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The Social Investment Welfare Expenditure data set (SIWE): a new methodology for measuring the progress of social investment in EU welfare state budgets

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# **The Social Investment Welfare Expenditure data set (SIWE): a new methodology for measuring the progress of social investment in EU welfare state budgets**

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## **Abstract**

The social investment perspective has become a reference framework for comparative welfare state analysis, and a powerful idea influencing the European social dimension since the Lisbon Strategy. A number of empirical studies in the field have focused on the budgetary side of welfare state change, tracking the dynamics of “new” social investment versus “old” social protection spending. Still, many data limitations (e.g. scarce country/years coverage) and the prevailing use of rough spending-over-the-GDP indicators have hindered the progress of our empirical knowledge over social investment in Europe. This working paper presents a new data set and methodology for the comparative analysis of welfare state budgets from the perspective of social investment. Based on various Eurostat data sources, the Social Investment Welfare Expenditure data set (SIWE) includes social spending data finely disaggregated into welfare functions for 29 countries (EU-28 less Croatia, plus Norway and Switzerland), and covers years from 1995 to 2013. Building on previous contributions, I develop a new methodology for measuring “budgetary welfare effort” (BWE), that is, the effort effectively put by governments on selected welfare programmes, net of the interferences due to economic and demographic oscillations. I also construct two composite BWE indices that allow to directly compare the whole social investment and social protection dimensions of welfare state budgets, in a way more accurate than what done so far. This provides researchers with a fresh tool for empirical analyses of the dynamics, causes and consequences of welfare state change from the perspective of social investment. The SIWE data set can be requested from the [author’s web page](#).

## **Keywords**

Social Investment, data set, indicators, welfare state, Europe

# 1. Introduction

The social investment perspective has become one of the most prominent angle from which to look at welfare state change (Morel, Palier, and Palme 2012). On the one hand, it provides scholars with a new analytical framework for academic research over the welfare state. On the other, it has served as a blueprint for the renewal of the European social dimension since the years of the Lisbon Strategy (European Council 2000). In 2013, it has been explicitly endorsed by the European Commission with the launch of the so called “Social Investment Package” (European Commission 2013a; European Commission 2013b).

In spite of its growing importance, the issue of measuring the social investment-orientation of welfare states is still a big empirical challenge for welfare state scholars. Within the literature on social investment, a number of studies based on quantitative methods have focused on the budgetary side of welfare state change, tracking the dynamics of “new” social investment spending (i.e. spending on education, care services, activation policies) versus “old” social protection spending (typically on passive cash transfers such as pensions, unemployment benefits and various allowances) (see e.g. Vandebroucke and Vleminckx 2011; Nikolai 2009). My data-collection and proposed methodology seek to improve the social expenditure-based approach as a tool for empirical investigations of the welfare state within the framework of social investment. All the variants of this approach used so far have shortcomings that make life harder for researchers that want to study the dynamics of social investment in European welfare states. These can be summarized in the following: (1) Most of the works in this stream rely on rough spending-over-the-GDP measures, highly dependent on business-cycle oscillations and on the number of beneficiaries of given programmes (e.g. the unemployed for unemployment benefits, children for family policies, and so forth); (2) Being mostly based on OECD-SOCX data, they include just a limited number of EU countries (generally 21); (3) More accurate indicators (e.g. “budgetary effort” indices as those used in Vandebroucke and Vleminckx (2011) and Cantillon and Vandebroucke (2014)) are specific to single policy fields: composite indices to compare the effort put by governments on the whole social investment and social protection dimensions of the welfare state are to date missing.

This working paper presents the Social Investment Welfare Expenditure data set (SIWE), a new data set on welfare spending which seeks to fill these gaps. Based on various Eurostat data sources, SIWE includes social spending data finely disaggregated into welfare functions for 29 countries (EU-28 less Croatia, plus Norway and Switzerland), covering the years from 1995 to 2013. I propose a new approach for reaggregating spending functions into the two crucial dimensions highlighted by the social investment literature: social investment and social protection.

Building on previous attempts, I also put forward a new methodology for computing indicators of “budgetary welfare effort” (deflated from the number of beneficiaries and from GDP oscillations) for each relevant welfare function, in turn aggregated into two composite indices which allow to directly compare the whole social investment with the social protection dimension of welfare state budgets. The two composite indices – to date available for the time span 2000-2013 – provide researchers with a powerful tool for empirical analysis. They can be used as either dependent or independent variables by those who want to study the determinants or the outcomes of welfare state change through the analytical lens of social investment. The SIWE data set (in various formats), and its codebook can be requested at <https://sronchi.wordpress.com/siwe-data-set/>.

Next section discusses the theoretical background in which the SIWE data and methodology place themselves. Section 3 illustrates the country/time coverage and the data sources on which SIWE has been built. Section 4 shows how public expenditure data from the original Eurostat classification have been reaggregated in a way coherent with the social investment perspective. Section 5 explains how the Budgetary Welfare Effort (BWE) indicators for each welfare function have been constructed, and in turn aggregated in two composite BWE indices: one for social investment and one for social protection. The conclusion wraps up, restating the value of the new data and ready-to-use indices for future empirical research.

