EU countries' progress towards 'Europe 2020 strategy targets'

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Abstract

This paper describes and analyzes EU Member States' progress towards the national EU2020 targets. To do so, this paper constructs a geometric composite index with Benefit-of-the-Doubt weights as a measure of a Member State's overall performance on the EU2020 headline indicators. A tripartite decomposition of Member State performance change is presented to explain and analyze performance change of the EU-region and the individual EU Member States during the period 2008–2014. The results reveal that all Member States are in general making progress towards their national targets. Member States generally moved forward in the areas of R&D, environmental and educational policy and moved backwards in terms of employment and poverty and social inclusion. As to the realization of the national targets, the majority of the Member States are still mostly lagging on R&D and social inclusion and poverty reduction.

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1. Introduction

The European Union launched the Europe 2020 Strategy during the European Council held in Brussels in 2010. Being the successor of the Lisbon Strategy, the Europe 2020 Strategy shares similar objectives to its predecessor, namely to stimulate sustainable and inclusive economic growth. However, in addition to the main objective of sustainable economic growth, the Europe 2020 Strategy also adds a strong emphasis on environmental concerns, promotion of social inclusion

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and the reduction of poverty. The Europe 2020 Strategy focuses on five headline targets comprising in total eight sub-targets that are to be achieved by 2020. These targets cover the domains of employment, research and development, climate and energy, education, social inclusion and poverty reduction. The main target for the EU-region as a whole as far as employment is concerned, is that 75% of the 20–64 year-olds are to be employed by 2020. For the domain of R&D, the EU-target is that 3% of the EU's GDP is invested in R&D. The Europe 2020 Strategy also wants to cut greenhouse gas emissions in the EU-region by 20% (or even 30%, if the conditions are right) as compared to the level of greenhouse gas emissions in 1990. Additionally, by 2020, 20% of all European energy should come from renewable sources and on average a 20% increase in total energy efficiency should be realized across EU Member States. Concerning education, the rates of early school leaving should be reduced to below 10%, and at least 40% of 30–34-year-olds should have completed tertiary level education. Finally, measures should be taken to ensure that by 2020 in the EU-region the number of people in a situation of poverty and social exclusion or at risk of such a situation should be at least 20 million lower. Each of these targets was translated into national targets, giving individual Member States a way to check their own progress towards these goals. These national targets also take into account the different starting positions of the Member States. With five headline targets measured by eight sub-indicators, the Europe 2020 Strategy is a very comprehensive project capturing many different facets of society. To make sure that the Europe 2020 strategy delivers, the Commission implemented a system to harmonize and coordinate policy actions between the EU and national authorities. In particular, for each of the EU Member States, progress on the set of indicators set out by the Europe 2020 Strategy is monitored during the European Semester, the EU's yearly cycle of policy coordination (European Commission, 2011).

The aim of the present paper consists in providing a comprehensive evaluation of the progress made by the EU Member States towards their national targets on the set of indicators as specified by the Europe 2020 Strategy. To do so, the evolution of the EU Member States' performance on Europe 2020 indicators for employment, research and development, climate and energy, education, social inclusion and poverty reduction are analyzed for the years 2008 and 2014. To evaluate the overall performance of the EU Member States, we construct a geometric composite index using Van Puyenbroeck and Rogge's (2017) variant of the 'benefit-of-the-doubt' (BoD)-weighted composite indicator. This approach differs in two important ways from the previously used composite indicators to evaluate EU Member State performances on the Europe 2020 strategy (Çolak & Ege, 2013; Pasimeni, 2012, 2013; Rappai, 2016). Firstly, instead of using equal weighting or any other format of fixed weighting (like, for instance, Pasimeni (2012, 2013)), Van Puyenbroeck and Rogge's (2017) composite index uses BoD-weights for the eight sub-indicators. In essence, it concerns country-specific sets of optimal weights that are determined on the basis of the performance data on the sub-indicators of the evaluated Member States themselves. The main conceptual starting point of the BoD-weighting method is that in the absence of any detailed information on the 'true' weights, representative weights can be retrieved from the observed sub-indicator data themselves (i.e., letting the data speak for themselves). The BoD-model looks for the weights that maximize the impact of sub-indicators of relative strengths and minimize the influence of sub-indicators of relative weaknesses. This indeed means that each Member State is granted the benefit-of-the-doubt when it comes to assigning weights in the building-up of the composite indicator.

There are many reasons for using BoD-weights in the construction of CIs for evaluating countries performances on complex and multidimensional policy projects such as the Europe 2020 Strategy. Firstly, whereas in practice poorly performing Member States often criticize the

reliability of the CI-scores and CI-ranking, claiming the use of unfavourable weights, this criticism cannot be invoked against BoD-weighted CIs since any other weighting scheme than the BoD set of weights would worsen the position of the evaluated country vis-à-vis the other countries. Secondly, and somewhat related to the first reason, a main practical advantage of using BoD-weights when analyzing policy performances of countries is its pragmatic stance. As countries are often sensitive about being evaluated, compared and benchmarked against other countries, granting countries the benefit of the doubt is a very attractive option. Thirdly, in a setting in which there is typically disagreement among policy makers, experts and stakeholders about what are effective policies for achieving the policy targets (and, hence, about what are true policy weights for the different sub-indicators), the use of BoD-based country-specific importance weights enables each country to employ policies that are tailored to its own specific policy context. Given the nature of EU policy making with, on the one hand, a broadly shared EU-wide concern to strive for sustainable and inclusive economic growth (i.e., the core of the Europe 2020 Strategy) and, on the other hand, the different traditions and instruments to achieve this goal into being, which under the subsidiarity principle are still largely situated at the national level, the idea of ‘imposing’ some policy priority weighting scheme fits uneasily and, hence, is overly restrictive. Finally, as indicated by [Cherchye, Moesen, Rogge, and Van Puyenbroeck, \(2007\)](#), the dashboard approach currently used in EU policy-making and evaluation, with EU Member State performances being evaluated on the basis of individual indicators, dimension by dimension, almost inevitably faces policy-makers with the problem that one cannot comparatively judge Member States’ overall performance unless one aggregates the sub-indicators. The reason for this is that a Member State can be better than another Member State according to one (or some) sub-indicator(s), while the reverse holds for another (some other) sub-indicator(s). As is well-known, this problem is endemic when, as usual, more sub-indicators and/or more countries are taken into account.¹ The case of the Europe 2020 Strategy and the evaluation and monitoring of 27 EU Member States on eight sub-indicators nicely illustrates this issue.² [Micklewright \(2001\)](#) warns us of the danger that, lacking a good composite index, excessive public attention may eventually be again focused on just one or a few dimensions, thus abolishing the original desideratum of portraying a multidimensional phenomenon. Indeed, this could undermine the credibility of policy performance evaluation. A composite indicator does provide a summary of the aggregate performance of EU Member States in relation to the set of Europe 2020 sub-indicators. As such, a composite indicator forms a useful addition to the dashboard approach that is currently employed by the Commission.

