



**Final Version**

**#EUSDG8**

**TOWARDS A EUROPEAN GOAL 8-  
CENTRED APPROACH TO THE UN 2030  
AGENDA**

***Discussion Paper***



# TABLE OF CONTENTS

|                                                                           |    |
|---------------------------------------------------------------------------|----|
| Executive summary .....                                                   | 3  |
| 1. Introduction .....                                                     | 4  |
| 2. The methodology for monitoring #EUSDG8 .....                           | 5  |
| 3. #EUSDG8 composite main results .....                                   | 9  |
| 4. Relationships between the #EUSDG8 and other SDGs.....                  | 12 |
| 5. Conclusions .....                                                      | 17 |
| 6. References .....                                                       | 18 |
| Appendix A. Results of #EUSDG8 composite indicator .....                  | 19 |
| Appendix B. Results of the sub-composite indicators.....                  | 21 |
| Appendix C. Pre-treatment of data and the composite methodology used..... | 27 |

## Executive summary

- Within the 2030 Agenda, SDG8 has the ambition to promote sustained inclusive and sustainable growth, full and productive employment and decent work for all.
- The Report presents an innovative approach to synthetically monitor several dimensions of SDG8 providing evidence on the progress towards the achievement of decent work in European countries.
- The empirical approach has been developed considering the multidimensional nature of SDG8, isolating different homogenous aspects connected to economic performance, labour market output and outcomes.
- The identification of three specific sub-domains of SDG8 (Economic Well-Being, Labour Market Efficiency, Employment Vulnerability) allows to isolate the main dynamics related to the decent work dimension. These three sub-composite indicators are used to estimate a composite index for SDG8 with the aim to provide a quick and concise monitoring of this Goal for European countries.
- Empirical results show that at the European level, #EUSDG8 has barely improved from 2010 to 2019 and that progress towards the Targets set by Goal 8 of the 2030 Agenda is still very slow. This performance largely depends on the presence of significant heterogenous patterns among countries.
- The large variability detected is mainly due to different countries' outcomes achieved in the three sub-domains, with huge differences at the regional level. The distribution of the sub-indicators among UN regions shows significant distances between all sub-composites but especially regarding Economic well-being and Employment quality.
- The analysis of linkages between the three sub-composites clearly shows that the Economic well-being performances of a country alone cannot explain other dimensions especially with respect to Employment quality. The Economic well-being dimension is poorly correlated with the Employment quality dimension, meaning that an increase in Economic well-being does not necessarily translate into better Employment quality.
- On the contrary, the relationship between Economic well-being and Labour vulnerability seems to be stronger and the former can be considered as a good predictor of the latter.
- The #EUSDG8 has also been used to investigate the potential trade-offs with other dimensions of the 2030 Agenda. CO<sub>2</sub> emissions, the DESI index for human capital and the life expectancy indicator have been selected as proxies for SDGs 13, 4 and 3, respectively.
- At the European level, the correlation between #EUSDG8 and CO<sub>2</sub> is positive even if its magnitude is decreasing over time. Significant differences appear among countries. Indeed, most of "mature" EU countries show a positive feedback between these two dimensions, while other countries (i.e. Italy, Spain Portugal and the former transition economies of Eastern Europe) are characterized by a clear trade-off between SDG8 and Environmental/climate issues.
- With respect to human capital, good performances in the DESI indicator are associated with higher performances in SDG8. The achievement of one Goal seems to reinforce the country's ability to achieve the other one. Similar results are detected for #EUSDG8 and life expectancy indicators.

## 1. Introduction<sup>1</sup>

Drawing upon the experience of the Millennium Development Goals (MDGs), the SDGs have been defined according to the triple bottom line sustainability approach, which includes elements of economic development, social inclusion and sustainable environmental management. Goals 1 through 6 build on the core agenda of the MDGs, while Goals 7 through 17 incorporate new ideas (UNSDSN, 2015). Three main principles that derive from the convergence of the MDGs and the Rio+20 Conference have been used to shape the SDGs (UNEP, 2015):

1. leave no one behind;
2. ensure equity and dignity for all;
3. achieve prosperity within Earth's safe and restored operating space.

Since the ambition of the 2030 Agenda is to address global problems that affect both developed and developing countries, its guiding principles were developed with a global perspective (Sachs, 2012). The sustainable development approach that underlies the SDGs is based on the idea that economic prosperity, environmental protection and social well-being are interconnected elements that cannot be addressed separately (Andreoni & Miola, 2016).

An integrated approach, based on the promotion of equity and equality, the inclusion of multiple cultural values, prosperity and development, human rights and environmental conservation, has been used to identify the Goals and their Targets. The SDGs have been specifically formulated around four main concepts (UNEP, 2015): human well-being is intrinsically linked to the health of natural ecosystems; global environmental challenges not only affect the development of the poor, but also pose a threat to the long-term prosperity of development; addressing inequalities in the distributive benefits of development is critical for global sustainable development; sustainable resource management and the maintenance and safeguarding of natural capital are fundamental aspects.

With the adoption of the 2030 Agenda, the international community recognized the need to rethink current socio-economic models to develop a more inclusive and rights-sensitive development paradigm. The Agenda has underlined the importance of common efforts through an integrated and coordinated involvement of both developed and developing countries to identify a new approach to reflect the increasing interdependence in terms of targets, policies and outcomes. Nevertheless, the lack of awareness of and commitment to the 2030 Agenda and the Sustainable Development Goals (SDGs) may hinder the transition towards sustainable development. Monitoring and measuring the SDGs is therefore crucial to guarantee the accountability of policy makers vis-à-vis stakeholders with respect to efforts made to promote a paradigm shift in the current growth model.

In this context, SDG8 highlights the ambition to promote inclusive and sustainable economic growth, full and productive employment, and decent work for all. Indeed, it is essential for the 2030 Agenda that economic growth and full employment are pursued without jeopardizing the achievement of

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<sup>1</sup> This report was prepared by Davide Ciferri and Adolfo Morrone.

other Targets such as those related to environmental and climate issues. Despite isolated pockets of achievement, progress towards SDG8 is slowing down in many areas of the world. An urgent acceleration of efforts is required to bring about transformative change in support of SDG8 (International Labour Office, 2019).