## **2. Theoretical background: what use for the SIWE data**

According to some of its proponents, social investment can be considered an emerging policy paradigm, distinct from both the Keynesian paradigm which characterised the “golden age” of welfare expansion and from the “neoliberal” thinking which carried the day in the era of retrenchment (Jenson 2012). The social investment perspective takes stock of the emergence of a new wave of social policy that has grown since the 1970s to cater for the new social risks of postindustrial societies (Taylor-Gooby 2004; Armingeon and Bonoli 2006). This wave has gradually reshaped advanced welfare states along a new logic. Social programmes aimed at enhancing human capital and promoting citizens’ inclusion *within* the labour market (as such read as “social investments” – e.g. education, care services, active labour market policies) have become a key trait of today’s welfare state alongside long-established social programmes to protect people *from* market risks (e.g. pensions, unemployment benefits and other passive cash transfers to those out of work).

Advocates of social investment go one step further, identifying the reorientation of social policy towards social investment as the key for building a new welfare state capable to keep up with both the social and economic challenges of the 21st century (Vandenbroucke, Hemerijck, and Palier

2011; Hemerijck 2013). Offering a captivating recipe for the rescue of welfare states under strain, social investment has been present in the EU discourse since the years of the Lisbon Strategy (2000-2010) (Esping-Andersen et al. 2002). The European Commission explicitly endorsed the idea with the launch of a “Social Investment Package for Growth and Social Cohesion” in 2013 (European Commission 2013a; European Commission 2013b). Social investment has in fact become relevant not only as an analytical tool in the academic world, but also as a real-world policy strategy in the EU.

Social investment-oriented policies have progressed at a very different pace across European welfare states (Hudson and Kuhner 2009; Nikolai 2009; Hemerijck 2013; Beramendi et al. 2015). The issue of measuring the social investment-orientation of welfare states is however still a big empirical challenge. Most of contributions based on quantitative methods have relied on social spending data, focusing on the budgetary side of welfare state change. A heuristic dichotomy that distinguishes between social investment- and social protection-spending has served to trace an empirical picture of the budgetary progress of social investment in the various Social Europes (Nikolai 2009; Vandenbroucke and Vleminckx 2011; Hemerijck 2013; Cantillon and Vandenbroucke 2014). Although the expenditure-based approach alone cannot grasp the multiple aspects of a so complex variable as welfare state change (cf. Clasen and Siegel 2007), it allows at least to inspect welfare state budgets from the innovative analytical perspective of social investment. Critical reviews of this approach are provided by Nolan (2013) and De Deken (2014). The SIWE data and the methodology proposed below seek to address the shortcomings of the expenditure-based approach, improving the toolbox available for empirical research over the state and progress of social investment in Europe.

### **3. The SIWE data set: time/country coverage and data sources**

The SIWE dataset is built on secondary data sources on public expenditure from Eurostat database. It contains data on public expenditure for various functions of advanced welfare states for 27 EU countries (all EU Member States less Croatia, plus Norway and Switzerland), covering years from 1995 to 2013 (composite budgetary welfare effort indices are computed for 2000-2013).<sup>1</sup> Public expenditure data for policy sub-fields are pooled and then reaggregated along an approach already followed in the literature on the social investment welfare state (Vandenbroucke and Vleminckx

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<sup>1</sup> Data for years prior to 2000 are available for the bulk countries in the SIWE data set. Nevertheless, time series for some of the welfare functions used to produce the composite indices for social investment and social protection contain many missing values prior to 2000. These are available just for a smaller number of welfare functions and countries.

2011; Nikolai 2009; Hemerijck 2013; Cantillon and Vandenbroucke 2014: see Appendix) All previous works were based on OECD Social Expenditure data (SOCX). The SIWE dataset relies instead on Eurostat data: these reach a degree of disaggregation by welfare functions which falls very close to that of OECD-SOCX, and cover all EU member states (instead of the 21 covered in SOCX). The differences between OECD-SOCX and Eurostat expenditure data are discussed in De Deken and Kittel (2007) and Adema and Ladaïque (2009: Annex 1). All spending data refer to gross (pre-tax) public expenditure, since data on net spending do not reach a so fine-grained level of disaggregation. For the same reason, expenditure from private sources is not considered.<sup>2</sup>

Next sub-sections give details about the data sources for expenditure and reference series included in the SIWE data set. The expenditure reaggregation approach is illustrated in section 4.

### *3.1. Expenditure series*

The first and most important source in the SIWE data set is the European System of integrated Social protection statistics (ESSPROS). It includes public expenditure data for several welfare functions: health and sickness, disability, old age, survivors, family and children, housing, social exclusion not elsewhere classified. These welfare functions are in turn disaggregated into a number of more specific sub-entries of spending, typically divided into “cash benefits” and “benefits in kind”. For an in-depth presentation of the database and of the original benefits classification, I refer to the latest edition of the official manual (Eurostat, 2012). Country-specific qualitative information is available here: <http://ec.europa.eu/eurostat/web/social-protection/data/qualitative-information>.