A second important way in which [Van Puyenbroeck and Rogge’s \(2017\)](#) method deviates from the most traditional method is that it constructs composite indices as a ‘weighted geometric average’ instead of the ‘weighted arithmetic average’ (exceptions are [Pasimeni, 2012, 2013; Pasimeni & Pasimeni, 2015](#)). The reason for doing this is the recent findings and discussions in the CI-literature that the weighted geometric average is superior to the weighted arithmetic average aggregation procedure (see, e.g., [Ebert & Welsch, 2004; Van Puyenbroeck & Rogge, 2017; Zhou, Ang & Zhou, 2010](#)). There are several advantages to using weighted geometric averages, over the

¹ Of course, all reasonable CIs would return the same logical ordering of the performances in the trivial case where a multi-dimensional dominance relation at the level of the sub-indicators existed. But settings in which a complete ordering can be achieved in such an uncontested manner are rare, if they exist at all. The present case study with the Europe 2020 sub-indicators for the EU Member States is not different, with Member States outperforming other Member States on one social inclusion sub-indicator and vice versa.

² In fact, the recent enlargement of the EU with several new Member States from the former Soviet Union made the task of comparatively evaluating and/or ranking EU Member States’ policy performances a much more intricate matter.

commonly used ‘weighted arithmetic average’. The first advantage is that the subsequent ordering we attain is independent of the scaling used for each of the statistical indicators, if we use solely ratio-scale measurement for strictly positive statistical indicators (as in the present case study) (see, [Ebert & Welsch, 2004](#)). In other words, the fact that the Europe 2020 Strategy indicators have different measurement units will not influence the ranking of the different countries when using the weighted geometric averages. The second advantage is that the weighted geometric average does not allow for perfect substitutability between the different sub-indicators, contrary to the traditional weighted arithmetic average. This means that it is no longer possible for a country to perfectly compensate for a poor performance in one sub-indicator with a better performance in another sub-indicator. Finally, because the weighted geometric average imposes that marginal returns to increases in a sub-indicator value are diminishing, it takes imbalances among sub-indicator values into account. Hence, countries with a more unbalanced performance on the set of Europe 2020 sub-indicators will receive lower CI-scores, all else being equal. The traditional weighted arithmetic average, on the other hand, is neutral as to such imbalances as it presumes constant marginal returns to increases in a sub-indicator value.

This paper hopes to answer several questions. In the period 2008–2014, have EU Member States been progressing towards the targets set out by the Europe 2020 Strategy, and if so, which countries are showing the best performances?³ Are there any EU Member States that have already reached their targets? Are certain policy areas showing more improvement than others? The added value of this paper lies mostly in its scope. Most researchers focus only on one or two domains of the Europe 2020 Strategy ([Barslund, 2012](#); [Dragomirescu-Gaina, Elia, & Weber, 2015](#)). By considering all eight sub-indicators and sub-targets of the Europe 2020 Strategy simultaneously in a performance evaluation of Member States, this paper hopes to give a broader overview of the dynamics in the performances of the EU Member States with respect to their targets.

2. Europe 2020 strategy: headline indicators and target levels

The Europe 2020 Strategy identifies five policy domains that the European Member States should focus on in their efforts to boost smart, sustainable and inclusive growth. These five policy domains cover employment, research and development, climate change and energy sustainability, education, and social inclusion and poverty reduction. For each of these domains targets have been agreed for the EU as a whole. At the level of the individual Member States, progress is monitored by means of a set of indicators (i.e., sub-indicators) for which EU-targets have been translated into national targets (for the national Europe 2020 Strategy targets, we refer to the Eurostat website). In more detail, the eight sub-indicators for measuring Member State progress relative to their own national targets are the following:

- 1 *Employment rate* (y_1), which measures the share of the population aged 20–64 in employment.
- 2 *Gross domestic expenditure on research and (experimental) development (GERD)* (y_2), measured as a percentage of gross domestic product (GDP).
- 3 *Greenhouse gas emissions* (y_3), measured as the annual aggregated greenhouse gas emissions expressed in million tonnes of CO₂ equivalent in relation to “Kyoto base year”. The Member States’ targets only cover the reduction of non-ETS (Emissions Trading System) greenhouse

³ In our proposal, the choice of the year 2008 as base year and 2014 as year of most recent evaluation is essentially the result of a trade-off between covering more years in the sample set and minimizing the presence of missing data.

gas emissions compared to the Effort Sharing Decision (ESD) base year (2005). In the dataset, the indicator data are expressed in the form of index numbers, with the base year having an index of 100.

- 4 *Share of renewable energy in gross final energy consumption* (y_4) expressed as a percentage.
- 5 *Energy efficiency* (y_5) measured by energy statistics data of all major sectors of the economy that are involved in production, trade, energy transformation and energy consumption. The targets set for the individual EU Member States are expressed as absolute levels of primary energy consumption, i.e., achieving a target reduction in million tonnes of oil equivalent (Mtoe) of primary energy consumption.
- 6 *Early leavers from education and training* (y_6), measured as the share of the population aged 18 to 24.
- 7 *Tertiary educational attainment* (y_7), defined as the share of the population aged 30–34 having completed tertiary education.
- 8 *Poverty and social exclusion* (y_8), defined as the number of persons who are at risk of poverty, severely materially deprived or living in households with very low work intensity (measured per 1000 persons). The national targets indicate the number of people that should be lifted out of being at risk of being poor or social excluded by 2020.

The three indicators y_3 , y_4 , and y_5 cover the domain of environmental policy. The indicators y_6 and y_7 cover the domain of educational policy. Most of the Member States chose to base their targets on the same indicators as the overall EU target, but there are some exceptions (e.g. for the indicator measuring poverty and social exclusion, Denmark focuses on the number of people living in households with low work intensity and Germany focuses on the number of long-term unemployed). The United Kingdom and Croatia were excluded from the dataset due to lacking national targets for (some of) the Europe 2020 Strategy indicators. As the data for 2014 on non-ETS greenhouse gases were not yet available the most recent data (data of 2012) were used instead. As some of the indicators (y_3 , y_6 , and y_8) in their original format are defined negatively (e.g. more poverty and social exclusion = bad result), the inverse was taken.

