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Institutional determinants of labour market outcomes in the EU – A Social Model Employment Efficiency and Income Distribution Index

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Abstract

Labour market performance as measured by employment rates conceals significant differences among EU countries. In 2014 the variation was between 48.8% in Greece and 74.4% in Sweden. Average employment rate for the EU28 was at 64.8% in 2014, perceptibly below the Lisbon goal of 70 percent. Inequality in income distribution as measured by S80/S20 income quintile share ratio ranges in 2013 from 3.4 in Czech Republic to 6.6 in Bulgaria, Romania and Greece and has risen especially in Southeast European countries during the last years. To some extent, labour market and social institutions may account for these differences. Implemented social models in Europe differ from each other by different combinations of policies and institutions showing the dimensions of social models. We use these dimensions to develop two indices which capture the employment and income distribution efficiency of social models i.e. shows how institutions impact on employment and income distribution. Both indices can be used to rank and compare the institutional quality of social models across EU countries.

1 Introduction

European social models differ from each other by different combinations of policies and institutions. Institutional dimensions of social models can be described by a potentially vast number of empirical socio-economic indicators. Our indicators focus on labour market institutions and include social protection indicators to reflect the productivity-enhancing role of social policy. We identify an institutional set of variables by means of Principal Components Analysis (PCA), which allows for reducing a large list of indicators to a few independent components. Our selected indicators reflect the main tasks of social models (reduction of poverty and income inequality; protection against insurable labour market risk; increase of rewards from labour market participation) and can be condensed to identify major social policy dimensions.

These dimensions can be exploited not only to classify clusters of social models (Knogler, Lankes, 2012) but can be related to employment and income distribution in European countries. Our aim is to develop indices which assess the relevance of institutional determinants for employment and income distribution. Therefore we compute the weights for the components with a regression of the components – which are due to the PCA linear independent – on the employment rate and income inequality as measured by the S80/S20 income quintile ratio. These indices can be used to quantify and compare the institutional quality of social models across EU countries. The Employment Efficiency Index ranks European Countries according to their employment efficiency, The Income Distribution Index ranks the European countries according to their inequality of income distribution.

The paper is organized as follows: the section 'Employment and income distribution patterns and institutions' gives a brief overview of employment rates and income distribution in EU Member States and discusses the impact of institutions on variations in observed cross country employment rates and income distribution ratios. The section 'Data and methodology' presents data and our two-step methodology, a sequence of principal components analyses and subsequent regression on employment rate and income distribution, respectively. The first step is to yield policy dimensions; the second step leads us to the weights to compute the indices. The section 'Results' presents the results of the PCA, which yields three policy dimensions as the basic components of social models. The subsequent regression of these components on the employment rate yields the *Social Model Employment Efficiency Index* – the regression on the income distribution yields the *Social Model Income Distribution Index*. We end with some conclusions.

2 Employment and income distribution patterns and Institutions

Despite some progress during the second half of the 1990s and the first half of 2000s, labour market performance in the EU has been rather week. Employment rates admittedly rose and unemployment rates sunk till 2008, but during the crisis period beginning with 2008, unemployment rate in the EU sharply rose and was at 10.4% in 2014. Employment rates are at 64.8% in the EU28 and below the Lisbon goal (70 percent) (figure 1) (European Commission, 2014).

However, the overall trends in the EU conceal significant differences in labour market outcomes among EU Countries. Although employment rates in most countries are recently (2014) higher than 1995, the difference in employment rates between the country with the highest employment rate and the country with the lowest employment was largely constant with more than 27 percentage points in 1995 (Denmark: 73.9; Spain: 46.8) and almost 26 percentage points in 2014 when the variation was between 48.8% in Greece and 74.4% in Sweden (according to Eurostat).

Similarly, unemployment rates differ in 1995 between 22.8 percent in Spain and 7.0 percent in Denmark. In 2014 the difference between the highest unemployment rate of 26.7 percent in Greece and 6.8 percent in Denmark was even higher.
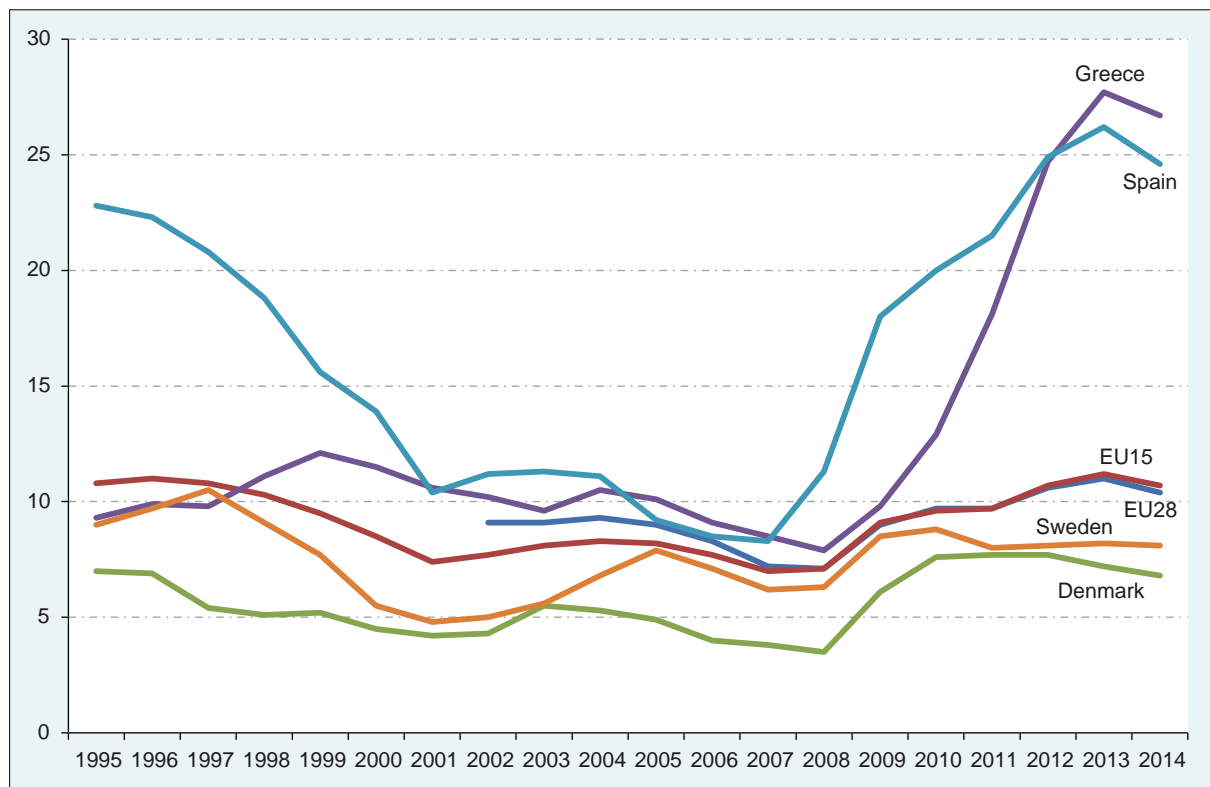
Source: Eurostat.