Most of the data regarding working age social programmes have been taken from Eurostat Labour Market Policy Statistics (LMPS), which allow for a detailed look into different dedicated spending functions in a so crucial sector of the welfare state. LMPS includes 9 categories of interventions: the first is the expenditure for the functioning of Public Employment Services (PES). Categories 2 to 7 are the various branches of active labour market policies (ALMP): training, job rotation/sharing, employment incentives, sheltered and supported employment and rehabilitation, direct job-creation, start-up incentives). Categories 8 and 9 include passive labour market policies (PLMP), that is, out-of-work income maintenance and support (all kinds of unemployment benefits and redundancy/bankruptcy compensation) and early retirement. Detailed information on the LMPS is found in the official manual (Eurostat 2013). Two other Eurostat data sources on public

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<sup>2</sup> The downsides of using gross instead of net public spending are well discussed in De Deken (2014). The same problems also emerge when using OECD-SOCX data. In a nutshell, data on gross expenditure over/(under)estimate social protection in countries which tax benefits (/make large use of tax breaks for social purposes). As for the exclusion of private spending, this leaves out private provision of goods and services. This also contributes to the overall welfare of citizens, arguably increasing its importance in the welfare mix of a social investment state (Ferrera and Maino 2014).

expenditure have been also used: Education & Training statistics, and Science, Technology & Innovation statistics. From the former I have taken data on expenditure for education, up to the level 4 of the ISCED-97 classification (post-secondary non-tertiary). From the latter, data on public Gross Domestic Expenditure on Research and Development (GERD) carried out in all sectors of the economy. GERD data are collected by Eurostat along the guidelines of the OECD Frascati Manual (2002). They also include a large part of spending for higher education.

All Eurostat data sources allow for the best degree of across-country comparability between equivalent welfare programmes. In the construction of the SIWE data set, the double counting of the same programmes has been cautiously avoided whenever possible. Some partial overlap between spending categories cannot be ruled out completely in a few cases where welfare functions are taken from different sources. To the knowledge of the author, the most likely case of partial overlap is that between the sub-function of old age benefits “anticipated pensions” from ESSPROS (in the “Old age” function in the SIWE data set categorization, see Table 2 below) and “early retirement” from LMPS (in the Working age – cash benefits function).<sup>3</sup>

### 3.2. Reference series

Expenditure variables contained in the SIWE data set are given in volumes, originally expressed in national currencies (NAC) at nominal value. Data on spending for Education in the Eurostat database are originally given just as percentage of GDP: the equivalent in NAC has been calculated with reference to the respective GDP, taken from the Eurostat National Account database. The reference National Account series used by Eurostat for all public expenditure data sources here utilised are those from the European System of National Accounts 1995 (ESA95).<sup>4</sup> Reference series are reported in Table 1.

**Table 1. Reference series**

<i>Item</i>	<i>Details</i>	<i>Eurostat tag</i>
GDP	Gross Domestic Product at market prices (ESA95)	nama_gdp_c
Deflator (Price Index)	Base year=2005, deflator from values in euro (ESA95)	nama_gdp_p (CPI05_EUR)
PPS for EU28: conversion factor	For “all GDP items” (aggreg95=00), from national currencies	prc_ppp_ind (PPP_EU28)
Exchange rates	Euro/national currency exchange rates	teimf200

<sup>3</sup> Due to the nature of the data collected by Eurostat it is not possible to estimate the degree of overlap, that remains anyway small. There are differences in the categorization not only country-by-country, but also between different schemes in the same country (information acquired with the Eurostat request registered under the reference number: ESTA32760).

<sup>4</sup> Information cross checked with the Eurostat requests registered under the reference number: ESTA32572 and ESTA34347.

In order to reach across-country comparability, values in NAC have been first deflated with the price index and expressed in 2005 constant prices. This allows to compare real values over time, net of the noise introduced by price oscillations. Values in NAC expressed in 2005 prices have been lastly converted into PPS (for the EU28). This last step equalises their purchasing power by eliminating the differences in price levels between countries. That is, it allows for more realistic across-country comparisons which take into account different price levels (“costs of living”) in different countries. The PPS chosen are euros valued at average EU28 price levels, that is, euros that have the same purchasing power over the whole EU28. Their purchasing power is a weighted average of the purchasing powers of the national currencies of EU Member States (Eurostat 2012b). Where necessary, exchange rates have been used before the PPS conversion procedure.

## **4. Expenditure reaggregation approach**

Although using different labels, all previous works have struggled to reaggregate welfare expenditure for different functions into two heuristic categories: one for all “capacitating”, social investment-oriented policies mainly targeting new social risks, the other for “compensatory” policies originally put in place to protect citizens from the “old” social risks typical of the industrial era. The analytical dichotomy here remains the same: nevertheless, the more straight-forward labels “Social Investment” (hereafter SI, for “capacitating” policies) and “Social Protection” (hereafter SP, for “compensatory” policies) are used. Some welfare functions are however hard to be categorized as either investment or protection spending: they fall somewhere in between, displaying characteristics of both welfare dimensions (De Deken 2014; see also: Nolan 2013). This leaves a wide margin of discretion to the researcher assigning spending function to either one or the other category.