3. A geometric composite index with Benefit-of-the-doubt weights

3.1. A geometric CI as snapshot of country performance

The geometric composite index with BoD-weights as proposed by [Van Puyenbroeck and Rogge \(2017\)](#) can be computed by a two-step procedure. In a first step, BoD importance weights are derived using the traditional BoD-model (see, [Cherchye et al., 2007](#)). Formally, this involves using the following linear programming model:⁴

$$\max_{w_{c,i}} \sum_{i=1}^m w_{c,i} y_{c,i} \quad (1)$$

⁴ Benefit-of-the-doubt (BoD) weighting is inspired by (the multiplier formulation of) Data Envelopment Analysis (DEA) ([Charnes, Cooper, & Rhodes, 1978](#)), a non-parametric technique to evaluate the efficiency performance of observations (e.g., companies, organizations, individuals, etc.) in complex settings (e.g., the measurement of economic efficiency and growth in the EU and OECD countries ([Bono & Giacomarra, 2016](#); [Halkos & Tzeremes, 2009](#); [Ventelou & Bry, 2006](#); [del Mar Salinas-Jiménez & Salinas-Jiménez, 2007](#)), the evaluation of national stability ([Tsuneyoshi, Hashimoto, & Haneda, 2012](#)), etc).

s.t.

$$\sum_{i=1}^m w_{c,i} y_{j,i} \leq 1 \quad \forall j = 1, \dots, n \quad (1.1)$$

$$w_{c,i} \geq 0 \quad \forall i = 1, \dots, m \quad (1.2)$$

with $y_{c,i}$ the performance of the evaluated country c on the i th indicator ($i = 1, \dots, m$; m in casu equal to 8 as there are eight sub-indicators), $y_{j,i}$ the performances of the countries j ($j = 1, \dots, n$) in the sample set on the i th indicator, and $w_{c,i}$ the optimal BoD-weight for the evaluated country c on the statistical indicator i . Besides the two standard constraints (1.1) and (1.2), we impose the additional minor restrictions that the optimal importance weights for each indicator should be at least 5% and that each policy dimension (i.e. employment, innovation, environment, education and social exclusion and poverty) shall have a combined importance weight of no higher than 35%. This implies considerable flexibility in the definition of the optimal BoD-weight, although not so much as to enable one dimension to be overemphasized or ignored in the construction of the CI.⁵

The objective function of Eq. (1) constitutes the basic linear BoD-weighted composite indicator. In the present case, however, we are interested in the estimated sub-indicator importance weights (Cherchye et al. (2007) and Van Puyenbroeck and Rogge (2017) use the term ‘pie-shares’):

$$\omega_{c,i} = \frac{w_{c,i} y_{c,i}}{\sum_{i=1}^m w_{c,i} y_{c,i}} \quad \forall i = 1, \dots, m \quad (2)$$

where, evidently, $\sum_{i=1}^m \omega_{c,i} = 1$, i.e., BoD-estimated importance weights sum up to a total of 1 or 100%. Following the BoD-rationale, high (low) importance weights $\omega_{c,i}$ implicitly reflect the particular policy area(s) of the Europe 2020 Strategy on which the evaluated Member State performs relatively strongly (weakly) as compared to the other EU Member States (in terms of having sub-indicator value that is closer to the national target value or which even surpasses the target value).

In the second step, the BoD-based importance weights $\omega_{c,i}$ are used as exponents in the construction of the geometric CI. Formally,

$$CI_c(y_{c,i}, y_{B,i}, \omega_{c,i}) = \prod_{i=1}^m \left(\frac{y_{c,i}}{y_{B,i}} \right)^{\omega_{c,i}} \quad (3)$$

⁵ Ideally, weight bound values should be specified by experts and/or stakeholders. Practical experience teaches us that strong consent, even between experts thoroughly acquainted with the object of study, is unlikely to come about on this matter (on social inclusion within the EU context, see e.g. Cherchye, Moesen, & Van Puyenbroeck, 2004; for an illustration with real data for the Technology Achievement Index see Cherchye et al., 2008). In the current illustrative application we lack such expert/stakeholder information, but still defined the lower weight bound value of 5% and the upper bound value of 35% so as to avoid unrealistically high or low (i.e., quasi-zero) BoD-weights. In other words, we take it that our social inclusion CI cannot be constructed by overemphasizing or ignoring one of its constituent sub-indicators, a minimalist position which we take to reflect the underlying idea that all dimensions are considered as providing at least some valuable information to the European Commission’s dashboard of key social indicators. As a robustness check we computed the BoD-model as in (P1) with other weight bound values. Overall, this implied only minor differences in the majority of resulting budget shares.

with $y_{B,i}$ the benchmark performance on the i th indicator. In the present study, benchmark performance values are country-specific as they involve the national Europe 2020 Strategy targets that were decided upon within the context of the Europe 2020 Strategy.⁶ It is important to note that the geometric composite index with BoD-weights as in Eq. (3) is constructed as the ratio of the indicator values of the evaluated country to its target values. This illustrates the benchmarking idea: the performance of the EU countries on the eight Europe 2020 Strategy indicators is evaluated in a relative perspective to the countries' national target values. This makes it possible to identify which countries are overall doing better, worse, or equally well as compared to their Europe 2020 Strategy targets. In the interpretation of the CI_c -scores, higher CI_c -values indicate better overall performance of the evaluated countries. More particularly, CI_c -values higher (lower) than 1 denote that the evaluated country generally outperforms (underperforms) the national Europe 2020 Strategy target levels. Note that this does not necessarily imply that the performance of the evaluated country surpasses (falls short of) the target levels on all sub-indicators. However, it does mean that the eventual falling short of the target levels on some sub-indicators is outweighed (not offset) by the surpassing of the target levels on the other sub-indicators. CI_c -values near or equal to one indicate that the evaluated country more or less performs at the level specified by its national targets.

3.2. Geometric CIs as measure of performance change over time

An important task of the Council of the EU (ministers) and the Commission consists in monitoring and peer-reviewing overall progress towards the Europe 2020 Strategy headline targets. In this section, we show that the geometric mean quantity index approach of Van Puyenbroeck and Rogge (2017) can be easily extended to assess and analyse country performance change over time. Essentially, measuring global performance change during a period boils down to comparing the aggregate (or weighted) sub-indicator performance at the beginning (moment t) and the end of the period (moment $t + 1$). More formally, this involves computing the ratio of the geometric BoD-weighted CIs at t and $t + 1$:

$$PC_c = \frac{CI_c^{t+1}}{CI_c^t} = \frac{\prod_{i=1}^m \left(\frac{y_{c,i}^{t+1}}{y_{B,i}^{t+1}} \right)^{\omega_{c,i}^{t+1}}}{\prod_{i=1}^m \left(\frac{y_{c,i}^t}{y_{B,i}^t} \right)^{\omega_{c,i}^t}} \quad (4)$$

This change metric outlines the progress of the evaluated country towards its national Europe 2020 Strategy targets between t and $t + 1$. A PC_c -value larger than one reflects a general improvement in the evaluated country's performance on stimulating sustainable and inclusive economic growth as outlined by the Europe 2020 Strategy. The opposite holds for a PC_c -value lower than one, i.e. a general deterioration. A PC_c -value near or equal to one indicates the status quo. As illustrated by Van Puyenbroeck and Rogge (2017), this performance change metric combines the