Unemployment rate

2
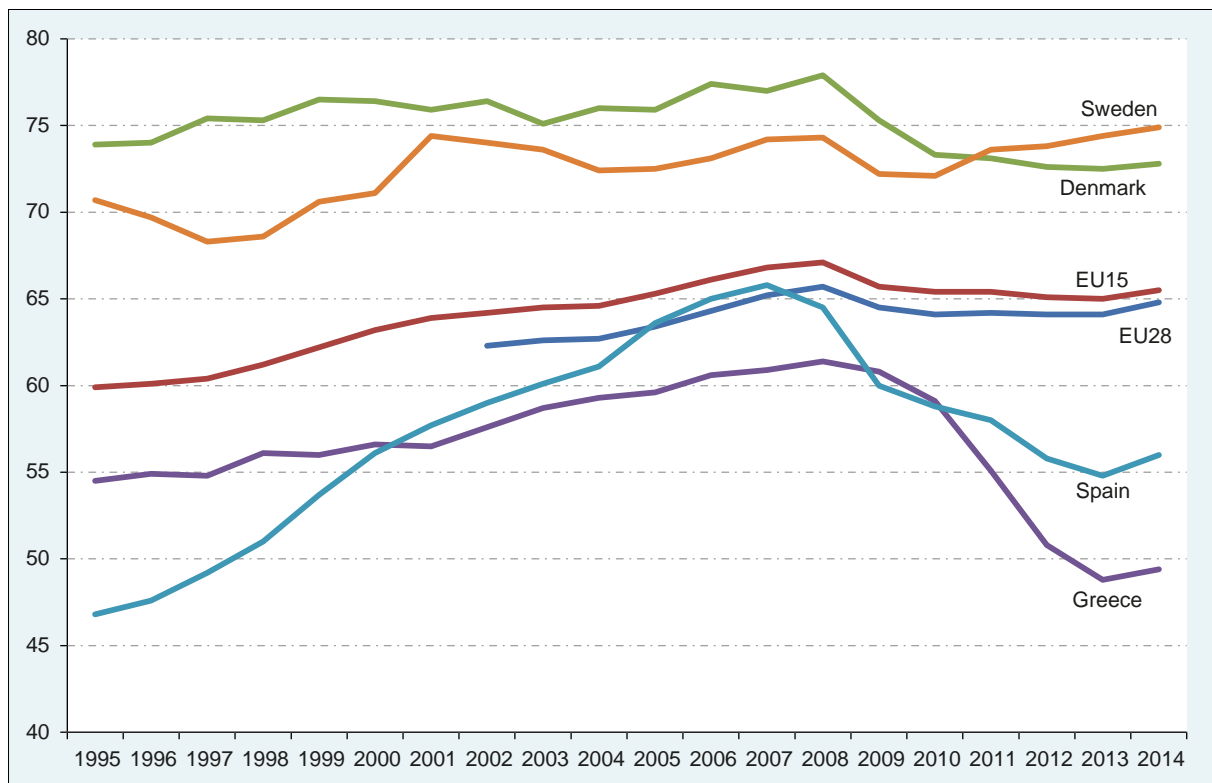
Source: Eurostat.

Employment rate

Figure 1: Unemployment and employment rate, 1995–2014

To some extent labour market institutions may account for these differences. There is a long-standing literature relating labour market outcomes to labour market institutions (for a broad review of the literature see Boeri and Van Ours (2008), brief summaries in Layard, Nickell and Jackman (2005, p. XIII–XXXIX) and Blanchard (2006), among others). Most researchers have focused on the relationship between institutions and unemployment. Some authors have also reported evidence on the link between institutions and employment (see Nickell (1997) and EU Commission (2004), and Bassanini and Duval (2006), among others). More recently, the focus of labour economists has shifted to interactions between different labour market institutions (Coe and Snower, 1997, Belot and van Ours 2001, Bassanini and Duval 2009). Labour market institutions have complementary effects on labour market outcomes, which are indicative for broad reform packages, rather than changes in a single institutional variable. Interactions between institutions triggered the analysis of economic systems or social models, which can be identified to prevailing combinations of policies and institutions across countries.

The low employment and growth performance over the recent decades in the EU has increased concerns regarding an increasing wage dispersion, income inequality and social exclusion. Different indicators show evidence that income inequality has increased significantly since the mid-1980s, and the Euro area debt crisis together with fiscal consolidation programmes adopted by several EU countries could worsen the situation in the short and medium run. Trends of steadily increasing income inequalities are well documented not only in EU countries but in OECD countries and most advanced and emerging developing countries as well.[1] New OECD data show that well into the recovery from global economic situation, the drop in income during the Great Recession has been larger for individuals at the bottom than for those at the top of the distribution for what reason the distribution of pre-tax and transfer income remains significantly more unequal than it was before (OECD, 2014).
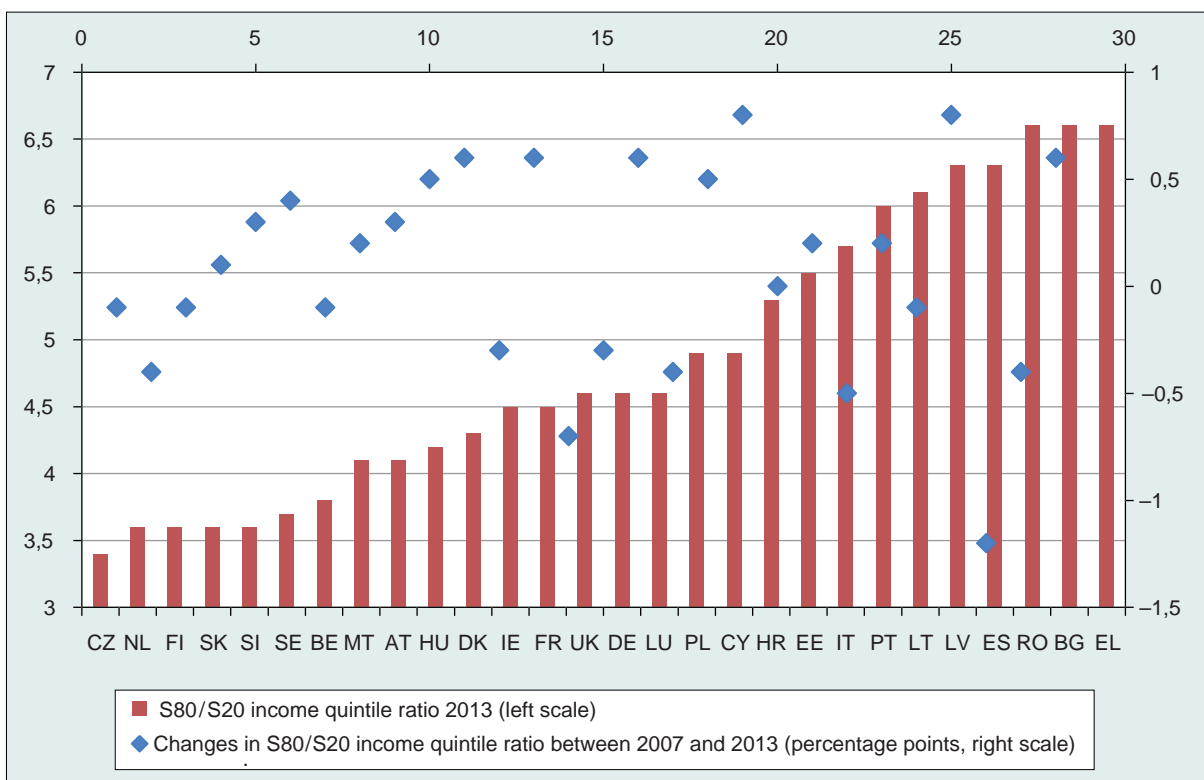
[*] The ratio of total income received by the 20% of the population with the highest income (top quintile) to that received by the 20% of the population with the lowest income (lowest quintile). Income must be understood as equivalised disposable income (see Footnote 2)