Although it follows as much as possible what done in previous contributions (Nikolai 2009; Vandenbroucke and Vleminckx 2011; Cantillon and Vandenbroucke 2014: see Appendix), the reaggregation approach proposed here seeks to avoid subjectivity as much as possible. Welfare functions are allocated based on the way in which a benefit is provided: cash benefits are classified as SP, benefits in-kind (services) as SI. This is also in line with the authors that highlight the role played by services as opposed to cash transfers in the emergence of a new welfare settlement (Kautto 2002; Ahn and Kim 2015). The only exception are parental leaves and family allowances: in spite of being typically provided as cash transfers, following Cantillon and Vandenbroucke (2014: see Appendix), they are classified as social investments in an alternative specification of the

indices (see below and in the SIWE codebook).<sup>5</sup>

The reaggregation approach proposed here differs from the previous ones in two main aspects:

(1) Healthcare spending is excluded from the classification instead of being counted in the SP category: it is left amongst the functions excluded from the dichotomy. Healthcare is a very ambiguous welfare function that does not fit into any of the two categories suggested: contrary to the rest of compensating functions it is not based on cash transfers, but on the provision of services, that both compensate for the occurrence of health problems, and also (re-)capacitate those in need. Moreover, in the case of health care, expenditure is a bad indicator of the effort put by a government on that welfare function, even worse than for other programmes (Green-Pedersen 2007, 20). Healthcare spending is in any case available in the SIWE data set, for researchers who want to include it. (2) The second distinguishing aspect of my approach is that I include public spending on research and development (R&D) into SI. This follows Streeck and Mertens' (2011) definition of social investment spending (originally called "soft public investment" by the two authors). R&D is in fact a crucial building block of the EU social investment strategy: fundamental for reaching the Lisbon goal of making the EU "the most competitive and dynamic *knowledge-based* economy in the world [...]" (European Council 2000, emphasis added).

Table 2 reports the complete list of welfare functions which compose the SIWE dataset, grouped in the categories "social investment", "social protection" (the two essential dimensions of the welfare state from the social investment perspective), and "others" (the latter excluded from the dichotomy, yet available in the SIWE data set). The second column reports the name of the welfare functions considered in the SIWE data set, for which separate indicators are then constructed. Welfare functions by and large follow a life-course logic. Programmes are grouped on the base of the phase of the life course they address: working-age programmes (i.e. basically labour market policies), programmes targeting families with children, and those targeting the elderly. Education and R&D spending are considered as separate functions. The third column lists the social programmes included in each welfare function. The specific Eurostat sources for each spending entry are reported in the right column, which also includes the tags to track them in the Eurostat online database.<sup>6</sup>

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<sup>5</sup> The same alternative specification is employed in Cantillon and Vandenbroucke (2014: see Appendix). See De Deken (2014) for a discussion on the ambiguity of leave policies when it comes to rigidly distinguish between social protection and social investment. Parental leaves are generally considered a social investment for two reasons: first, as an investment in the employability of the parents, insofar as they allow a parent to retain her/his job (at least when the leave is not too long); second, as an early investment in the child, both for the fact that they contribute to remove disincentives to have children in a society such the European, where low fertility is acknowledged as a threat for future welfare sustainability, and for the resources that they release for early quality childrearing.

<sup>6</sup> <http://ec.europa.eu/eurostat/data/database>, last accessed August 2016.

**Table 2. Re-aggregation of welfare spending function**

<i>Category</i>	<i>Function</i>	<i>Social programmes included</i>	<i>Source (Eurostat tag)</i>
<b>Social protection</b>	WORKING AGE cash benefits	– Out-of-work income maintenance and support (all unemployment benefits)	LMPS ( <i>cat. 8</i> ) <i>lmp_expsumm</i>
		– Early retirement	LMPS ( <i>cat. 9</i> ) <i>lmp_expsumm</i>
		– Housing benefits	ESSPROS <i>spr_exp_fho</i>
		– Disability pensions & early retirement	ESSPROS <i>spr_exp_fdi</i>
		– Minimum income support	ESSPROS <i>spr_exp_fex</i>
	FAMILY/CHILDREN cash benefits	– Family/children cash benefits <sup>1</sup>	ESSPROS <i>spr_exp_ffa</i>
OLD AGE cash benefits	– Old age pensions and other benefits	ESSPROS <i>spr_exp_fol</i>	
	– Survivors' benefits	ESSPROS <i>pr_expfsu</i>	
<b>Social investment</b>	WORKING AGE services	– ALMP (includes spending for PES)	LMPS ( <i>cat. 1-7</i> ) <i>lmp_expsumm</i>
		– Rehabilitation of disabled people	ESSPROS <i>spr_exp_fdi</i>
	FAMILY/CHILDREN services	– Family/children benefits in kind <sup>1</sup>	ESSPROS <i>spr_exp_ffa</i>
	OLD AGE services	– Old age benefits in kind	ESSPROS <i>spr_exp_fol</i>
	EDUCATION	– Education (ISCED 1-4) <sup>2</sup>	Education & training <i>educ_figdp</i>
R&D	– R&D (includes higher education)	Science, Technology & Innovation <i>rd_e_gerdfund</i>	
Others (excluded from the composite indices)	HEALTHCARE	– Healthcare & sickness	ESSPROS <i>spr_exp_fsi</i>
	DISABILITY	– Disability (remaining programmes not included in any function)	ESSPROS <i>spr_exp_fdi</i>
	SOCIAL EXCLUSION	– Social exclusion n.e.c. (remaining programmes not included in any function)	ESSPROS <i>spr_exp_fex</i>