⁶ It is important to note that the national targets do not necessarily add up to the EU target. Moreover, national targets may also differ in the level of ambition, with some EU member States having national targets that are ambitious whereas other Member States have target levels that are less demanding.

joint effect of three types of change components. In particular, by rewriting and rearranging the performance change metric the following tripartite decomposition can be obtained:

$$PC_c = \prod_{i=1}^m \left(\frac{y_{c,i}^{t+1}}{y_{c,i}^t} \right)^{\frac{\omega_{c,i}^{t+1} + \omega_{c,i}^t}{2}} \times \prod_{i=1}^m \left(\frac{y_{B,i}^{t+1}}{y_{B,i}^t} \right)^{\frac{\omega_{c,i}^{t+1} + \omega_{c,i}^t}{2}} \times \frac{\prod_{i=1}^m \left(\sqrt{\frac{y_{c,i}^{t+1}}{y_{B,i}^{t+1}}} \frac{y_{c,i}^t}{y_{B,i}^t} \right)^{\omega_{c,i}^{t+1}}}{\prod_{i=1}^m \left(\sqrt{\frac{y_{c,i}^{t+1}}{y_{B,i}^{t+1}}} \frac{y_{c,i}^t}{y_{B,i}^t} \right)^{\omega_{c,i}^t}} \quad (5)$$

$$= \Delta OWN_c \times \Delta BP_c \times \Delta W_c$$

The ΔOWN_c -factor measures that part of the performance change that is due to changes in the evaluated Member State's own sub-indicator data. The ΔBP_c -factor looks at the change in the performance metric that is due to changes in the benchmark indicator values. Both the ΔOWN_c - and ΔBP_c -components are measured while averaging out the effects of changes in the BoD-derived importance weights, i.e., $(\omega_{c,i}^{t+1} + \omega_{c,i}^t)/2$. The ΔW_c -component measures the change in the performance change metric that is due to changes in the evaluated Member States' BoD-based importance weights. In the interpretation of the estimated change component values, a ΔOWN_c -value higher (lower) than one denotes an aggregate improvement (deterioration) in the evaluated Member State's indicator data. A ΔOWN_c -value equal to one indicates an overall status quo in their own indicator data. A ΔBP_c -value higher (lower) than one marks progress (regress) in the benchmark performance values, i.e. target values that were revised upwards (downwards) during the period of study. Obviously, upgraded (downgraded) targets are more (less) difficult to reach for countries and negatively (positively) impact the PC_c -value, ceteris paribus. In the present case study, we presumed that Europe 2020 Strategy national target values remained unchanged during the period 2008 and 2014. Hence, ΔBP_c is assumed to be equal to one for all Member States. A ΔW_c -value larger (smaller) than one implies a change in the BoD-derived importance weights that generally raised (lowered) the PC_c -score of the evaluated country relative to the other countries. More particularly, a $\Delta W_c > 1$ ($\Delta W_c < 1$) denotes that the BoD-estimated importance weights have changed in such a way that sub-indicators on which the evaluated country shows a relatively strong performance are rewarded more (less) generously at $t+1$ as compared to t . Before concluding this section, it is important to note that the performance change components may move in opposite directions. For example, for a EU Member State performance regress (i.e., $PC_c < 1$) may occur because of BoD-derived importance weights being less favourable ($\Delta W_c < 1$) and in spite of its own sub-indicator data being better ($\Delta OWN_c > 1$) at $t+1$ as compared to t , or vice versa. In the same vein, performance progress (i.e., $PC_c > 1$) may occur because of its own sub-indicator data being better ($\Delta OWN_c > 1$) and in spite of BoD-derived importance weights being less favourable ($\Delta W_c > 1$) at $t+1$ as compared to t .

4. Results

Snapshots of Member State performance on the Europe 2020 Strategy indicators in 2008 and 2014

The detailed results of the CI-values for the EU Members States in 2008 and 2014, as well as their respective rankings, can be found in [Tables 1 and 2](#). As we can see in [Table 1](#), in 2008

Table 1
Europe2020 geometric CI with BoD-based sub-indicator importance weights in 2008 by Member State.

Country	CI_c	$\omega_{c,1}$	$\omega_{c,2}$	$\omega_{c,3}$	$\omega_{c,4}$	$\omega_{c,5}$	$\omega_{c,6}$	$\omega_{c,7}$	$\omega_{c,8}$
EU28	0.80	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Belgium	0.79	0.05	0.35	0.05	0.05	0.25	0.15	0.05	0.05
Bulgaria	0.78	0.35	0.05	0.05	0.25	0.05	0.15	0.05	0.05
Czech Republic	0.96	0.20	0.05	0.05	0.05	0.25	0.30	0.05	0.05
Denmark	0.85	0.15	0.35	0.05	0.25	0.05	0.05	0.05	0.05
Germany	0.90	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Estonia	0.76	0.05	0.05	0.05	0.25	0.05	0.05	0.15	0.35
Ireland	0.64	0.10	0.05	0.05	0.05	0.05	0.05	0.30	0.35
Greece	0.99	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Spain	0.86	0.35	0.05	0.05	0.05	0.25	0.05	0.15	0.05
France	0.71	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Italy	0.87	0.05	0.20	0.05	0.25	0.05	0.30	0.05	0.05
Cyprus	0.78	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Latvia	0.86	0.35	0.05	0.05	0.25	0.05	0.05	0.15	0.05
Lithuania	0.94	0.35	0.05	0.05	0.25	0.05	0.15	0.05	0.05
Luxembourg	0.75	0.20	0.05	0.05	0.25	0.05	0.30	0.05	0.05
Hungary	0.83	0.15	0.35	0.25	0.05	0.05	0.05	0.05	0.05
Malta	0.66	0.20	0.05	0.05	0.05	0.25	0.30	0.05	0.05
Netherlands	0.81	0.35	0.05	0.25	0.05	0.05	0.05	0.15	0.05
Austria	0.80	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Poland	0.84	0.05	0.35	0.05	0.25	0.05	0.15	0.05	0.05
Portugal	0.68	0.20	0.05	0.05	0.05	0.25	0.30	0.05	0.05
Romania	0.81	0.15	0.35	0.05	0.25	0.05	0.05	0.05	0.05
Slovenia	0.76	0.35	0.05	0.05	0.25	0.05	0.15	0.05	0.05
Slovakia	0.78	0.05	0.20	0.05	0.25	0.05	0.30	0.05	0.05
Finland	0.87	0.20	0.05	0.05	0.25	0.05	0.30	0.05	0.05
Sweden	0.97	0.05	0.35	0.05	0.25	0.05	0.15	0.05	0.05
Average	0.82	0.18	0.19	0.06	0.15	0.13	0.13	0.07	0.08
Stdev.	0.09	0.11	0.14	0.05	0.10	0.10	0.11	0.06	0.09
Min.	0.64	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Max.	0.99	0.35	0.35	0.25	0.25	0.25	0.30	0.30	0.35