Source: Eurostat.

Figure 2: Income inequality. S80/S20 income quintile ratio[*] 2007 /2013

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[1] For an overview on trends of inequality see Dreger (2014), OECD (2015), Dabla-Norris (2015).

EUROSTAT regularly provides two indicators related to income inequality: the Gini coefficient of equivalised disposable income and the S80/S20 income quintile ratio, which is used here.[2] Recent changes in income inequality have been associated with the business cycle, particularly with the accessibility of labour markets. However, the situation is far from being homogenous: as figure 2 shows the impact of the recent crisis had not been the same across Europe (see figure 2). Increases and decreases of income inequality can be observed in both high and low inequality countries. Calculating income inequality by Gini coefficient would give more or less the same picture.

The literature highlights three drivers of higher income inequality, namely technological change, trade globalisation, and labour market institutions and redistributive policies (Dabla-Norris, 2015; Kierzenkowski and Koske, 2012). Technological change with new information technologies raises disproportionally the demand for capital and skilled labour over low-skilled or unskilled labour and drives up the skill premium, resulting in increased labour income inequality. Trade specialisation and offshoring shifts labour demand in developed countries towards skilled workers, reinforcing the effect of technological change on inequality (Dreger, 2014).

Labour market policies and institutions can have an impact, both on the employment record and the wage distribution. Since wages for most people make up the predominant part of their income, the result is a relationship between labor market institutions and household income. More flexible labour market institutions can induce reallocation resources to more productive firms. However, greater flexibility can pose challenges especially for low skilled workers and explain income inequalities. Also, a decline in trade union membership could reduce the bargaining power of labour and result in enhanced wage inequality (OECD (2012).[3] For many labour market institutions, such as employment protection legislation, the impact on inequality is less clear as they affect both the dispersion of earnings and the level of employment in sometimes conflicting ways (Dabla-Norris, 2015).

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[2] Equivalised disposable income is the total income of a household after tax and other deductions that is available for spending or saving divided by the number of household members converted into equalized adults. The indicator is calculated using data from the EU Statistics on Income and Living Conditions (EU_SILC) available for most EU members.

[3] In relation to US Levy and Temin argue that the income distribution was strongly shaped by a set of economic institutions. The early postwar years were dominated by unions, a negotiating framework set in the Treaty of Detroit, progressive taxes, and a high minimum wage -- all parts of a general government effort to broadly distribute the gains from growth. More recent years have been characterized by reversals in all these dimensions in an institutional pattern known as the Washington Consensus. Levy and Temin see other explanations for income disparities including skill-biased technical change and international trade as factors operating within this broader institutional story (Levy and Temin (2007).

3 Data and Methodology

Besides genuine institutions of labour markets we include further social policy institutions that might influence labour market outcomes and income distribution and can be used to identify different dimensions of social models. This relates to a growing body of literature which confirms the existence of different social models, identified according to different combinations of policies and institutions (Knogler/Lankes 2012). We develop three dimensions of social models which are weighted and combined into an Employment Efficiency and Income Distribution Index.

The central idea of the indices is to assess the extent to which European countries dispose of the institutional quality to achieve high levels of employment and social cohesion. Labour market and social policy institutions can be described by a potentially vast number of empirical indicators. The guiding principle for our selection of indicators is the hypothesis that social models reflect the main tasks of labour and social policy to varying degrees, that is, reduction of poverty and income inequalities, protection against insurable labour market risk, and increase of rewards from labour market participation (Boeri, 2002). In detail, eleven indicators which are essentially exogenous to the economic outcome (employment rates, income inequality etc.) were included. All these indicators taken mostly from Eurostat and World – Bank sources characterize policy or institutional features chosen in order to reflect the main tasks of social and labour market policy (table 1).

In order to map the task of poverty reduction, we use *the reduction of the at-risk-of-poverty-rate* by social transfers, illustrating the influence of policy on income distribution and poverty. *Early leavers from education and training* as well *as mean years of schooling* reflect the impact of education on poverty and income distribution.

As employment protection legislation and unemployment benefits are two different ways to protect against the risks of labour markets (Boeri et. al., 2003) we include *hiring and firing practises* and *generosity of unemployment benefits*. High labour market security is influenced by *expenditures on active labour market policy*, as well as by investments in human capital, where the latter is operationalised by two indicators, *life long learning* and *expenditures for education*. The arrangement of protection against labour market risks is eventually influenced by form of social dialogue. The *flexibility of wage determination* takes account of the impact that these factors have on employment trends, as empirical studies support.[4]

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[4] There is evidence for a stronger decline in employment rations in countries with weaker coordination of wage bargaining (OECD, 2003, Chapter 3). Research by Bassanini and Duval (2006) shows that highly coordinated and/or centralized wage-bargaining systems are considered to reduce employment.

An intrinsic incentive for labour market participation can be equated with the level of corruption as measured by the *Corruption Perception Index*. The higher corruption the more disincentives to participate in (official) labour markets and to bear tax burden associated with the return of an unemployed person to employment (*marginal effective tax rate*) will gain importance.