Abbreviations: ALMP: Active Labour Market Policies; PES: Public Employment Services; LMPS: Eurostat Labour Market Policy Statistics (composed by 9 categories); ESSPROS: European System of Integrated Social Protection Statistics; n.e.c.: not elsewhere classified.

Notes: <sup>1</sup> In an alternative specification of the family/children welfare function, parental leaves and family allowances are not included under the social investment dimensions in spite of being provided through cash transfers.

<sup>2</sup> Education includes primary, secondary and post-secondary non tertiary levels (ISCED 1-4); Pre-primary is included in Family/children (daycare) services; High education is counted in R&D. Data on Education for Greece are taken from World Bank database.

The data sources mentioned in Table 2 were described in section 3. Further details on them and on the data managing that was necessary during the construction of the SIWE data set are given in the codebook.

## 5. Budgetary Welfare Effort: spending per beneficiary

Apart from presenting the SIWE data, the aim of this working paper is to provide a measure of the effective budgetary effort put by governments on social investment (and social protection) which is more accurate than raw spending-over-the-GDP figures. Welfare expenditure over the GDP is neither reliable nor really explanatory in this respect. Both the numerator and denominator are in fact particularly susceptible to economic downturns as well as to the demographic structure of the population, intervening factors that do not tell us anything about the change in social investment-(protection-) outlays that can be led back to (lack of) political choices.<sup>7</sup>

In this section I propose a new methodology for calculating Budgetary Welfare Effort (BWE) indicators. BWE gives a better idea of the effective effort put by governments on given welfare functions, net of other factors such as business cycle oscillations and the demographic structure of (ageing) populations. BWE indicators are spending per beneficiary indicators for each of the welfare functions presented above, whereas the target population at the denominator is specific to each welfare function. The general formula is the following:

$$BWE_{fct} = \frac{\text{€ spent on a given welfare function (f)}}{\text{target population of that given function}} \quad (1)$$

where f= expenditure for a given welfare function, c= country, and t= year.

In other words, the BWE indicators reflect the expenditure for each welfare function “deflated” by the number of potential beneficiaries of any given function, that is, the specific target population. The target populations used as denominator in the computation of the indicators for each welfare function are reported in Table 3, together with the respective Eurostat sources.

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<sup>7</sup> The most fitting example for the excessive business cycle-sensitivity of spending-over-the-GDP figures is that of the so called “automatic stabilizers”, that is, for instance, unemployment benefits. In the case of spending for unemployment benefits over the GDP, the numerator tends to react counter-cyclically, increasing during recessions as a consequence of the increased number of claimants. On the contrary, the denominator (GDP) naturally decreases when the economy falls into recession. This leads to overestimating the effective effort deliberately put by governments on given social programmes.

**Table 3. Target populations utilised for the construction of BWE indicators**

<i>Welfare function</i>	<i>Target population</i>	<i>Source (Eurostat tag)</i>
WORKING AGE cash benefits	The unemployed (age 15-64)	Labour Force Survey <i>lfsa_ugan</i>
WORKING AGE services		
FAMILY/CHILDREN cash benefits	Population 0 – 4 years	Population Statistics <i>demo_pjangroup</i>
FAMILY/CHILDREN services		
EDUCATION	Population 5 – 19 years	
R&D	Total population	
OLD AGE	Population 65+	

For the working age group, the number of unemployed has been taken as target population (instead of the total population in the working age). Another note is necessary for the R&D function: here the whole population is taken as denominator. This is because the spending entries included in the GERD do not regard solely those in a tertiary-education average age range. Instead, the financing for all R&D activities is included in this function. Since investments in R&D can be reasonably expected to have positive externalities on the society as a whole, it makes sense to use the total population as a denominator.

BWE is here defined in a way similar to what first done by Vandenbroucke and Vleminckx (2011; see also Appendix in Cantillon and Vandenbroucke 2014). There is however an important difference with the way they calculated it. In order to have values comparable across different countries, Vandenbroucke and Vleminckx used GDP per capita as denominator for computing their BWE indicators. As explained above, this makes their measure very sensitive to oscillations of the business cycle. This is an especially problematic issue in periods marked by recessions, when GDP generally grows significantly less than expenditures, or even decrease. That is, exactly the case of the time span covered by the SIWE data set (2000-2013, marked by the outbreak of the economic-crisis in 2008-2009). To grant cross-country comparability, I instead use values expressed in volumes, at constant 2005 prices and converted in PPS for the EU-28 (reference series and procedure explained in section 3.2).