none of the EU Member States had already reached the national Europe 2020 Strategy targets. A general observation is that the CI-scores in 2014 are considerably higher than in 2008 (average CI_c –score of 0.82 in 2008 and of 0.92 in 2014). This suggests that countries have overall made some progress on the Europe 2020 targets. Exceptions are Ireland, Spain and Greece, the first two of which saw a small overall regress on the sub-indicators (respectively $CI_c = 0.64$ and $CI_c = 0.86$ in 2008 and $CI_c = 0.60$ and $CI_c = 0.85$ in 2014). Greece experienced a more serious overall regress on the Europe 2020 indicators ($CI_c = 0.99$ in 2008 and $CI_c = 0.86$ in 2014). A second observation is that there is no clear difference between Western European, Southern European, and Central and Eastern European (CEE) EU Member States. For each of these groups, there are countries that are in general performing relatively strongly and countries that are overall performing relatively poorly on the Europe 2020 indicators. The Scandinavian countries are all showing relatively strong performances on the Europe 2020 Strategy indicators. In 2014, Sweden and Denmark had even already surpassed on more than half of the target levels established by the Europe 2020 Strategy (Finland had only reached its national targets on two sub-indicators, although on some other sub-indicators it came close). The Scandinavian countries traditionally perform well, as they have both

Table 2

Europe2020 geometric CI with BoD-based sub-indicator importance weights in 2014 by Member State.

Country	CI _c	$\omega_{c,1}$	$\omega_{c,2}$	$\omega_{c,3}$	$\omega_{c,4}$	$\omega_{c,5}$	$\omega_{c,6}$	$\omega_{c,7}$	$\omega_{c,8}$
EU28	0.84	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Belgium	0.89	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Bulgaria	0.93	0.35	0.05	0.05	0.25	0.05	0.05	0.15	0.05
Czech Republic	1.27	0.05	0.35	0.05	0.05	0.25	0.15	0.05	0.05
Denmark	0.95	0.15	0.35	0.05	0.25	0.05	0.05	0.05	0.05
Germany	0.97	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Estonia	0.86	0.05	0.05	0.05	0.25	0.05	0.05	0.15	0.35
Ireland	0.60	0.10	0.05	0.05	0.05	0.05	0.30	0.05	0.35
Greece	0.86	0.35	0.05	0.05	0.25	0.05	0.15	0.05	0.05
Spain	0.85	0.35	0.05	0.05	0.05	0.25	0.05	0.15	0.05
France	0.86	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Italy	0.90	0.20	0.05	0.05	0.25	0.05	0.30	0.05	0.05
Cyprus	1.08	0.35	0.15	0.05	0.05	0.25	0.05	0.05	0.05
Latvia	1.01	0.20	0.05	0.25	0.05	0.05	0.30	0.05	0.05
Lithuania	1.11	0.35	0.05	0.05	0.25	0.05	0.15	0.05	0.05
Luxembourg	1.02	0.20	0.05	0.05	0.25	0.05	0.30	0.05	0.05
Hungary	0.85	0.35	0.05	0.10	0.05	0.05	0.30	0.05	0.05
Malta	0.79	0.35	0.15	0.05	0.05	0.25	0.05	0.05	0.05
Netherlands	0.85	0.35	0.15	0.25	0.05	0.05	0.05	0.05	0.05
Austria	0.92	0.15	0.35	0.05	0.05	0.25	0.05	0.05	0.05
Poland	0.88	0.15	0.35	0.05	0.25	0.05	0.05	0.05	0.05
Portugal	0.80	0.20	0.05	0.05	0.05	0.25	0.30	0.05	0.05
Romania	0.88	0.35	0.15	0.05	0.25	0.05	0.05	0.05	0.05
Slovenia	0.89	0.35	0.05	0.05	0.25	0.05	0.05	0.15	0.05
Slovakia	0.88	0.05	0.35	0.05	0.25	0.05	0.15	0.05	0.05
Finland	0.90	0.20	0.05	0.05	0.25	0.05	0.30	0.05	0.05
Sweden	1.12	0.15	0.35	0.05	0.25	0.05	0.05	0.05	0.05
Average	0.92	0.21	0.17	0.07	0.15	0.12	0.13	0.06	0.08
Stdev.	0.13	0.11	0.14	0.05	0.10	0.10	0.11	0.04	0.09
Min	0.60	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Max	1.27	0.35	0.35	0.25	0.25	0.25	0.30	0.15	0.35

solid economic fundamentals (high employment and participation rates) and low poverty rates (because of efficient and effective welfare state models). Additionally, the Scandinavian countries have considerable renewable energy sources which ensures that they perform well in the domain of environmental policy (with all three countries already (nearly) achieving their target values for the share of renewable energy in gross final energy consumption in 2014). Two Baltic States, Lithuania and Latvia, are also performing well, occupying high positions in the rankings. Of the Baltic States, Estonia has the most challenging national targets. This probably explains why Estonia is still further away from the national target levels. Nevertheless, in 2014, all three Baltic States had already succeeded in reaching their national targets on several Europe 2020 indicators. Prominent among the countries that are doing worst in terms of moving towards their national target values are Portugal, Ireland, and Malta. At first glance, it is perhaps surprising that Western European countries like France but also Belgium and the Netherlands are performing relatively poorly in comparison to other countries. This does not mean that these countries are obtaining the lowest performance values on the sub-indicators. However, it does mean that, relatively speaking,

these countries are further away from achieving their target values. It is important to note, however, that the targets for these countries are typically more demanding.