To demonstrate the centrality of SDG8 in the 2030 Agenda and to highlight that reaching the Targets of SDG8 will be functional to a full and holistic accomplishment of the 2030 Agenda ambitions, the European Trade Union Confederation (ETUC)<sup>2</sup> partnered with the experts of the Italian Alliance for Sustainable Development (ASviS)<sup>3</sup> to develop a research project aimed at monitoring the level of implementation of SDG8 in European countries. This project draws upon the work done at world level for ITUC and aims to develop an EU-specific approach to the monitoring of SDG8, supporting ETUC in its work to promote and use such a measure, especially in the context of the European Semester. The work will be carried out to ensure the comparability of the EU version of the composite with the ITUC Goal 8 composite (ITUC, 2020).

The report is structured as follows: chapter 2 describes the approach used to develop the composite indicator for #EUSDG8 and the main results. Chapter 3 uses the composite indicator for SDG8 to measure the trade-offs between Goal 8 and other selected SDGs. Finally, chapter 4 highlights the policy implications of this exercise.

## **2. The methodology for monitoring #EUSDG8**

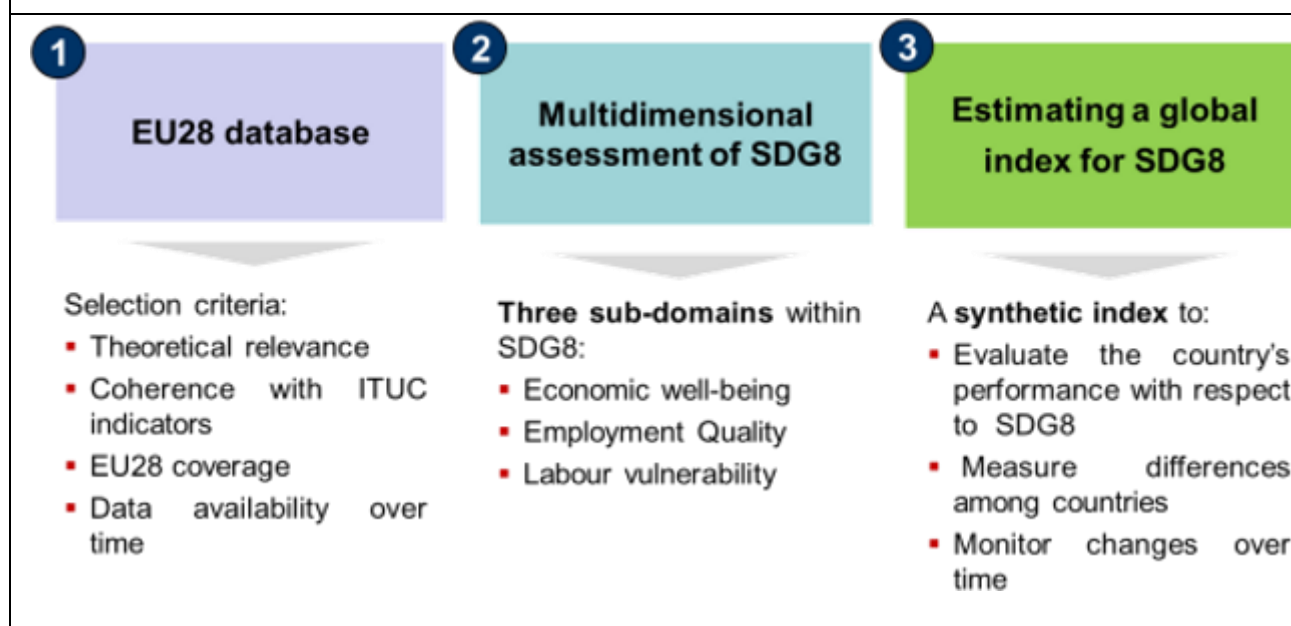
Achieving decent work is a multidimensional goal that recognizes the importance of several aspects connected to economic performance, labour market output and outcomes. Therefore, an effective monitoring of SDG8 must be developed considering these different dimensions which usually show a significant level of heterogeneity among EU countries. Understanding the source of this heterogeneity is key to address countries' specific performances on the domain of SDG8 and, as a result, to better identify the policies needed at country level to ensure a full achievement of Goal 8. At the same time, it remains important to have a synthetic representation of the current condition of each country with respect to SDG8. For this reason, the methodology adopted in this report is based on the three-step approach that is illustrated in the following figure.

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<sup>2</sup> Trade Unions contributed to the conception and the adoption of the 2030 Agenda since the very beginning. The SDGs are a central element in Trade Unions' current agenda as they are rights-based, universal and built on interrelated economic, social, and environmental dimensions.

<sup>3</sup> ASviS is an Italian network established in 2016 with the aim to raise the awareness of the society, economic stakeholders, and Institutions about the importance of the 2030 Agenda for Sustainable Development, and to mobilize them to pursue the SDGs. ASviS brings together over 290 member organizations among the most important civil society institutions and networks (<https://asvis.it/>).

Figure 1 – Developing a composite indicator for #EUSDG8



The #EUSDG8, in coherence with the ITUC–SDG8 composite indicator, divides the multidimensionality of Goal 8 into three subdomains each corresponding to a sub-composite indicator: economic well-being, employment quality and labour vulnerability. For the #EUSDG8 we decided not to build a sub-composite indicator for the labour right dimension but to keep this dimension separate to evaluate the relationship between the labour rights indicators and the #EUSDG8.

The elementary indicators included in each sub-composite were selected according to different criteria. First, the theoretical relevance with the underlying concept and second, the theoretical coherence with the indicators selected for the ITUC – SDG8 composite indicator. However, the European statistical system provides more advanced and timely data and so the indicators selected for the #EUSDG8 were also selected considering pragmatic criteria. Firstly, we selected, for each dimension, the indicators deemed most advanced and fit to the European context. Secondly, the #EUSDG8 was designed to be dynamic over time, covering the period from 2010 to 2019. As a result, the dataset contains 26 indicators (see Table 1) covering the EU27 countries plus the UK and is available from 2010 to 2019.