Table 1: Social policy indicators

Indicator	Description and Source
Mean years of schooling (males aged 25 years and above) (years)	Average number of years of education received by people ages 25 and older, converted from education attainment levels using official durations of each level. Source: Source: Barro and Lee (2013), UNESCO Institute for Statistics (2013b) and HDRO estimates based on data on educational attainment from UNESCO Institute for Statistics (2013b) and on methodology from Barro and Lee (2013). http://hdr.undp.org/en/content/mean-years-schooling-males-aged-25-years-and-above-years
Reduction of poverty via social transfers	Quotient of: (i) The share of persons with an equivalised disposable income, before social transfers, below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers). Retirement and survivor's pensions are counted as income before transfers and not as social transfers. (ii) The share of persons with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers). Source: Eurostat.
Early leavers from education and training	This indicator refers to persons aged 18 to 24 fulfilling the following two conditions: first, the highest level of education or training attained is ISCED 0, 1, 2 or 3c short, second, respondents declared not having received any education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding no answers to the questions "highest level of education or training attained" and "participation to education and training". Both the numerators and the denominators come from the EU Labour Force Survey. Source: Eurostat.
Hiring and firing practises	In your country, how would you characterize the hiring and firing of workers? [1 = heavily impeded by regulations; 7 = extremely flexible] Source: Global competitiveness Report, World Economic Forum, Executive Opinion Survey.
Generosity of unemployment benefits	Expenditures on passive labour market policy (Category 8 and 9: financial assistance that aims to compensate individuals for loss of wage or salary and support them during job-search (i.e. mostly unemployment benefits) or which facilitates early retirement.) weighted with unemployment ratio. Source: Eurostat; Own calculations.
Expenditures on active labour market policy	Expenditures on active labour market policy (Category 2–7: interventions that provide temporary support for groups that are disadvantaged in the labour market and which aim at activating the unemployed, helping people move from involuntary inactivity into employment, or maintaining the jobs of persons threatened by unemployment) weighted with unemployment ratio. Source: Eurostat; Own Calculations.

Table 1 (continued)

Indicator	Description and Source
Life-long learning	Percentage of the adult population aged 25 to 64 participating in education and training: Life-long learning refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding those who did not answer to the question 'participation to education and training'. Both the numerator and the denominator come from the EU Labour Force Survey. The information collected relates to all education or training whether or not relevant to the respondent's current or possible future job. Source: Eurostat.
Expenditures for education (investments in education and training)	Total public expenditure on education as a percentage of GDP: Generally the public sector funds the education either by bearing directly the current and capital expenses of educational institutions (direct expenditure for educational institutions) or by supporting students and their families with scholarships and public loans as well as by transferring public subsidies for educational activities to private firms or non-profit organizations (transfers to private households and firms). Both types of transaction together are reported as total public expenditure on education. Source: Eurostat.
Flexibility of wage determination	In your country, how are wages generally set? [1 = by a centralized bargaining process; 7 = by each individual company] | 2013–14 weighted average Source: Global competitiveness Report, World Economic Forum, Executive Opinion Survey.
Marginal effective tax rates on employment incomes	This indicator measures the percentage of gross earnings which is "taxed away" through higher tax and social security contributions and the withdrawal of unemployment and other benefits when an unemployed person returns to employment. This structural indicator covers single persons without children earning, when in work, 67% of the average earnings. Source: Eurostat.
Corruption Perception Index	A country/territory's score indicates the perceived level of public sector corruption on a scale of 0–100, where 0 means that a country is perceived as highly corrupt and a 100 means that a country is perceived as very clean. Source: Transparency International http://www.transparency.org/research/cpi/

The employment efficiency and income distribution index is based on a two-step procedure.

First, a Principal Component Analysis (PCA)[5] is carried out on eleven original social policy indicators in order to identify the main dimensions of social models.[6] PCA is a multivariate analysis technique that aims to evaluate how different variables are associated with each other.

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[5] SPSS version 21, PCA based on the correlation matrix of the eleven indicators with varimax rotation to indicate the best distinct components.

[6] We use standardised indicators. Transformation/standardization of indicators: indicator values minus mean value (mean value 2006–2010) divided by standard deviation (mean value 2006–2010). Resulting is a linear combination of indicators with fixed weights.

The variable identification issue (several indicators may proxy for the same institution or distinct variables may proxy for similar institutions) is addressed by reducing the dimensionality of the dataset. This is achieved by transforming correlated indicators into the (smallest possible) new set of variables (the principal components) using the correlation matrix (Nardo, et. al. 2005). The obtained components are uncorrelated, thus measuring different 'statistical dimensions' in the dataset and addressing the problem of multicollinearity of indicators.

Second, after reducing the dimensionality of the dataset by transforming the indicators in three independent variables (components), we analyze in a second step how many components are relevant in determining labour market outcome (employment rate) and income distribution (income inequality S80/S20) in EU countries. Therefore we compute the weights for the components by a regression of the three components on the employment rate and the income inequality, respectively. In order to account for the fact, that institutions are seen to lead labour market performance, we use three-year lags of the indicators. The advantage of this procedure is that a component that is more important for employment/income inequality gets a higher weight then a component that is not important. In contrast to indices that weight variables ex ante by assigning identical or arbitrary weights, we use PCA and regression coefficients to generate an empirically derived weighting of indices.

4 Results

4.1 Social policy dimensions

The PCA yields three components based on the idea that a component should at least explain the variance that is contained on average in a single indicator (Technically: the eigenvalue of each extracted component exceeds one) (table 2).

Table 2: Total variance explained

Com-ponent	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sum of squared loadings		
	Total	Percentage of Variance	Cumulative percentage	Total	Percentage of variance	Cumulative percentage	Total	Percentage of variance	Cumulative percentage
1	5.076	46.145	46.145	5.076	46.145	46.145	4.820	43.815	43.815
2	2.318	21.070	67.215	2.318	21.070	67.215	2.187	19.883	63.698
3	1.264	11.488	78.703	1.264	11.488	78.703	1.651	15.005	78.703
4	.800	7.270	85.973						
5	.525	4.773	90.745						
6	.360	3.276	94.021						
7	.282	2.567	96.589						
8	.139	1.260	97.848						
9	.104	.948	98.796						
10	.104	.942	99.738						
11	.029	.262	100.000						

Note: Extraction method: Pricipal component analysis.

The loadings of the components on the indicators are shown in Table 3. The higher the value the bigger is the effect of the component on the indicator. To show the essential structure of the dimensions, only values greater than 0.6 are presented. Component loadings of single indicators are calculated using mean values of indicators over five years (2006–2010; see Appendix). This ensures that possibly existing annual effects play a minor role.