The BoD-derived importance weights for the EU Member States in Table 1 and 2 provide a closer look at the distribution of the importance weights over the set of Europe 2020 Strategy indicators in 2008 and 2014 respectively. In the interpretation of the importance weights it is important to focus on the five policy domains (employment, research and development, climate and energy, education, social inclusion and poverty reduction). This means that the importance weights w_3 , w_4 , and w_5 , and w_6 and w_7 should respectively be summed to obtain the overall importance weights for the domains of environmental policy and educational policy. Overall the distribution of the importance weights is rather heterogeneous across countries. In particular, whereas the BoD-method decided that it is optimal for one or more country to obtain the minimum allowed importance weight for a certain sub-indicator, it decided that it is optimal for one or more other countries to get the maximum allowed importance weight for that same sub-indicator. Looking at the descriptive statistics for the importance weights for the Europe 2020 Strategy indicators at the bottom of Table 1 and Table 2, one readily observes some general patterns. Firstly, for both 2008 and 2014, there is a high average importance weight for the environmental policy dimension ($w_{3+4+5} = 0.34$) and a low average importance weight for the policy dimension of social inclusion and poverty reduction ($w_8 = 0.08$). The high average importance weight for the environmental policy dimension suggests that most of the EU Member States are performing relatively better on three sub-indicators measuring environmental country performance as compared to the other sub-indicators. As far as the use of renewable energy and energy efficiency is concerned, the indicator data indeed shows that, in general, considerable progress has been made with 2014 efficiency levels approaching and, for some countries, even surpassing the national target levels (European Commission, 2015a, 2015b, 2015c, 2015d). However, there is also large divergence between the Member States. For the energy efficiency sub-indicator, for instance, some countries like Sweden and Estonia have exceeded national targets (e.g., Sweden did 7% better than its national target in 2014) and other countries such as Romania, Croatia and Hungary remain considerably (more or less 30%) short of reaching their national Europe 2020 Strategy target levels. A study of the data shows that final energy consumption decreased in the industry, although some of that may be linked to reduced economic activity because of the consequences of the financial and economic crisis. It will remain a challenge for policy makers, therefore, to continue the decoupling of energy consumption and economic growth and increase the share of renewable energy. As for the sub-indicator measuring greenhouse gas emissions, according to the most recent estimates (European Commission, 2015a, 2015b, 2015c, 2015d), the majority of the EU Member States are currently on track to meet their Europe 2020 greenhouse gas reduction targets. In fact, the data show that some Member States had already met their Europe 2020 Strategy targets in 2014 (e.g., Sweden, Finland, Luxembourg, Denmark). Only four Member States (Belgium, Luxembourg, Ireland and Austria) are currently failing to meet their targets and will need to make an additional effort. However, as noted in recent reports (European Commission, 2015a, 2015b, 2015c, 2015d), as the trajectory for reaching the Europe 2020 Strategy goals becomes steeper in the coming years, several Member States will need to assess their existing policies and decide whether they will be sufficient in order to meet the targets.

The low average importance weight for the sub-indicator measuring poverty and social exclusion confirms what was recently noted in the report Social Europe: Aiming for inclusive growth (Social Protection Committee, 2014), namely that the overall situation in the EU with regards to social inclusion and poverty reduction has improved very little, and in fact has been deteriorating in several countries. In 2014, only 10 Member States reported a fall in poverty and social exclu-

sion as compared to 2008. Around 1/3 of EU Member States reported a significant rise in poverty and social exclusion over the period 2008–2014. In 2013 there were 6–8 million more people living in poverty or social exclusion in the EU as compared to 2008, and a total of close to 1 in 4 Europeans. It is clear that a large majority of the EU Member States is making no progress towards the goals set out by the Europe 2020 Strategy. The [Social Protection Committee \(2015\)](#) points out the financial and economic crisis as primary cause for the rise in poverty and social exclusion. Whereas in many countries the welfare system succeeded in cushioning some of the blow of the economic crisis ([Hermann, 2015](#)), the choice for fiscal consolidation and the implementation of austerity packages during the second phase of the crisis reduced the availability and/or quality of programs for combatting poverty and social exclusion. The cuts were especially severe in the countries that were hit hardest by the crisis, and they affected not only cash benefits but also the provision of services such as healthcare and education ([Matsaganis & Leventi, 2014](#)). These cuts combined with feeble economic growth have fueled poverty and social exclusion.

The BoD-derived distributions of the importance weights in 2008 and 2014 also show intermediate average importance weights for the policy dimensions employment, research and development, and education ($w_1 = 0.18$, $w_2 = 0.19$, and $w_{6+7} = 0.20$ in 2008 and $w_1 = 0.21$, $w_2 = 0.17$, and $w_{6+7} = 0.19$ in 2014). The average importance weight for the policy domain employment remained more or less stable over the period 2008–2014. This result is not surprising given that in most EU Member States employment rates haven't recovered to their pre-crisis levels. This was also confirmed recently by the European Commission in the Report on Employment and Social Developments in Europe 2014 ([European Commission, 2015a, 2015b, 2015c, 2015d](#)). This report noted clear differences between Member States, with countries with more open and less segmented labour markets suffering less harsh blows during the crisis. Amongst other things, the weak demand caused by policy uncertainty and low capital and social investments, the fact that SMEs have a hard time accessing the financial markets, the large skill mismatch on the labour market, and the lack of intra-EU labour mobility were identified as causes for the low levels of job creation. What is also surprising in the distribution of the BoD-based importance weights is that the PIGS-countries (Portugal, Italy, Greece, and Spain) obtain a high to very high importance weight for the employment sub-indicator in 2014. As these countries were hit particularly hard by the economic crisis and the subsequent sovereign debt crisis ([Matsaganis & Leventi, 2014](#)) with considerable decreases in employment rates (respectively, -5.5% , -3% , -13% , and -8.6%), we would expect rather low importance weights. A detailed study of their raw sub-indicator data showed, however, that the reason why these countries were given relatively high importance weights to the employment sub-indicator was not because of a strong performance on the employment sub-indicator but rather due to weak to very weak performances on the other sub-indicators.

For the research and development policy dimension, the average importance weight for the GERD sub-indicator remained rather stable over the period 2008–2014. This suggests that there has not been a strong negative impact of the recent financial and economic crises on R&D-spending. At least the expenditure rates on R&D in 2014 are not much further away from the national target values. A possible explanation for this result may be the attempts by the European Commission to promote, integrate and coordinate European research across borders with, for instance, the establishment of a European Research Area ([Barré, Henriques, Pontikakis, & Weber, 2013](#)). Nevertheless, several European policy reports (e.g., [European Commission, 2014](#)) also highlighted that current R&D expenditure levels are still well below the Europe 2020 Strategy target levels.

The average importance weights for the educational policy area also remained more or less unchanged during the period 2008–2014. This suggests that, in spite of recent data showing a declining trend in education spending, this has not (at least not yet) led to regress in education outcomes. On the contrary, a comparison of the educational sub-indicator data in 2014 and 2008 shows that for the majority of the countries the share of early leavers from education and training slightly decreased and the share of the population aged 30–34 having completed tertiary education somewhat increased during that period. However, in spite of recent progress, for several countries the performance levels in 2014 are still far from the national target values. Therefore, educational progress remains an important challenge for the EU-region, particularly with a considerable share of young people still failing to reach certain minimum levels of education, both in terms of attainment and performance. Of particular concern is the fact that this educational poverty is still very strongly determined by a person's socio-economic and immigration background (European Commission, 2015a, 2015b, 2015c, 2015d). In the literature, there is some skepticism as to whether or not the European Union will succeed in the educational goals set by the Europe 2020 Strategy. Whereas Dragomirescu-Gaina et al. (2015) and recent Eurostat reports (e.g., Eurostat, 2015) are more optimistic, Barslund (2012) believes that countries like Portugal, Spain and France will have difficulties meeting their target levels, mostly due to the ambitiousness of their national target levels (particularly given these countries' starting points and insufficient educational spending).

