx.doi.org/10.1111/ajps.12116

Acemoglu D., Robinson J. A. and Verdier T. (2014). Asymmetric growth and institutions in an interdependent world, *Journal of Political Economy* (forthcoming).

Acemoglu D. and Restrepo P. (2017). Secular Stagnation? The Effect of Aging on Economic Growth in the Age of Automation, *NBER Working Paper* 23077. http://dx.doi.org/10.3386/w23077

Andersen T.M. (2016). Does the public sector implode from Baumol's cost disease? *Economic Inquiry*, 54(2): 810-818. http://dx.doi.org/10.1111/ecin.12304

Andersen T.M. and Kreiner C.T. (2016). Baumol's Cost Disease and the Sustainability of the Welfare State, *Economica*. http://dx.doi.org/10.1111/ecca.12221

Andersen T. M., Holmström B., Honkapohja S., Korkman S., Söderström H. T. and Vartiainen J. (2007). The Nordic Model: Embracing Globalization and Sharing Risks, *Helsinki: The Research Institute of the Finnish Economy (ETLA)*.

Asplund R., Barth E., Lundborg P. and Misje Nilsen K. (2011). Polarization of the Nordic Labour Markets, *Finnish Economic Papers*, 24(2): 87-100.

Barth E. and Moene K. O. (2012). Employment as a Price or a Prize of Equality: A Descriptive Analysis, *Nordic Journal of Working Life Studies*. http://dx.doi.org/10.19154/njwls.v2i2.2355

Barth E., Moene K.O. and Willumsen F. (2014). The Scandinavian model – An interpretation, *Journal of Public Economics*, 117: 60-72. http://dx.doi.org/10.1016/j.jpubeco.2014.04.001

Barth E., Finseraas H. and Moene K.O. (2015). Political reinforcement: how rising inequality curbs manifested welfare generosity, *American Journal of Political Science*, 59(3): 565-577. http://dx.doi.org/10.1111/ajps.12129

Barth E. and Moene K. O. (2016). The Equality Multiplier: How Wage Compression and Welfare Empowerment Interact, *Journal of the European Economic Association*, 14(5): 1011-1037. http://dx.doi.org/10.1111/jeea.12163

Baumol W. J. (1967). Macroeconomics of unbalanced growth: the anatomy of urban crisis, *American Economic Review*, 57(3), 415-26.

Baumol W.J. (1993). Health care, education and the cost disease: a looming crisis for public choice, *Public Choice*, 77: 17-28. http://dx.doi.org/10.1007/978-94-017-3402-8_3

Calmfors L. (1993). Lessons from the Macroeconomic Experience of Sweden, *European Journal of Political Economy*, 9(1): 25-72. http://dx.doi.org/10.1016/0176-2680(93)90028-S

Dyrstad J.M. (2016). Resource curse avoidance: governmental intervention and wage formation in the Norwegian petroleum sector, *Oxford Economic Papers*, 1-25. http://dx.doi.org/10.1093/oep/gpw053

Englund P. (1999). The Swedish banking crisis: Roots and consequences, *Oxford Review of Economic Policy*, 15: 80-97. https://doi.org/10.1093/oxrep/15.3.80

Erixon L. (2010). The Rehn-Meidner Model in Sweden: Its Rise, Challenges and Survival, *Journal of Economic Issues*, 44(3): 677-715. https://doi.org/10.2753/JEI0021-3624440306

Erixon L. (2016). Building a path of equality to economic progress and macroeconomic stability - the economic theory of the Swedish model, *Research Papers in Economics*, Department of Economics, Stockholm University, 2016:3.

Esping-Andersen G. (1990). The three worlds of welfare capitalism. Polity Press, Cambridge.

Fernández-Macías E. and Hurley J. (2016). Routine-biased technical change and job polarization in Europe, *Socio-economic Review*. https://doi.org/10.1093/ser/mww016

Holmøy E. and Strøm B. (2014). Må vi jobbe mer? Konsekvenser av mindre materialistisk vekst, *Statistics Norway*, report 2014/13 (available only in Norwegian). https://goo.gl/HoFIQU

Honkapohja S. (2009). The 1990's financial crises in Nordic countries, *Bank of Finland Research Discussion Papers*, no. 5-2009.

Iacono R. (2016). The Nordic Model and the Oil Nation, *Working Papers hal-01402143*, HAL. https://hal.archives-ouvertes.fr/hal-01402143/document

Kangas O. (2016). From idea to experiment - Report on universal basic income experiment in Finland, *Kela – FPA Working papers* 106(2016). http://hdl.handle.net/10138/167728

Larsen E.R. (2006). Escaping the Resource Curse and the Dutch Disease? When and Why Norway Caught Up with and Forged Ahead of Its Neighbors, *American Journal of Economics and Sociology* 65: 605-640. http://dx.doi.org/10.1111/j.1536-7150.2006.00476.x

Lindbeck A. (1997). The Swedish Experiment, *Journal of Economic Literature*, 35(3): 1273-1319. http://www.jstor.org/stable/2729978

Lindbeck A. (2006). Sustainable Social Spending, *International Tax and Public Finance*, 13(4): 303-24. http://dx.doi.org/10.1007/s10797-006-9175-5

Mideksa T.K. (2013). The economic impact of natural resources, *Journal of Environmental Economics and Management*, 65: 277-289. http://dx.doi.org/10.1016/j.jeem.2012.07.005

Moene K.O. and Wallerstein M. (1997). Pay inequality, *Journal of Labor Economics*, 15(3): 403-430. http://dx.doi.org/10.1086/209866

Moene K. and Wallerstein M. (2001). Inequality, social insurance, and redistribution, *American Political Science Review*, 95(4): 859-874.

Moene K. (2008). Labor and the Nordic Model of Social Democracy - Introduction, in Selected Works of Michael Wallerstein — The Political Economy of Inequality, Unions, and Social Democracy, edited by Austen-Smith D., Frieden J.A., Golden M.A., Moene K.O. and Przeworski A. Cambridge: Cambridge University Press.

Salverda W. and Checchi D. (2014). Labour-Market Institutions and the Dispersion of Wage Earnings, *IZA Discussion Papers* 8220, Institute for the Study of Labor. http://ftp.iza.org/dp8220.pdf

Scruggs L. (2014). Social Welfare Generosity Scores in CWED 2: A Methodological Genealogy, *CWED working paper series no.1*, University of Connecticut & University of Greifswald.

Scruggs L., Jahn D. and Kuitto K. (2014). Comparative Welfare Entitlements Dataset 2 Codebook, Version 2014-03, University of Connecticut & University of Greifswald.

Solt F. (2016). The Standardized World Income Inequality Database, *Social Science Quarterly* 97. SWIID Version 5.1, July 2016. http://dx.doi.org/10.1111/ssqu.12295

Stiglitz J. (2015). Leaders and followers: Perspectives on the Nordic model and the economics of innovation, *Journal of Public Economics*, 127: 3-16. http://dx.doi.org/10.1016/j.jpubeco.2014.09.005

Van der Ploeg F. (2007). Sustainable social spending and stagnant public services: Baumol's cost disease revisited, *Finanzarchiv*, 63(4): 519-47. http://www.jstor.org/stable/40913167

Visser J. (2015). ICTWSS Data base. Version 5.0. Amsterdam: Amsterdam Institute for Advanced Labour Studies AIAS. October 2015.

Vona F. and Zamparelli L. (2014). Centralized Wage Setting and Active Labor Market Policies in Frictional Labor Markets: The Nordic Case, *Eastern Economic Journal*, 40(3): 349-364. http://dx.doi.org/10.1057/eej.2013.11

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