Based on the component loadings, the actual values of individual cases, that is, countries, for the factor scores are calculated. The country scores obtained along the principal components that account for most of the overall variation in the data can then be used as input into a classification method (Lankes, Knogler2012) but also for analysing how many factors are relevant in determining labour market outcome.

Table 3: Principal components analysis of social policy indicators

Component loadings	Component 1: Emphasis on labour market security	Component 2: Social equality	Component 3: Labour marker flexibility
Early leavers from education and training		–0.919	
Marginal effective tax rate	0.633		
Reduction of the at-risk-of-poverty rate by social transfers		0.631	
Life-long learning	0.846		
Hiring and Firing			0.854
Spending on human resources	0.925		
Flexibility of wage determination			0.801
Generosity of unemployment benefits	0.808		
Expenditures on active labour market policy	0.909		
Corruption Perception Index	0.863		
Years of schooling		0.844	

Note: Only loadings >0.6; Principal component analysis based on correlation matrix with varimax rotation.

A first component (accounting for 46.1% of total variance) can be interpreted as *emphasis on labour market security*. This social model dimension is correlated with marginal effective tax rate, expenditures on human resources, life-long learning, generosity of unemployment benefits, expenditures on active labour market policy and the Corruption Perception Index (see the component loadings in table 2). Active labour market policy and investment in human resources stand for activation, flexibility and mobility of employees (Flexicurity) and increase labour market and income security. In association with high unemployment benefits a high emphasis on employment security can lead to a high marginal tax rate. The higher the emphasis on labour market security the more is a country perceived as 'clean' in terms of corruption.

A second component (accounting for 21.1% of total variance) stands for the dimension of *social equality*. It correlates negatively with early school leavers and positively with the reduction of poverty through social transfers and with years of schooling.

A third component (accounting for 11.5% of total variance) depicts the dimension of *labour market flexibility*. It affects hiring and firing practises and the flexibility of wage determination.

4.2   Social Model Employment Efficiency Index (SMEE-Index)

After reducing the dimensionality of the dataset by transforming the indicators in three independent dimensions (components) of social models, we analyze in a second step how many dimensions are relevant in determining labour market outcome (employment rate) in EU countries. The Employment Efficiency-Index is to show, how social institutions (captured by the dimensions of social models) contribute to employment. Such the higher the value of the Index the higher is the employment rate. Therefore, the weights for the dimensions are computed with a regression of the employment rate (average over 2009–2013) on the three components. The advantage of this procedure is that a dimension that is more important for employment gets a higher weight then a dimension that is not important. Only those dimensions with significant explanatory power ($p < 0.05$) were retained. This procedure resulted in a set of institutional dimensions that is able to explain 56.3 percent of the variation in the employment rates (table 4).

Table 4: Regression Results

	Employment rate	**S80/S20 income quintile ratio**
Constant term	63.558	4,823
Emphasis on labour market security	4.458***	–.443***
	(5.203)	(–3.355)
Social equality	2.149**	–.768***
	(2.508)	(–5.823)
Labour market flexibility	–.651	.357**
	(–.760)	(2.704)
Adjusted R-squared	.563	.673

Note: T-value in parentheses; *$p < 0.1$; **$p < 0.05$; ***$p<0.01$.

As the influence of the component "Labour market flexibility" on the employment rate is not significantly different from zero, we ignore "Labour market flexibility" by computing the index. Because the components are independent we use the regression coefficients according to table 3 and build a linear combination of the components "emphasis on labour market security" and "social equality" with weights according to the regression coefficients:

(1) Social Model Employment Efficiency Index = $63.558 + 4.458^{*}(\text{ELMS}) + 2.149^{*}(\text{SE})$

The constant term (63.558) in equation (1) equals the mean value of employment rates 2009–2013, resulting from the fact that regressors have a mean value of 0. The Social Model

Employment Efficiency (SMEE) Index is then equivalent to an institutional estimation of the employment rate across countries.[7]

Table 5 shows the country scores of the two components Emphasis on labour market security (elms) and Social equality (se) (column 2 and 3). Column 4 of table 4 displays the SMEE-Index which was calculated according to the formula above.

Table 5: SMEE Index 2014

	elms	**se**	**SMEE-Index**	**Ranking**
dk	2.92	0,28	77,16	1
se	0.98	0.97	70.04	2
fi	1.29	0.26	69.85	3
nl	0.98	0.61	69.26	4
at	0.87	0.52	68.56	5
ie	0.54	0.72	67.51	6
be	0.89	−0.19	67.13	7
uk	0.14	0.63	65.51	8
si	0.03	0.81	65.45	9
de	0.02	0.83	65.43	10
fr	−0.08	0.13	63.49	11
cz	−0.60	1.00	63.01	12
ee	−0.42	0.46	62.70	13
hu	−0.45	0.32	62.22	14
lt	−0.76	0.81	61.92	15
lv	−0.26	−0.33	61.70	16
pl	−0.61	0.38	61.65	17
es	0.25	−1.73	60.96	18
pt	0.03	−1.87	59.67	19
sk	−1.52	1.12	59.18	20
hr	−1.38	0.69	58.90	21
it	−0.57	−1.03	58.83	22
bg	−0.95	−0.64	57.97	23
gr	−1.31	−0.42	56.82	24
ro	−1.52	−0.30	56.14	25

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[7] The observed employment rate differs from that institutionally caused employment rates due to other factors like business cycle.

The Ranking (column 5 of table 4) shows Denmark on first position, which has the highest score in emphasis on labour market security (elms). The first places in the ranking are dominated by countries with high elms but differently marked social equality. Slovenia, by far the new member country with the highest SMEE index score, is in this leading group as well. The Index shows, that different combinations of emphasis on labour market security and social equality can result in good labour market outcomes in terms of employment rate.[8]

Finally the SMEEI for years 2009 to 2014 for all countries is calculated, illustrating changes in the institutional formation which influence the employment rate.