As previously discussed, SDG8 can be considered a multi-dimensional Goal that simultaneously addresses different domains related both to economic performance and labour market output and income. Countries which show good performance in one dimension do not necessarily have the same positive outcomes in the others. For example, robust economic growth (or even productivity growth) alone cannot guarantee an inclusive and efficient labour market or labour conditions that are fully compliant with international standards for labour rights.

Table 1 – Elementary indicators selected for the composite indicator

| Code                        | Name                                                                             | Unit of measure                                   | Polarity |
|-----------------------------|----------------------------------------------------------------------------------|---------------------------------------------------|----------|
| <b>Economic well-being</b>  |                                                                                  |                                                   |          |
| A01_tertiary                | Tertiary educational attainment                                                  | % of population aged 30 to 34                     | +        |
| A02_sme                     | Proportion of small-scale industries in total industry value added               | %                                                 | +        |
| A03_gdpgrw                  | Real GDP growth rate                                                             | % change on previous period                       | +        |
| A04_gnicapita               | GNI per capita, PPP                                                              | current international \$                          | +        |
| A05_poverty                 | People at risk of income poverty after social transfers                          | %                                                 | -        |
| A06_bottom                  | Income share of the bottom 40 % of the population                                | % of income                                       | +        |
| A07_workpov                 | In-work at-risk-of-poverty rate                                                  | % of people aged 18 and over                      | -        |
| A08_wboard                  | Positions held by women as board members                                         | % of positions                                    | +        |
| A09_socialp                 | General government expenditure by social protection, health and education        | % of GDP                                          | +        |
| <b>Employment Quality</b>   |                                                                                  |                                                   |          |
| B01_employ                  | Employment rate                                                                  | % of population aged 20 to 64                     | +        |
| B02_Collect                 | Collective bargain coverage                                                      | %                                                 | +        |
| B04_outwork                 | Annual growth rate of output per worker                                          | % of GDP in constant 2011 international \$ in PPP | +        |
| B05_varlab                  | Labour income share as a percent of GDP                                          | %                                                 | +        |
| B06_empgap                  | Gender employment gap                                                            | Percentage points                                 | -        |
| B07_longunmp                | Long-term unemployment rate                                                      | % of active population                            | -        |
| B08_slack                   | Labour market slack                                                              | %                                                 | -        |
| B09_emgrad                  | Employment rates of recent graduates                                             | % of population aged 20 to 34                     | +        |
| <b>Labour Vulnerability</b> |                                                                                  |                                                   |          |
| C01_fatal                   | People killed in accidents at work                                               | number per 100 000 employees                      | -        |
| C02_poor65                  | People 65 and over at risk of poverty or social exclusion                        | % of people 65 and over                           | -        |
| C03_neet                    | People neither in employment nor in education and training                       | % population aged 15-29                           | -        |
| C04_invptime                | Involuntary part-time employment as percentage of the total part-time employment | %                                                 | -        |
| C05_vuln                    | Vulnerable employment                                                            | % of total employment                             | -        |
| C06_temporay                | Temporary contracts for people aged 20-64                                        | % of total employment                             | -        |
| C07_paygap                  | Gender pay gap in unadjusted form                                                | % of average gross hourly earnings of men         | -        |
| C08_inactive                | Female/male ratio of inactive population due to caring responsibilities          | f/m ratio of inactive population aged 20 to 64    | -        |
| C09_LLL                     | Adult participation in learning                                                  | % of population aged 25 to 64                     | +        |

Source: ASviS

The indicators selected for #EUSDG8 were divided into three main sub-domains:

- 1) Economic well-being: includes indicators related to economic performance and living standards, such as: per-capita growth, financial services inequality, poverty.
- 2) Employment quality: includes indicators related to labour market output, such as employment and unemployment rate, labour productivity, income share.

3) Labour Vulnerability: includes indicators related to labour market outcomes, such as fatal injuries, the number of NEET, time-related unemployment rate, vulnerable employment.

Three composite indicators were developed to monitor the level of achievement of the three dimensions for the EU countries and to study the relationship between these dimensions.

The selection of elementary indicators to be included in the composite indicator is the result of a delicate balance between the indicators considered relevant from the theoretical point of view and the availability of data. Table 1 above lists the elementary indicators selected for the three domains. In addition to those listed in the 2030 Agenda, other indicators were included to better identify the sub-dimensions of SDG8. For the Economic well-being dimension, the proportion of small-scale industries was included considering the relevance of SMEs in the process of job creation, while the government expenditure for social protection, health and education was included as a proxy for welfare.

The Employment quality dimension also includes the indicator on the annual variations of the labour income share as a percentage of GDP because it is included in the Decent Work Agenda and is therefore particularly useful for the purposes of our analysis, especially to cover Target 4 of SDG 10 “Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality”. The average annual variation of the labour income share is used as proxy for the dynamic relation of compensation among production factors.

The Labour vulnerability dimension includes two additional indicators: vulnerable employment as a percentage of total employment and involuntary part-time employment. Both indicators can be helpful in explaining whether economic systems reach high levels of employment through vulnerable jobs. The indicator measuring the frequency rates of fatal occupational injuries is also key for this dimension, as “occupational health and safety” (OHS) is one of the most relevant outcomes of the Declaration on the future of work that was recently approved in Geneva at the International Labour Conference, which stated that OHS should become a fundamental standard. Unfortunately, the most recent available data concerned the year 2018, so we had to impute the 2019 data. The specific pre-treatment data procedures and the composite methodology used to estimate the composite indicators are described in Appendix C.