### 5.1. BWE composite indices: social investment vs social protection

Another novelty proposed in this working paper is the methodology for computing two composite BWE indices that allow to directly compare the whole social investment with the social protection dimension of the welfare state, instead of just some policy sub-fields as done in previous research (e.g. Vandenbroucke and Vleminckx 2011). Once generated BWE indicators for each of the welfare functions in Table 2 along the general formula (1), two composite BWE indices for SI and SP can be computed as in the following:

1) First, BWE indicators for each welfare function are standardized (std) based on the respective mean ( $\bar{x}$ ) and standard deviation ( $\sigma$ ) from the full sample, i.e. pooling all countries and years (2000-2013):

$$\text{stdBWE}_{fc} = \frac{\text{BWE}_{fct} - \bar{x}_{fct}}{\sigma_{fct}} \quad (2)$$

The reason for using all variation from the pooled time-series instead of the variation from one reference year is to take into account across-time variation in the indices (the same rationale used, e.g., by Lyle Scruggs for the welfare generosity index (Scruggs 2014, 8)).

2) The composite indices for SI and SP are then calculated as the (unweighted) means of the standardized BWE indicators of the welfare functions respectively included in the SI and SP categories (5 welfare functions for SI, and 3 for SP: see again Table 2). That is:

$$\text{BWE}_{SI} = \frac{\text{stdBWE}_{f(SI)c}}{5} \quad (3)$$

$$\text{BWE}_{SP} = \frac{\text{stdBWE}_{f(SP)c}}{3} \quad (4)$$

The composite BWE indices computed as above are already included in the SIWE data set. For the sake of replicability, the STATA syntax used for generating them along the procedure above is made available in the codebook. The SIWE data set also includes SI and SP composite indices based on difference categorization of welfare functions (i.e., parental leaves and family allowances counted as SI, and a specification of  $\text{BWE}_{SP}$  which also includes healthcare spending). Interested researchers can in any case easily re-compute the indices with alternative procedures (e.g., choosing a fixed reference year for the standardization).

The Appendix shows the over-time (2000-2013) trends of the BWE composite indices for SI and SP computed as above, plotted for each country.

## 6. Conclusion

The expenditure-based approach has proved useful for analysing the dynamics of welfare state budgets within the analytical framework of social investment. Nevertheless, many gaps in terms of country/time coverage and methodological accuracy have posed serious limitations to empirical research in this stream. The SIWE data set and the methodology proposed in this working paper represent a systematic effort to improve the empirical toolbox for researchers interested in comparative welfare state change from this specific angle.

The SIWE data set contains social spending data finely disaggregated into welfare functions for 29 European countries (EU-28 less Croatia, plus Norway and Switzerland), covering the years from 1995 to 2013. It also includes indicators of “budgetary welfare effort” for each of the welfare spending functions relevant to the literature on social investment, and two composite indices which allow to directly compare the whole social investment with the social protection dimension of the welfare state. Composite indices are computed along the methodology explained in this working paper, for the time span 2000-2013.

The SIWE data and the BWE indices provide researchers with a very powerful tool for empirical analysis. In particular the latter can be used as either dependent or independent variables by those who want to study the determinants or the outcomes of changes in budgetary welfare effort through the analytical lens of social investment.

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## Data accuracy and revisions