**Table 6: SMEEI Country Rankings 2009–2014**

Rank	2009		2010		2011		2012		2013		2014	
1	dk	79.0	dk	77.4	dk	77.8	dk	77.2	dk	76.7	dk	77.2
2	se	70.4	se	70.6	se	70.5	se	70.1	se	70.2	se	70.0
3	nl	69.8	nl	70.2	nl	69.9	nl	69.5	fi	69.9	fi	69.8
4	fi	69.6	fi	69.1	fi	68.8	fi	69.1	nl	69.4	nl	69.3
5	at	67.6	at	67.5	at	68.1	at	68.7	at	69.0	at	68.6
6	uk	66.2	ie	65.5	ie	67.0	ie	68.3	ie	68.3	ie	67.5
7	si	65.5	be	65.5	be	66.4	be	66.8	be	66.6	be	67.1
8	be	65.5	si	65.0	si	64.8	si	66.0	si	66.1	uk	65.5
9	de	65.1	uk	64.8	de	64.5	de	65.5	uk	65.8	si	65.5
10	ie	64.8	fr	64.5	fr	64.4	uk	65.2	de	65.4	de	65.4
11	fr	64.3	de	64.2	uk	64.1	fr	64.5	fr	64.2	fr	63.5
12	hu	62.9	hu	63.7	hu	63.3	hu	63.2	ee	63.3	cz	63.0
13	cz	62.6	cz	62.4	cz	62.7	cz	63.1	hu	63.0	ee	62.7
14	pl	61.7	pl	62.0	pl	62.3	lt	62.7	cz	62.8	hu	62.2
15	ee	61.0	lt	61.0	ee	61.5	ee	62.5	pl	62.4	lt	61.9
16	lt	60.7	ee	60.6	lt	61.3	pl	62.0	lt	62.2	lv	61.7
17	sk	60.4	lv	60.3	lv	60.3	lv	60.9	lv	61.8	pl	61.6
18	lv	60.1	sk	60.2	es	60.0	es	60.2	es	60.8	es	61.0
19	es	59.6	es	59.8	sk	59.9	sk	59.6	sk	59.8	pt	59.7
20	it	59.2	it	59.3	it	59.3	it	59.3	pt	59.2	sk	59.2
21	hr	58.3	hr	58.3	hr	59.1	hr	59.2	it	59.1	hr	58.9
22	bg	58.2	bg	57.7	bg	58.8	pt	58.9	hr	59.1	it	58.8
23	pt	57.8	pt	57.5	ro	57.7	bg	58.9	bg	58.5	bg	58.0
24	gr	56.6	gr	57.0	pt	57.5	ro	57.9	ro	56.9	gr	56.8
25	ro	55.7	ro	56.9	gr	57.5	gr	57.4	gr	56.9	ro	56.1

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[8] The mean values of elms and se are zero.

Table 6 displays the Index scores of the Social Model Employment Efficiency Index for the years from 2009 to 2014. They are comparable over time and form the basis for the ranking of countries. On the top of the ranking is Denmark for all years, Finland, Netherlands and Sweden are on next positions. On the bottom of the ranking are over the whole period Bulgaria, Slovakia Croatia, Greece and Romania, indicating institutional deficiencies in these countries.

Index scores have risen for most countries during 2009–2014. This is especially true for Ireland with an index score of 67.5 in 2014, 2.7 percentage points higher than in 2009. The biggest decline in index scores until 2014 shows Denmark, albeit from a very high level in 2009.

Figure 3 compares the best performer Denmark with the lowest ranked country Romania. Characteristic for high-ranking countries like Denmark is a high emphasis on labour market security as witnessed by the important role of active labour market policy, a high level of spending on human resources and of lifelong learning and low corruption.
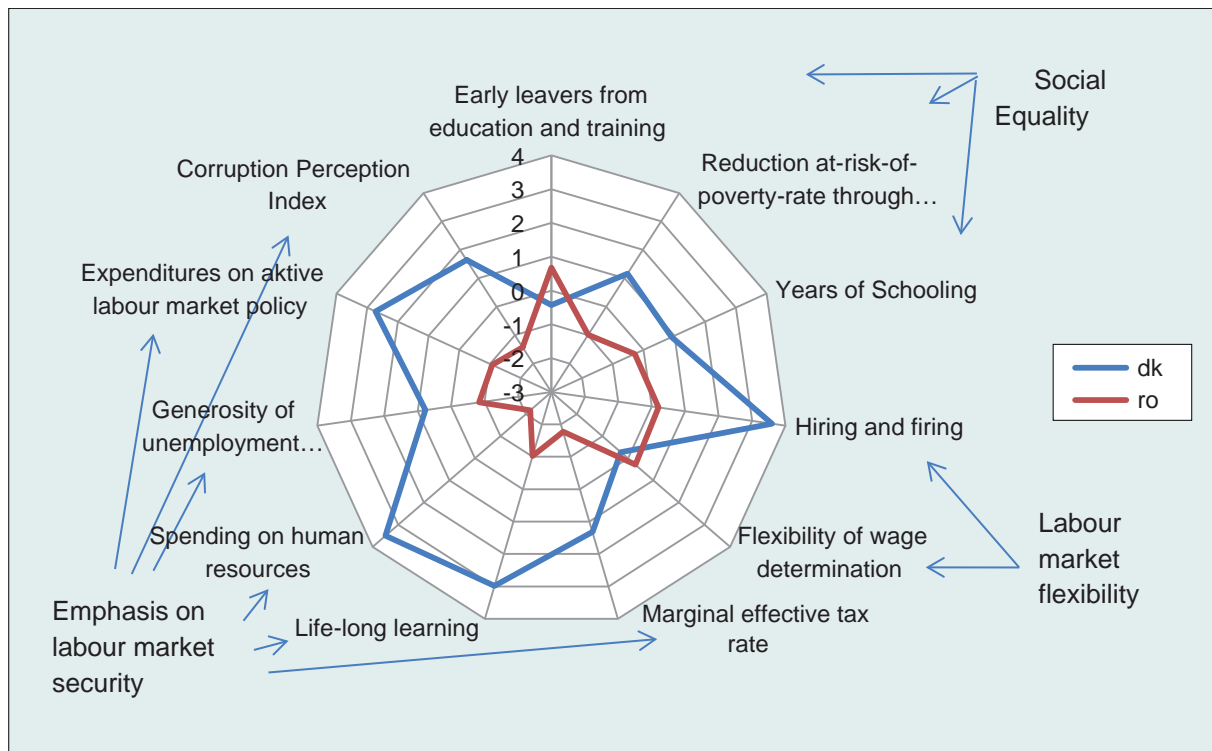
Note: Standardized values.

Figure 3: Employment Efficiency Index: Best vs. worst performer, 2014

4.3   Social Model Income Distribution Index (SMID-Index)

The Income Distribution Index shows, how social institutions (captured by the dimensions of social models) contribute to income inequality as measured by S80/S20 income quintile ratio. Such the higher the value of the Index the higher is the S80/S20 ratio. Therefore we compute the weights for the components with a regression of the S80/S20 (average over 2006–2010) on the three components. As with the Employment Efficiency Index, only those components with significant explanatory power ($p < 0.05$) were retained. The outcome is that all three components are significant and explain 67.3 percent of the variation in the S80/S20 ratio.