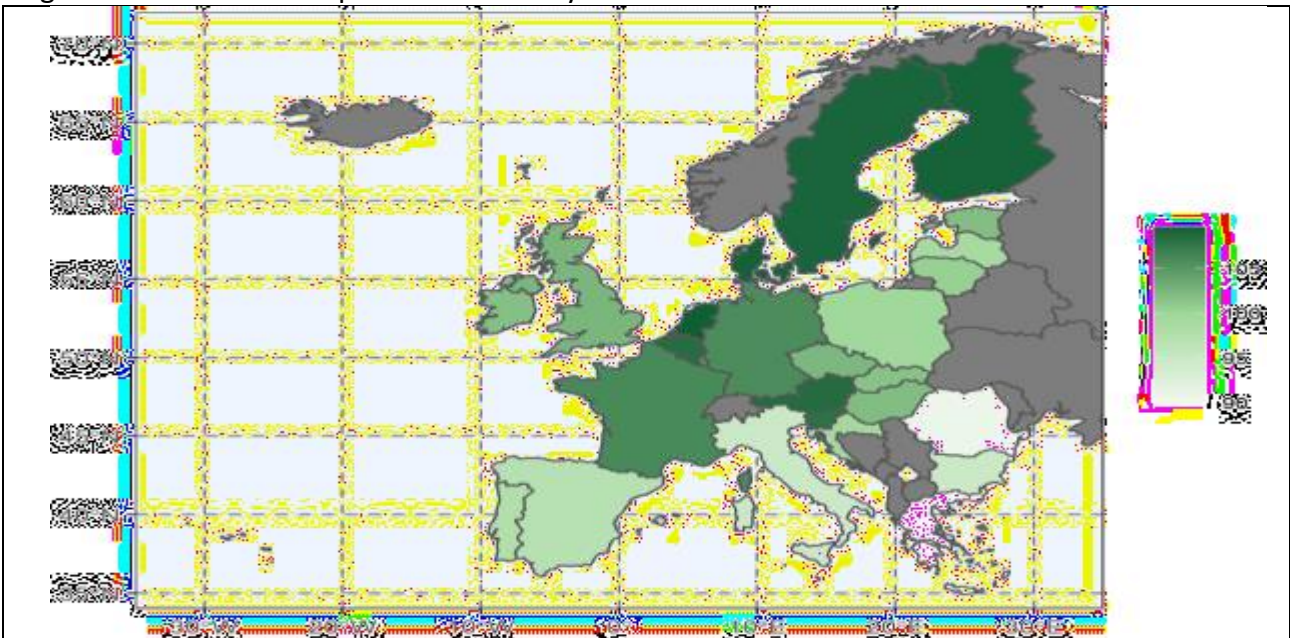


### 3. #EUSDG8 composite main results

The three composite indicators for the sub-domains are used to estimate a composite indicator for #EUSDG8 with the aim to provide a quick and concise monitoring of Goal 8 over time for the EU28 countries and to compare the level of achievement of SDG8. The composite indicator ranges between 70-130 and the EU28 average is set to 100 for the year 2010. The interpretation of the results of the composite indicator is therefore quite straightforward: a country having a value over 100 performs better than the EU28 average in 2010, whereas the contrary is true for countries with a value below 100.

Considering the EU28 average, the #EUSDG8 has barely improved from 2010 to 2019, increasing from 100 in 2010 to 101.8 in 2019. This first result already points out that progress towards the Targets set by Goal 8 of the Agenda is still very slow. The slow progress of the EU28 average largely depends on the huge differences between countries, that persist in 2019. Figure 2<sup>4</sup> below shows the distribution of #EUSDG8 in Europe in 2019. The first four countries are northern European countries, namely the Netherlands, Denmark, Finland and Sweden, with an average score of 109 for #EUSDG8, while the bottom four countries - Italy, Bulgaria, Romania and Greece - score 92 points on average, with a 16-point difference.

Figure 2 – #EUSDG8 composite indicator by countries. Year 2019



Source: ASviS

Moreover, as we can see from Table 2 and Figure 12, the gap between the best and worst performer is constant over time. From 2010 and 2019, the #EUSDG8 has improved or remained constant for

<sup>4</sup> See appendix A for a table with the complete results.

all countries, but these improvements did not translate into a reduction of the inequalities among countries.

The large variability among countries and regions reflects different performances in the sub-domains of SDG8. Figure 3 shows the average distribution of the three sub-composites by UN regions showing large differences at the regional level. The distribution of the sub-indicators among UN regions shows significant distances between all sub-composites but especially between Economic well-being and Employment quality. Eastern and Southern European countries are particularly worst off, performing below average for all three sub-composites.

Figure 3 – Distribution of sub-domain composite indicators by income groups UN Regions<sup>5</sup>. Year 2019



Source: ASviS

An in-depth analysis of the relationships between the three sub-composites allows to point out that country Economic well-being performances cannot explain the performances on other dimensions, especially with respect to Employment quality. The Economic well-being dimension is poorly correlated ( $r = .55$ ) with the Employment quality dimension, meaning that an increase in Economic well-being does not necessarily translate into better Employment quality.