Intertemporal analysis of Member State performances

Looking at the results of the intertemporal analysis in Table 3, one immediately observes that almost all EU Member States have realized a positive overall performance change over the span of these six years (PC_c –values higher than one). There are only three exceptions, Ireland ($PC_c = 0.9393$), Spain ($PC_c = 0.9788$) and Greece ($PC_c = 0.8642$). The higher the PC_c -score the more progress was realized by the Member State. The highest overall progress was realized by the Czech Republic ($PC_c = 1.3230$), Cyprus ($PC_c = 1.3975$) and Luxembourg ($PC_c = 1.3578$). Unsurprisingly, these countries won considerable positions in the country ranking (respectively jumping from the 3rd, 19th and 22th ranking position in 2008 to the 1st, 4th and 5th ranking position in 2014). Among the countries that made little progress (i.e., PC_c –values slightly higher than one) there are Germany, Finland, Poland, Hungary, Italy and the Netherlands. A possible explanation for the limited progress in some of these countries (such as Germany and Finland) is that these countries were already doing well on the Europe 2020 indicators in 2008, which made strong progress more difficult. The limited progress in Italy and Hungary and the regress in Ireland, Spain and Greece are largely due to the negative consequences of the financial and economic crisis over the period 2008–2014. The limited progress of Finland towards its national targets is worth noting. In fact, as compared to 2008, Finland was in 2014 further away from its national target values on three sub-indicators (i.e., employment rate, GERD, and tertiary educational attainment). All of this caused Finland to drop from the 7th ranking position in 2008 to the 12th ranking position in 2014. Possible explanations are the negative impact of the fall of Nokia, the fall of the paper industry, the decline in trade with one of its most important trading partners, Russia, after the sanctions imposed by the European Commission, and the overall macroeconomic development in the Euro area, or a combination of all these factors.

The tripartite decomposition of the PC_c -scores reveals more detailed insights into the changes in the EU Member States on the Europe 2020 Strategy indicators. The ΔOWN_c -component values larger than one for all but three countries confirm the previous finding that all countries, except Ireland, Spain and Greece, generally progressed towards their national targets on the Europe

Table 3

Member State performance change on Europe2020 and the tripartite decomposition (period 2008–2014).

Country	PC_c	ΔOWN_c	ΔBP_c	ΔW_c
EU28	1.0467	1.0467	1.0000	1.0000
Belgium	1.1270	1.1210	1.0000	1.0054
Bulgaria	1.1846	1.1835	1.0000	1.0010
Czech Republic	1.3230	1.1483	1.0000	1.1522
Denmark	1.1197	1.1197	1.0000	1.0000
Germany	1.0875	1.0875	1.0000	1.0000
Estonia	1.1311	1.1311	1.0000	1.0000
Ireland	0.9393	0.9170	1.0000	1.0243
Greece	0.8642	0.9664	1.0000	0.8942
Spain	0.9788	0.9788	1.0000	1.0000
France	1.2174	1.2174	1.0000	1.0000
Italy	1.0339	1.0061	1.0000	1.0276
Cyprus	1.3975	1.1891	1.0000	1.1752
Latvia	1.1855	1.1855	1.0000	1.0000
Lithuania	1.1797	1.1797	1.0000	1.0000
Luxembourg	1.3578	1.1272	1.0000	1.2045
Hungary	1.0254	1.0579	1.0000	0.9693
Malta	1.2001	1.2959	1.0000	0.9261
Netherlands	1.0486	1.0486	1.0000	1.0000
Austria	1.1568	1.1751	1.0000	0.9844
Poland	1.0419	1.0419	1.0000	1.0000
Portugal	1.1792	1.0426	1.0000	1.1310
Romania	1.0803	1.0677	1.0000	1.0118
Slovenia	1.1784	1.2650	1.0000	0.9316
Slovakia	1.1349	1.1349	1.0000	1.0000
Finland	1.0270	1.0126	1.0000	1.0142
Sweden	1.1500	1.0936	1.0000	1.0516
Average	1.1258	1.1052	1.0000	1.0187
Stdev.	0.1199	0.0913	0.0000	0.0708
Min.	0.8642	0.9170	1.0000	0.8942
Max.	1.3975	1.2959	1.0000	1.2045

2020 Strategy indicators. As noted previously, this does not necessarily mean these countries progressed on all sub-indicators. However, it does indicate that the progress realized on some of the Europe 2020 indicators outweighed any eventual regress on other Europe 2020 indicators. In fact, all countries, including top performers such as Sweden, Denmark and the Czech Republic saw their performance deteriorate for one or more of the sub-indicators. The sub-indicators for which most countries experienced a decline were the employment rate and poverty and social exclusion (respectively 18 and 17 out of 26 countries in the sample set). As a possible explanation, we point out the impact of the financial and euro crisis of 2008–2010 and the period of economic downturn and austerity that followed. Whereas the economic impact of the crisis has been rather mild for citizens in the Northern European countries (decline in the employment rate was low in countries such as Belgium (−0.7%), Sweden(−0.4%) and France (−0.6%), while Germany managed to increase (+3.7%) the employment rate), countries in the South of Europe were hit particularly hard by the economic crisis and the series of strict austerity measures imposed by the ECB and/or the IMF. For Greece, Spain, Portugal and, to some extent, Italy the implementation of the austerity packages led to a deepening of the economic recession, a sharp increase in

unemployment (particularly among young people), a crumbling social security system and a marginalization of an increasing part of the population. There is one sub-indicator for which all countries progressed towards their target value, i.e. share of renewable energy in gross final energy consumption. Almost all EU Member States progressed on the other two sub-indicators covering the domain of environmental policy: greenhouse gas emissions (with only Malta showing small increases in emission levels and the Czech Republic and Poland remaining more or less at the status quo) and energy efficiency (with only Estonia displaying a small deterioration). Similarly, a large majority of the countries improved on the two sub-indicators covering the domain of educational policy, namely early leavers from education and training (with only Poland, Romania and Slovakia displaying a slightly higher number in 2014 as compared to 2008) and tertiary educational attainment (with only Finland showing a small drop in the share of the population aged 30–34 having completed tertiary education). The second decomposition factor, the ΔBP_c -component, is not informative in our particular case study given that we used the same national target values to measure country performance on the Europe 2020 Strategy indicators in 2008 and 2014. Hence, for all countries ΔPB_c is by assumption equal to one.