We use the regression coefficients according to table 3 and build a linear combination of the components "emphasis on labour market security", "social equality", and "labour market flexibility" with weights according to the regression coefficients:

(2) Social Model Income Distribution Index = 4.82 + (–.443*(ELMS)) + (–.768*(SE)) + .357*LMF

The constant term 4.82 in equation (2) equals the mean value of S80/S20 income quintile ratio, resulting from the fact that regressors have a mean value of 0. The Social Model Income Distribution (SMID) Index is then equivalent to an institutional estimation of the income distribution ratio rate across countries.[9]

Table 7 shows the country scores of the components (column 2, 3, 4). Column 5 of table 4 displays the SMID-Index which is calculated according to the formula above. The ranking (column 6 of table 4) shows Sweden on first position, which has the lowest score in income inequality. The first ten places in the ranking are exclusively dominated by countries with relatively high ELMS and simultaneously high social equality except for Belgium. Slovenia, by far the new member country with the lowest SMID Index, is in this leading group as well. The Index shows, that different combinations of emphasis on labour market security, social equality and labour market flexibility can result in low inequality of income distribution.

As with the Employment Efficiency Index, the Distribution Income Index is calculated for years 2009 to 2014 for all countries, illustrating changes in the institutional formation which influence the income distribution.

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[9] The observed income quintile ratio differs from that institutionally caused income distribution due to other factors mentioned above.

Table 7: SMID Index 2014

	elms	**se**	**lmf**	**SMID-Index**	**Ranking**
se	0.98	0.97	–0.99	3.29	1
nl	0.98	0.61	–0.95	3.58	2
at	0.87	0.52	–0.99	3.69	3
de	0.02	0.83	–1.24	3.74	4
si	0.03	0.81	–0.92	3.86	5
ie	0.54	0.72	–0.14	3.98	6
fi	1.29	0.26	0.02	4.06	7
dk	2.92	0.28	2.71	4.28	8
be	0.89	–0.19	–0.81	4.28	9
cz	–0.60	1.00	0.11	4.36	10
sk	–1.52	1.12	–0.26	4.54	11
fr	–0.08	0.13	–0.40	4.62	12
lt	–0.76	0.81	0.54	4.73	13
uk	0.14	0.63	1.36	4.77	14
hr	–1.38	0.69	–0.14	4.85	15
pl	–0.61	0.38	0.34	4.92	16
hu	–0.45	0.32	0.83	5.07	17
ee	–0.42	0.46	1.53	5.20	18
gr	–1.31	–0.42	–0.94	5.39	19
it	–0.57	–1.03	–0.83	5.57	20
lv	–0.26	–0.33	1.22	5.63	21
ro	–1.52	–0.30	–0.01	5.73	22
es	0.25	–1.73	–0.71	5.79	23
pt	0.03	–1.87	–0.63	6.02	24
bg	–0.95	–0.64	0.91	6.06	25

Table 8 displays the index scores of the Social Model Distribution Income Index for the years from 2009 to 2014. They are comparable over time and form the basis for the ranking of countries. On the top of the ranking is Sweden for all years, Netherlands, Austria and Germany are on next positions. On the bottom of the ranking are over the whole period until 2013 Portugal which rotates with Bulgaria in 2014. Spain, Latvia and Romania also document high levels of inequality of income distribution, indicating institutional deficiencies in these countries.

The index scores have slightly decreased since 2009 in most of the countries, indicating a more balanced income distribution. In Denmark, the income distribution index has risen to 4.28 against the initial value of 3.89 in 2009.

Table 8: SMID-Index Country Rankings 2009–2014

Rank	2009		2010		2011		2012		2013		2014	
1	se	3,33	se	3,25	se	3,45	se	3,57	se	3,34	se	3,29
2	de	3,46	nl	3,54	nl	3,62	nl	3,58	nl	3,56	nl	3,58
3	nl	3,52	de	3,70	de	3,63	at	3,59	at	3,56	at	3,69
4	fi	3,72	fi	3,78	at	3,82	de	3,63	de	3,72	de	3,74
5	dk	3,89	at	3,94	ie	3,96	ie	3,87	ie	3,84	si	3,86
6	at	3,91	si	3,94	fi	4,03	si	4,03	si	3,92	ie	3,98
7	cz	3,99	cz	4,06	si	4,04	fi	4,07	fi	4,00	fi	4,06
8	si	4,02	ie	4,07	cz	4,15	dk	4,22	cz	4,21	dk	4,28
9	be	4,21	be	4,16	dk	4,25	cz	4,27	be	4,32	be	4,28
10	ie	4,25	dk	4,24	be	4,30	be	4,36	dk	4,33	cz	4,36
11	fr	4,49	fr	4,38	fr	4,38	fr	4,55	sk	4,44	sk	4,54
12	uk	4,75	hu	4,80	sk	4,63	sk	4,61	fr	4,67	fr	4,62
13	sk	4,93	sk	4,85	hu	4,81	uk	4,78	uk	4,74	lt	4,73
14	pl	5,05	pl	4,94	uk	4,97	hu	4,89	lt	4,79	uk	4,77
15	hu	5,17	uk	4,98	hr	5,04	pl	5,01	hr	4,86	hr	4,85
16	lt	5,22	lt	5,11	pl	5,05	hr	5,06	hu	4,93	pl	4,92
17	hr	5,27	hr	5,15	lt	5,17	lt	5,17	pl	4,94	hu	5,07
18	ee	5,47	gr	5,38	ee	5,37	ee	5,18	ee	4,96	ee	5,20
19	gr	5,50	it	5,48	it	5,41	it	5,46	gr	5,27	gr	5,39
20	it	5,67	ee	5,51	gr	5,45	gr	5,51	it	5,54	it	5,57
21	ro	6,09	ro	6,02	ro	5,82	ro	5,91	lv	5,83	lv	5,63
22	lv	6,28	lv	6,05	lv	6,12	lv	6,14	es	5,87	ro	5,73
23	bg	6,29	bg	6,40	bg	6,30	es	6,24	ro	5,91	es	5,79
24	es	6,43	es	6,45	es	6,44	bg	6,29	bg	6,07	pt	6,02
25	pt	7,11	pt	7,03	pt	6,96	pt	6,64	pt	6,26	bg	6,06