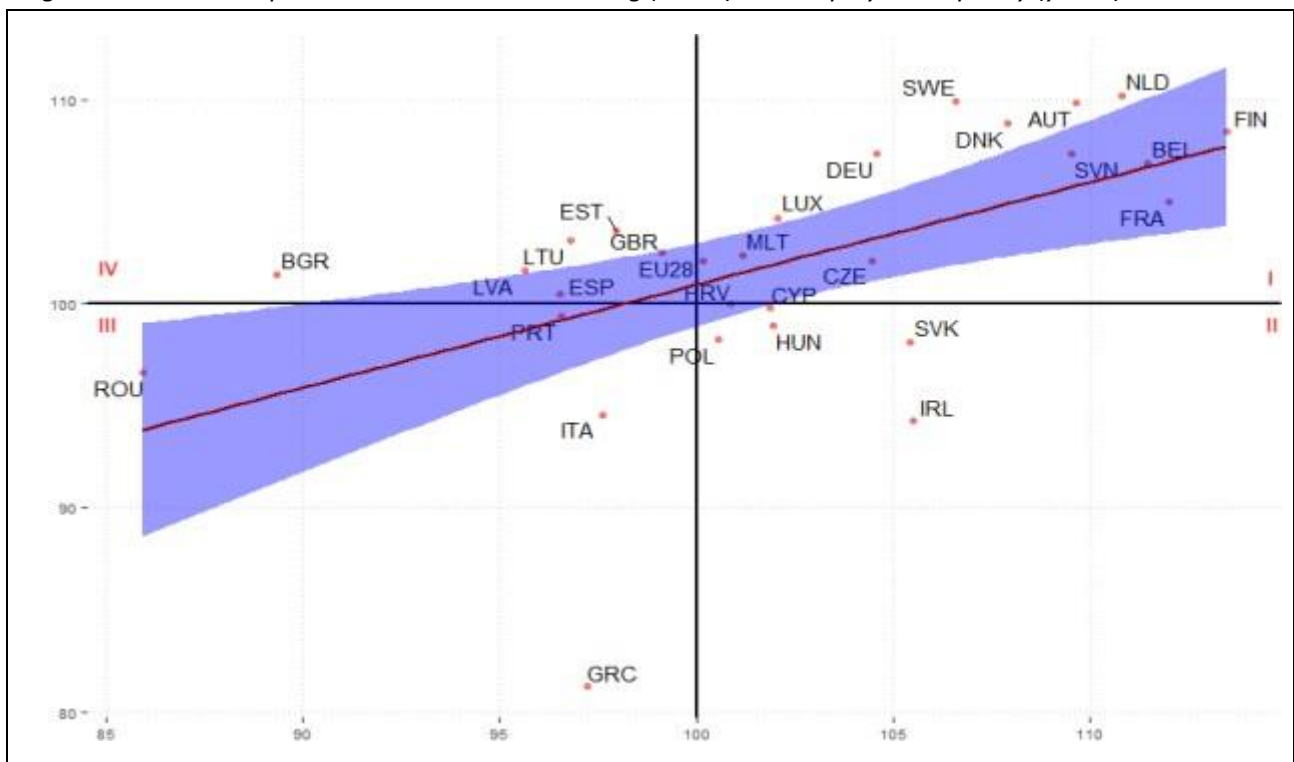
In this framework, Figure 4 gives a detailed overview of the relationship between Economic well-being and Employment quality sub-indicators. The scatterplot can be divided into four areas according to the performances for both indices, while the red line shows the linear regression estimating Employment quality performances with respect to Economic well-being and its confidence interval (in blue). In area I there are 13 countries (46% of the total) registering higher-than-average performances in both Economic well-being and Employment quality. In area II there

<sup>5</sup> According to the definition of UN Regions, EU member states are grouped as follows: (i) Northern Europe includes DK, FI, SE, EE, LT, LV, IE and UK; (ii) Southern Europe includes PT, ES, IT, MT, EL, SI and HR; (iii) Western Europe includes AT, BE, DE, FR, NL and LU; (iv) Eastern Europe includes PL, CZ, SK, HU, BG and RO. Please note that Cyprus is usually included in the Western Asia group but, for the purpose of this study, was included in Southern Europe.

are 5 countries (18% of the total) with good performances in the Economic well-being sub-composite, but low performances in the Employment quality domain. In area IV there are 6 countries (21% of the total) that display good performances in Employment quality but lower-than-average performances in Economic Well-being. Finally, area III has 4 countries (15% of the total) with lower-than-average performances on both sub-composites.

More in detail, Greece is clearly an outlier<sup>6</sup> as its level of Employment quality is far worse than its level of Economic well-being but also other countries such as Italy, Poland, Hungary, Ireland, Slovakia underperform on Employment quality considering their level of Economic well-being. On the other end Bulgaria, Estonia, Germany Sweden, Denmark, Austria and the Netherlands are all countries that outperform on Employment quality, considering their level of Economic well-being.

Figure 4 –Relationship between Economic well-being (x-axis) and Employment quality (y-axis). Year 2019