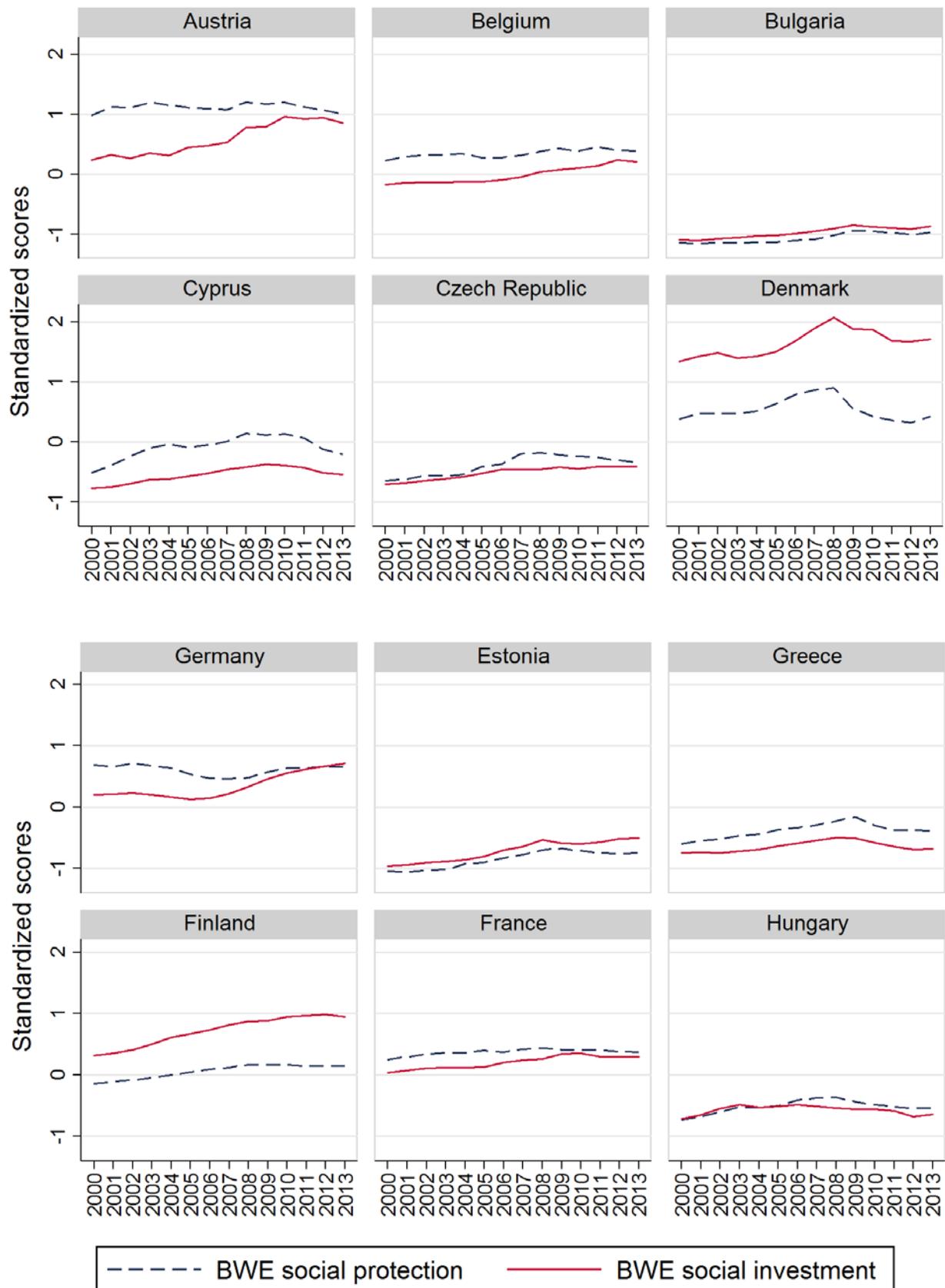
The SIWE data set can be requested from the author’s website (<https://sronchi.wordpress.com/siwe-data-set/>), together with the codebook. The data set will be constantly updated with the new data on social expenditure made available by Eurostat yearly. I have tried to be as consistent and accurate as possible throughout the whole data procedure. Nevertheless, there may be errors. If you find one, please report it to me, referring to the contacts on my web page.

## References

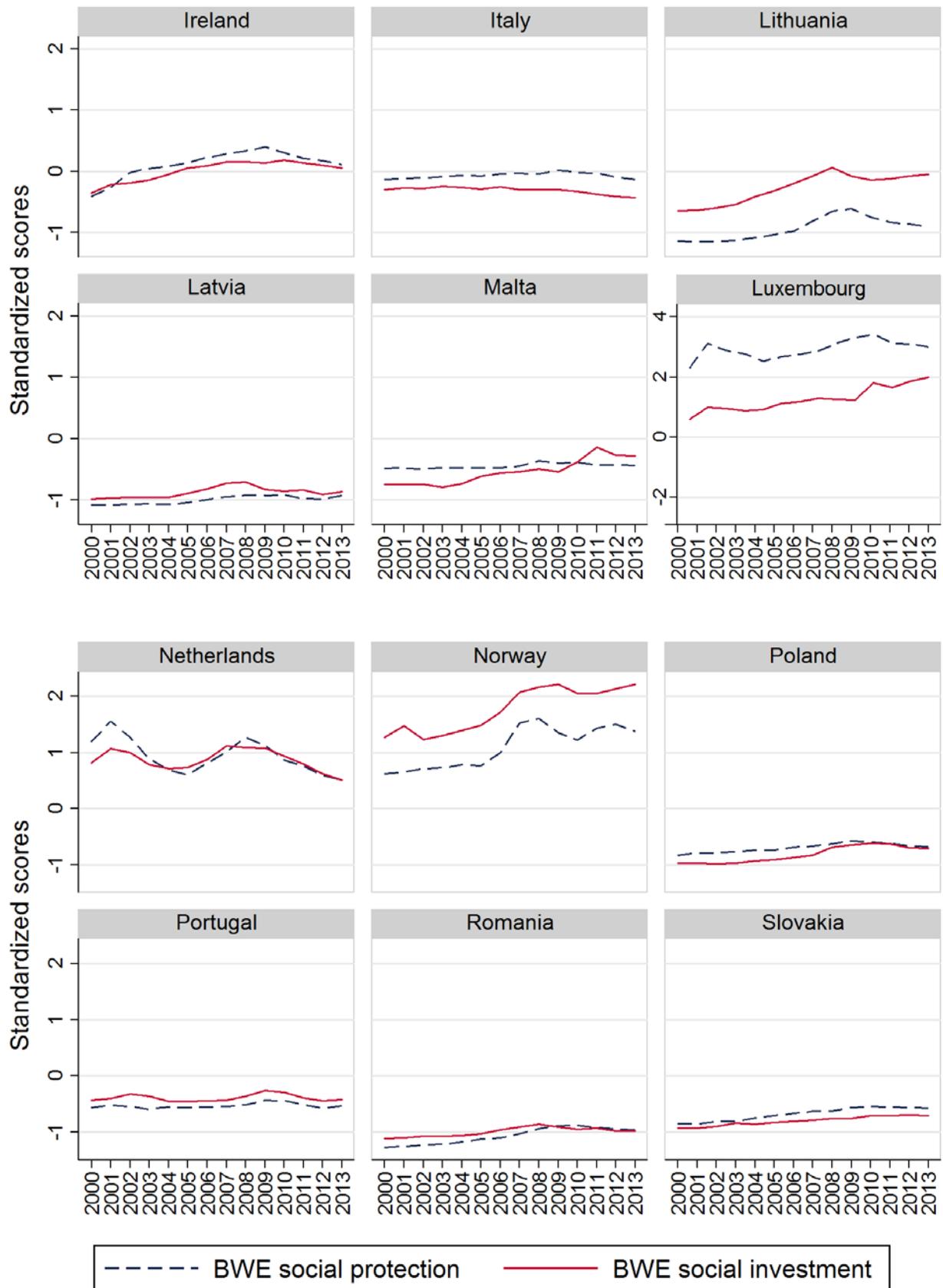
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**Appendix.** Trends of BWE for social protection and social investment by country (1/3).