As to the change in the BoD-based importance weighting systems, the average ΔW_c -values close to 1 and the low standard deviation values suggest that for a large majority of the EU Member States the optimal BoD-based importance weights remained more or less unaltered. For 10 EU Member States the ΔW_c -values are perfectly equal to the neutral value of one. This denotes that for these countries the BoD-based importance weights for the Europe 2020 indicators completely correspond in 2008 and 2014. A possible interpretation of this result is that these countries did not undergo serious shifts in comparative (dis)advantage over this period. That is, performance levels on the sub-indicators changed approximately proportionally, leaving the differences in the relative distances from the target levels more or less unaltered. There are seven countries with ΔW_c -values that deviate substantially from one, suggesting that they did undergo considerable shifts in their importance weights for the Europe 2020 indicators. Four of these countries, the Czech Republic ($\Delta W_c = 1.1522$), Cyprus ($\Delta W_c = 1.1752$), Luxembourg ($\Delta W_c = 1.2045$) and Portugal ($\Delta W_c = 1.1310$), have ΔW_c -values that are considerably higher than one. This means that for these countries the BoD-based importance weighting system has changed over the period 2008–2014 in such a way that it benefited their performance evaluation score CI. More precisely, the Europe 2020 Strategy indicators on which the concerned countries obtained relative good performance values (performance levels closer to the national target values) were rewarded more generously by the BoD-model in 2014 as compared to 2008. The opposite interpretation applies to the three other countries, Greece, Malta and Slovenia with ΔW_c -values considerably lower than one (respectively $\Delta W_c = 0.8942$, $\Delta W_c = 0.9261$ and $\Delta W_c = 0.9316$). For these three countries it holds that sub-indicators on which they performed relatively more strongly obtained a lower importance weight and sub-indicators on which they performed relatively more weakly obtained a higher importance weight, in 2014 as compared to in 2008. Obviously, this disadvantageous shift in BoD-based importance weights reduced the PC-scores for these countries.

5. Conclusion

The aim of the present paper was to provide a mid-term evaluation of the progress made by the EU Member States towards their national targets on the set of indicators specified by the Europe 2020 Strategy. To measure a country's global performance on the Europe 2020 indicators we used Van Puyenbroeck and Rogge's (2017) 'indirect' geometric Benefit-of-the-Doubt (BoD)-method to construct a geometric composite index with Benefit-of-the-Doubt weights. Throughout the

paper, we argued that this technique offers a pragmatic tool for evaluating country performances. In particular, in what is usually a very sensitive setting in which traditions and policy instruments, under the subsidiarity principle, are still largely situated at the national level, and countries dislike being patronized by overly restrictive EU policy directives, the BoD-weighted geometric composite index provides an interesting and appealing tool to summarize Member State progress towards the Europe 2020 Strategy targets.

Using the basic version of the technique we obtained snapshots of EU Member State performances on the Europe 2020 Strategy indicators in 2008 and 2014. A comparison between these two snapshots revealed several interesting insights. Firstly, all but three of the EU Member States (i.e., Ireland, Spain and Greece) overall progressed towards the national target values on the Europe 2020 Strategy indicators. This suggests that the EU-region generally improved in terms of stimulating sustainable and inclusive economic growth. Secondly, it was found that Scandinavian and Baltic countries consistently performed strongly on the Europe 2020 indicators, while more heterogeneous performances were observed for Western European, Southern European, and Central and Eastern European (CEE) countries. Thirdly, an analysis of the BoD-estimated importance weights in 2008 and 2014 showed that the majority of the EU Member States are performing relatively well on the sub-indicators measuring environment policy, whereas they have performance values that are still relatively more distant from the national target values on the sub-indicators measuring expenditure on R&D and poverty and social exclusion.

More useful insights were obtained by Van Puyenbroeck and Rogge (2017) multi-factor decomposition of Member State performance change on the Europe 2020 indicators during the period 2008–2014. In particular, it was found that for all but three EU Member States, progress realized on the Europe 2020 indicators outweighed any eventual regress on these indicators (the exceptions are Ireland, Spain, and particularly Greece). The highest level of progress was realized by the Czech Republic, Luxembourg and Cyprus. The Europe 2020 indicators on which most countries experienced a decline were the ones measuring employment and poverty and social exclusion. As a possible explanation, we pointed out the impact of the financial and euro crisis of 2008–2010 and the period of economic downturn and austerity that followed. Almost all EU Member States progressed on the sub-indicators covering the domains of environmental and educational policy. All in all, the static and intertemporal analysis showed that there has been a positive trend in the promotion of sustainable and inclusive economic growth in the EU-region. However, results show that progress has been mild and that for the majority of the EU Member States there is still a lot of work to be done. These findings are confirmed by recent reports of the European Commission (European Commission, 2015a, 2015b, 2015c, 2015d; Social Protection Committee, 2014, 2015), which recently launched new initiatives such as the European Investment Plan in an attempt to further stimulate sustainable and inclusive economic growth and progress towards the Europe 2020 Strategy targets.

In terms of policy insights, the analysis revealed several interesting findings. Firstly, in spite of economic instability and challenges, most of the EU countries succeeded to consolidate or even progressed towards the Europe 2020 Strategy targets. Ireland, Spain, Italy, Portugal and Greece are countries with performances that still fall short of the target levels and/or experienced regress or status quo on the Europe 2020 Strategy indicators. These countries should be more closely monitored by the European Commission (EC). In particular, the EC could help these Member States in transposing EU-guidelines into national and regional policies and the practical implementing of these policies. Secondly, EU countries are on average still relatively more distant from the national target values on the sub-indicators measuring expenditures on R&D. The European Commission could stimulate countries to make more efforts and investments in improving

performance in this area. The European Commission could, for instance, promote a coordinated initiative through guidelines, benchmarking and sharing of best practice. Finally, results showed that most countries experienced a decline on poverty and social exclusion. As indicated above, this decline is probably due to the financial and euro crisis of 2008–2010 and the period of economic downturn and austerity that followed. If the EU still wants to have a realistic change at achieving its poverty and social exclusion targets for Europe 2020, pushing through reforms which next to guaranteeing the long term stability and adequacy of the social security systems also aim at improving social inclusion are needed as quickly as possible. Particularly in the Southern and most of the new EU Member States the situation is urgent. The longer it takes for these countries to implement the necessary reforms the more difficult it becomes for these countries to catch up with the old EU Member States and the more socially disintegrated the EU will get.

This paper concludes by pointing out that the CIs as defined in Eq. (3) clearly exploit the BoD-perspective to the fullest extent: each Member State is equipped with its own optimal sub-indicator weights. It is well-known in the CI-literature that CIs computed using country-specific weights are of limited value if one's objective is to consider the performance of all observations simultaneously. In particular the use of observation-specific weights in the construction of the CIs makes it difficult to order the resulting aggregate (CI) values. One option for coming up with full rankings of the Member States would consist in using the same set of sub-indicator weights in the construction of the CI. Van Puyenbroeck and Rogge (2017) proposed different ways of coming up with a shared weighting structure, and thus different variants of a multilateral composite index. An interesting avenue for further research is to implement these CI-variants in the measurement of EU Member States' performances in the Europe 2020 Strategy.

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