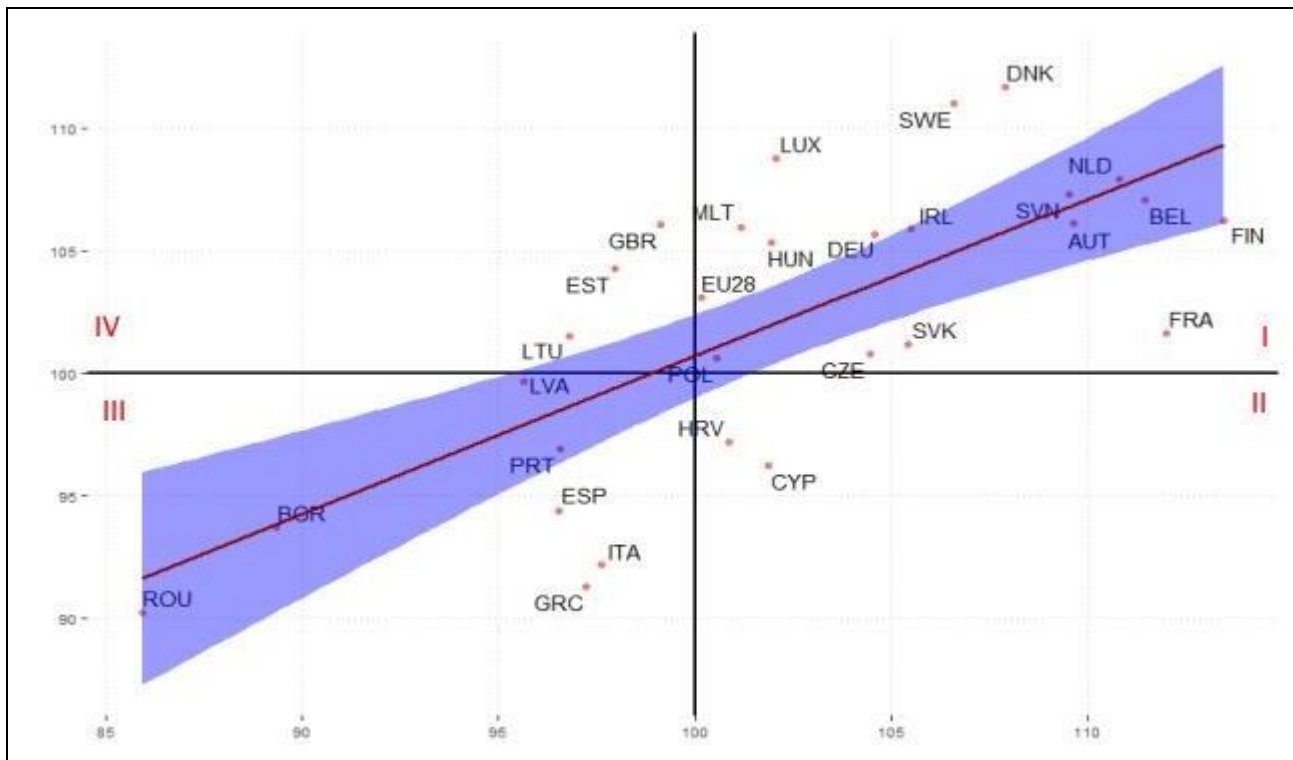
Source: ASviS calculations

The scatterplot in Figure 5 shows the relationship between Economic well-being and Labour vulnerability, highlighting a more polarised situation, with countries concentrated either in area I (higher-than-average economic well-being and lower-than-average labour vulnerability) or in area III (lower-than-average performance for both indicators). The relationship between these two variables is stronger ( $r=.71$ ), meaning that the level of Economic well-being is a good predictor of the Labour vulnerability of a country. As in the previous example, the regression line estimates the level of labour vulnerability with respect to the level of economic well-being of a given country. All

<sup>6</sup> Removing Greece from the analysis only slightly improved the correlation between the two sub-composites.

countries under the regression line (including the confidence interval in blue) are countries that underperform on Labour vulnerability given their level of economic well-being, while the contrary applies for the countries above the regression line.

Figure 5 –Relationship between Economic well-being (x-axis) and Labour vulnerability (y-axis). Year 2019



Source: ASviS calculations

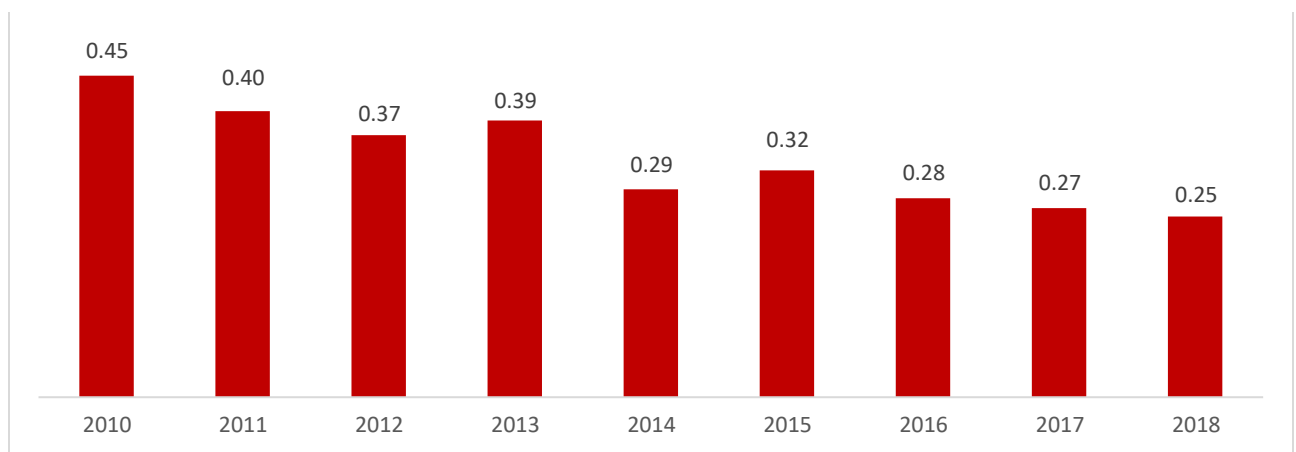
This analysis confirms that the multidimensionality of Goal 8 must be addressed using different dimensions and that Economic well-being cannot be the overarching aim of Goal 8 when it is not coupled with other fundamental dimensions such as employment quality and labour vulnerability.

#### 4. Relationships between the #EUSDG8 and other SDGs

One of the main issues related to the implementation of the 2030 Agenda concerns how to deal with the potential integration of the different dimensions of Sustainable Development identified within the framework of the 17 SDGs. With this respect, estimating a unique indicator for SDG8 allows to directly analyse interactions between the economic and decent work dimensions of the 2030 Agenda with other statistical indicators used as proxies for sustainable development domains. This exercise aims to identify the potential presence of trade-offs also considering evolution over time. In this chapter, some interactions are analysed through statistical correlations between the SDG8 indicator and other variables: CO<sub>2</sub> emissions (SDG13), DESI-Indicator (as proxy for human capital, SDG4); life expectancy (SDG3).

The trade-off between economic growth and climate targets is one of the most debated issues. While there is a consistent evidence, especially in advanced economies, that green activities can create significant new opportunities in the labour market (i.e. green jobs), whether the transition towards a more climate resilient production system can be coherent with robust growth dynamics it is less clear, considering the emissions intensity of the current technology and the heterogeneity among sector performances. Figure 6 shows the time-correlation between SDG8 and CO<sub>2</sub> among European countries. Overall, there is evidence of positive correlation: improvements in SDG8 lead to higher CO<sub>2</sub>, reducing the possibility of jointly achieving the Targets of SDG8 and SDG13 (Climate action). However, this negative trade-off seems to be reducing over time since the positive correlation detected has firmly decreased from 2010 to 2019.