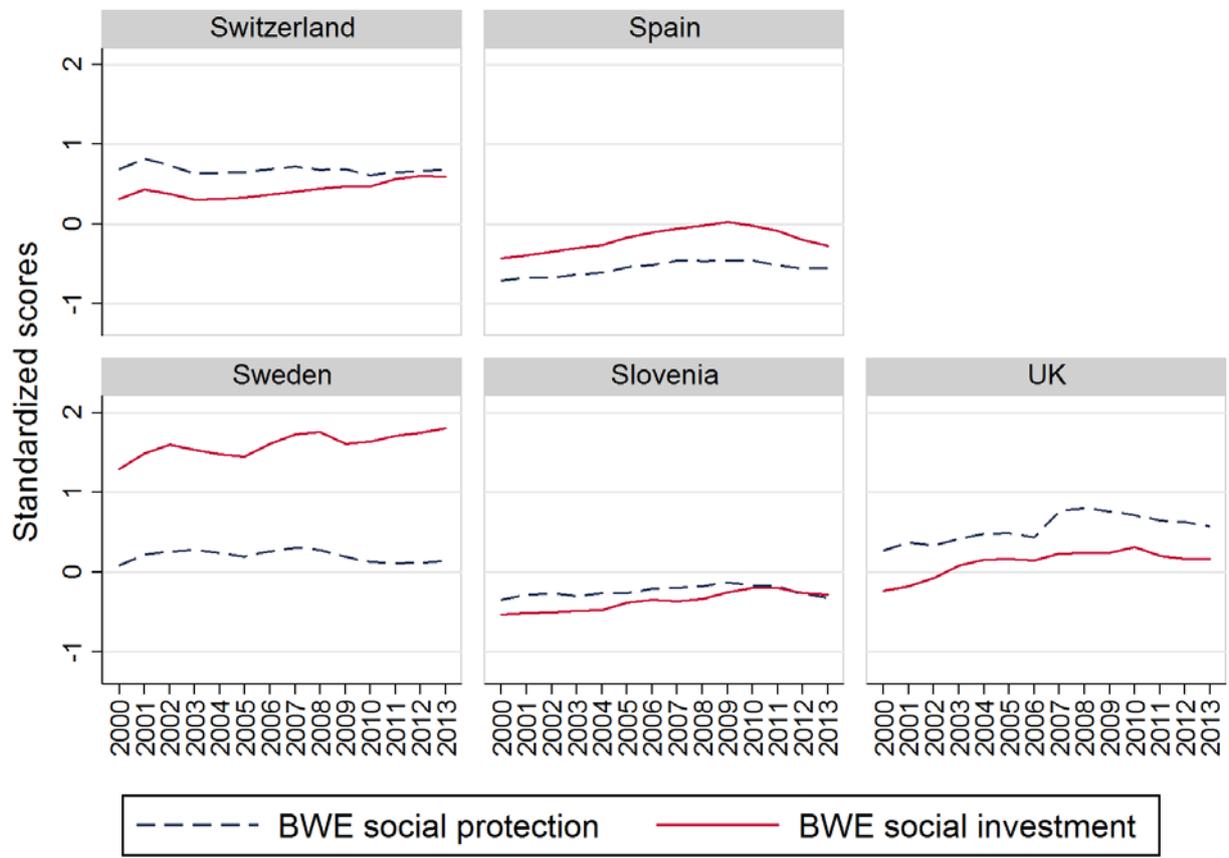


**Appendix.** Trends of BWE for social protection and social investment by country (2/3).



Note: different scale for Luxembourg.

**Appendix.** Trends of BWE for social protection and social investment by country (3/3).



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