Figure 3 compares the best performer Sweden with the lowest ranked country Bulgaria. High levels of expenditures on human resources and of lifelong learning, low corruption, a high poverty reduction through social transfers and a relatively rigid labour market regulation make the difference.
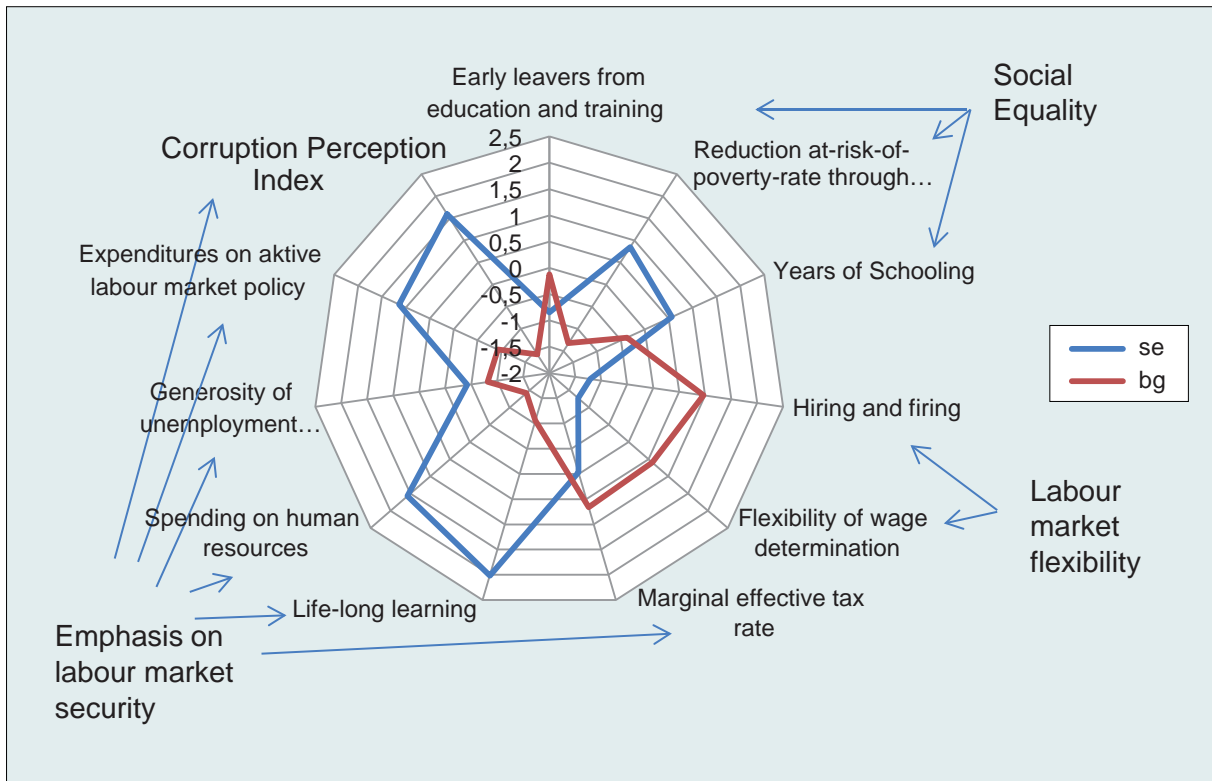
Note: Standardized values.

Figure 4: Income Distribution Index: Best vs. worst performer

5 Conclusions

Based on socio-economic indicators reflecting the main tasks of social models, this paper identifies a set of institutional variables that are weighted and combined into two indices of institutional quality for European Union Member countries. We show that the *Index of Employment Efficiency* is able to explain the impact of institutional characteristics of European social models on employment rates; the *Index of Income Distribution* explains the impact of different institutional combinations on the inequality of income distribution. Both indices can be used to analyse and understand the differences in employment performance and income distribution across European Member countries.

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Appendix: Social policy indicators, mean values 2006–2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
at	9,52	67,39	50,12	13,32	3,51	5,61	2,54	28,73	0,13	8,12	10,46
be	11,94	87,76	45,21	7,10	2,75	6,31	3,51	25,61	0,07	7,18	10,76
bg	15,12	78,56	20,26	1,32	4,24	4,21	5,53	3,08	0,03	3,82	10,36
cz	5,24	71,59	52,73	6,68	3,16	4,20	5,59	4,22	0,02	4,94	12,62
de	12,20	74,20	39,70	7,74	2,45	4,73	2,91	15,46	0,07	7,92	12,86
dk	11,36	89,68	56,98	30,36	5,73	8,20	4,45	33,37	0,25	9,36	12,00
ee	13,26	62,73	26,03	8,92	3,95	5,34	6,17	4,01	0,01	6,58	11,96
es	30,38	81,24	19,55	10,68	2,73	4,64	4,29	14,62	0,09	6,44	9,30
fi	9,76	73,65	51,99	22,94	3,56	6,37	3,16	19,97	0,09	9,22	10,20
fr	12,24	77,90	47,40	5,84	2,61	5,72	4,81	14,39	0,08	7,06	10,80
gr	14,62	59,00	13,85	2,64	2,89	4,09	3,21	4,95	0,02	4,20	10,06
hr	3,98	53,12	30,43	2,40	3,73	4,19	5,16	2,21	0,01	4,02	10,34
hu	11,48	79,84	55,46	3,20	3,90	5,17	5,40	5,05	0,05	5,08	11,24
ie	11,64	78,69	53,59	7,00	3,54	5,63	3,32	18,66	0,08	7,72	11,52
it	19,60	76,51	19,70	6,16	2,49	4,54	3,21	12,88	0,05	4,62	9,88
lt	8,14	79,23	28,57	4,60	3,32	5,07	5,91	2,61	0,04	4,82	12,18
lv	14,62	87,52	18,94	6,18	3,94	5,29	5,91	4,04	0,03	4,66	11,04
nl	11,32	83,30	49,71	16,56	2,98	5,65	3,48	39,26	0,11	8,86	11,82
pl	5,22	78,93	31,20	4,88	3,61	5,10	5,27	4,16	0,05	4,56	11,48
pt	34,26	80,83	27,15	5,24	2,53	5,29	4,39	11,05	0,05	6,20	7,48
ro	17,22	58,40	21,91	1,38	3,78	3,95	5,16	4,35	0,01	3,62	10,46
se	7,60	79,82	55,66	21,16	2,86	6,87	3,12	10,50	0,11	9,24	11,62
si	5,02	82,59	48,99	14,90	2,87	5,49	4,33	7,19	0,03	6,54	11,62
sk	5,74	43,22	39,92	3,38	4,10	3,87	5,67	3,52	0,01	4,68	11,60
uk	15,10	66,20	39,50	21,22	4,18	5,60	5,76	3,47	0,01	8,00	12,26

(1) Early leavers from education and training

(2) Marginal effective tax rates on employment incomes

(3) Reduction at-risk-of-poverty-rate via social transfers

(4) Life-long learning

(5) Hiring and firing practises

(6) Expenditures for education

(7) Flexibility of wage determination

(8) Generosity of unemployment benefits

(9) Expenditures on active labour market policy

(10) Corruption Perception Index

(11) Mean years of schooling

See Table 1 for sources and definition.