*Figure 6 – Correlation (2010-2018) between SDG8 and CO<sub>2</sub> emissions (ton. eq. per capita) among countries*

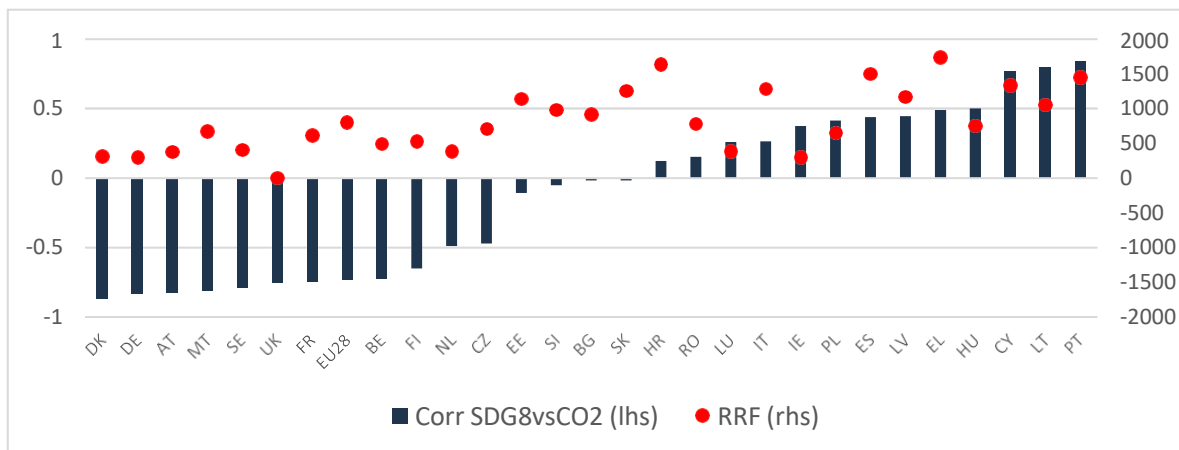


Source: ASviS calculations

The decreasing pattern of positive correlation between SDG8 and CO<sub>2</sub> emissions is the result of different performances among countries. In Figure 7, the time-correlations “within” countries are reported. Most of the “mature” EU countries are already showing a negative correlation (in some case strong) between the two dimensions, coherently with a development model where economic growth and labour market effectiveness are consistent with a “relatively” low-carbon production system. This seems to be true for Denmark, Germany, Austria, Sweden and France, among others. Other countries, such as Italy, Spain Portugal and the former transition economies of Eastern Europe, are still characterized by a clear trade-off between SDG8 and Environmental/climate issues. While in the last group of countries (eastern European economies) the need to catch up with the level of production and well-being of other European countries can – in the transition phase – lead to a misalignment between the Targets of SDG8 and SDG13, the situation in other countries is more worrying. However, as shown in the same Figure 7, the allocation of funds in the Next Generation

programme<sup>7</sup> seems to be well calibrated to finance countries with higher priorities. On average, countries with a positive correlation between SDG8 and SDG3 (stronger trade-off) will receive more resources from the EU to be invested in the activities needed to transform the production system.

Figure 7 – Correlation (2010-2018) between SDG8 and CO<sub>2</sub> emissions (ton.eq. per capita) within European countries and EU Recovery Facilities (€/ab)

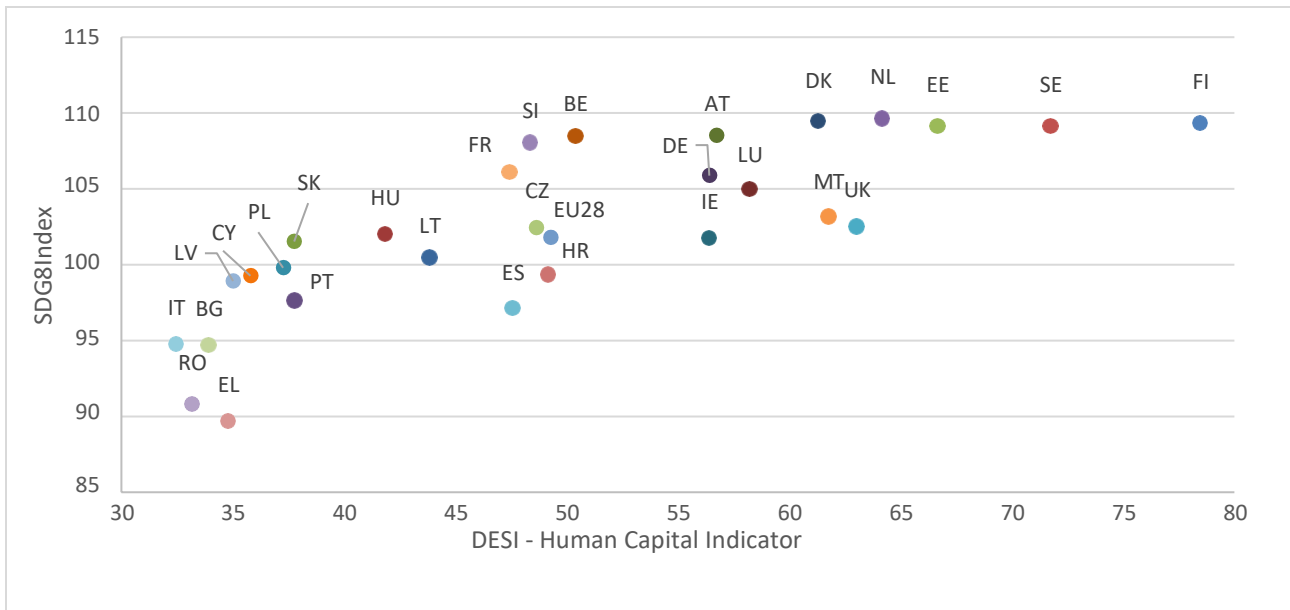


Source: ASviS calculations

The relationship between SDG8 and human capital development (proxy for SDG4) seems to be clearer. Indeed, good performances in the DESI indicator for human capital are coupled with higher performances in SDG8 (Figure 8). Therefore, the achievement of one Goal seems to reinforce the country's ability to achieve the other one. Investing in human capital remains a priority for several countries including Italy, Portugal, Spain and some eastern European economies, also to ensure a faster convergence towards the ambitious Targets of SDG8.

<sup>7</sup> We consider resources of EU Recovery Facilities including: (i) Recovery and Resilience Facility Grants (ii) REACT EU(iii) Just transition Fund. Source European Commission and ASviS calculations.

Figure 8 – Correlation between the SDG8 Index and the DESI-Indicator related to the human capital dimension



Source: ASviS calculations

There is also no evidence of a trade-off between SDG8 and SDG3 “Good Health” (for which the proxy used is the life expectancy indicator). The two dimensions seem to be characterized by a reinforcing dynamic, where good performances in both dimensions ensure a stronger convergence towards the respective Targets. Figure 9 shows that the positive correlation between SDG8 and life expectancy seems to be quite stable over time (with a slightly decreasing trend).

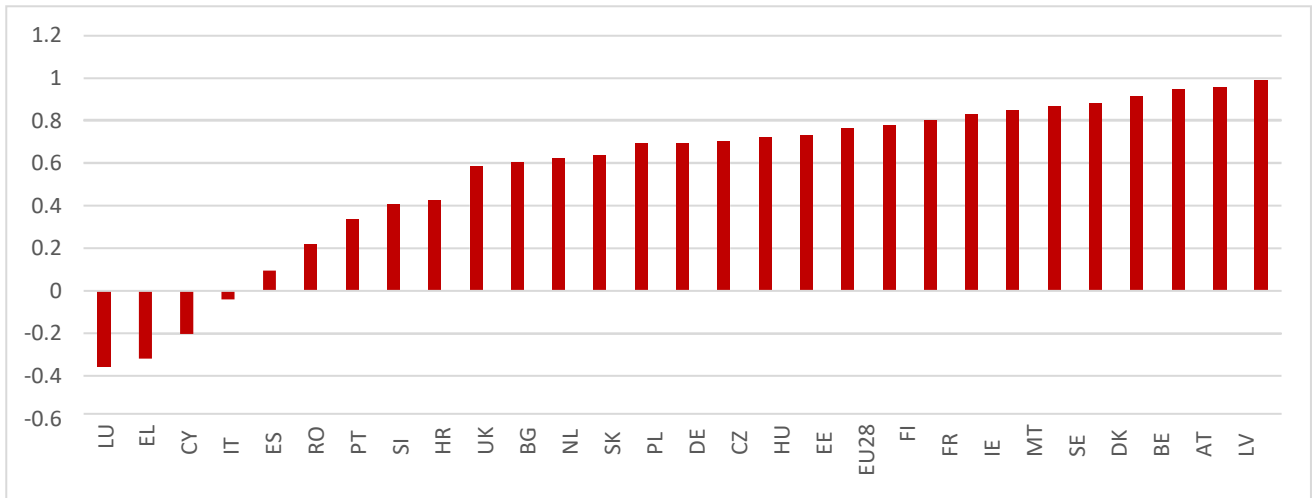
Figure 9 – Correlation (2010-2018) between SDG8 and Life expectancy among Eu28 countries



Source: ASviS calculations

At the same time, the majority of European countries shows such positive correlation (EU average= 0,76) in the last decade (Figure10).

Figure 10 – Correlation (2010-2018) between SDG8 and Life expectancy within European countries



Source: ASviS calculations



## 5. Conclusions

This report has underlined several issues which are crucial in the monitoring process of SDG8 and to identify potential policy options. First, the stratification of sub-domains within the different dimensions of SDG8 allows to better identify the current situation of the European target *vis-à-vis* the specific dynamics of economic well-being, employment quality and labour vulnerability. Estimation results show that heterogeneous performances between countries and among sub-domains remain significant. As a result, EU progress towards the Targets set by Goal 8 of the 2030 Agenda are still too slow.

Moreover, the economic dimension of SDG8 alone cannot explain the dynamic detected in other areas with respect to decent work and employment quality. Therefore, results suggest that there is a need to reinforce the efficiency of labour market dynamics, reducing inequality in outcomes, especially with respect to vulnerable people, youth and women. Investment in lifelong learning and a calibrated management of technological transformations will be crucial to ensure decent work for all. At the same time, social protection schemes must be improved from birth to old age. Also, at European level, the establishment of a universal labour guarantee would lead to less labour market fragmentation, especially in a framework of increasing competition at the global level.

Secondly, the joint achievement of SDG8 and environmental/climate targets is a crucial priority to be addressed. At European level, the trade-off between these two dimensions is still relevant, even if its magnitude seems to decrease over time with some economies experiencing a more balanced pattern. However, there is still the need for a change of pace in the promotion of investment in key areas for sustainable work, using both public and private financial resources. Countries must invest in technological innovations that are able to reduce the impact of production on the environment and, at the same time, citizens must change their consumption behaviours by adopting a more responsible approach.

As stressed by ILO (2019), SDG8 has a central role in the 2030 Agenda. Indeed, SDG8 Targets not only underline the importance of promoting sustained inclusive and sustainable growth, full and productive employment and decent work for all, but also the need to pursue a transition to a low-carbon production and consumption system and to ensure improvement in the level of prosperity and well-being for workers and citizens. Thus, failure to make progress on the other SDGs would impede the attainment of SDG8. Therefore, the full achievement of the ambitious Targets of the 2030 Agenda depends on an endogenous causality relation which links the success in the growth model identified by SDG8 to the promotion of a more inclusive, resilient and sustainable development.

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## Appendix A. Results of #EUSDG8 composite indicator

Table 2– #EUSDG8 Composite index

| Countries      | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Belgium        | 104.9 | 104.5 | 105.3 | 105.2 | 106.1 | 106.3 | 106.5 | 107.0 | 107.4 | 108.5 |
| Bulgaria       | 89.7  | 87.8  | 87.9  | 89.0  | 89.5  | 91.1  | 91.3  | 91.8  | 93.7  | 94.7  |
| Czech Republic | 97.3  | 98.8  | 98.4  | 98.5  | 96.9  | 100.8 | 101.0 | 103.0 | 102.6 | 102.4 |
| Denmark        | 107.4 | 107.2 | 107.4 | 107.9 | 108.3 | 108.7 | 108.4 | 109.3 | 108.8 | 109.5 |
| Germany        | 102.3 | 103.0 | 102.8 | 103.3 | 103.3 | 103.7 | 104.4 | 105.2 | 105.2 | 105.9 |
| Estonia        | 97.0  | 97.3  | 97.8  | 97.5  | 96.8  | 97.9  | 98.0  | 100.8 | 101.1 | 101.9 |
| Ireland        | 99.6  | 98.2  | 97.2  | 98.2  | 99.4  | 100.2 | 99.0  | 101.0 | 101.8 | 101.7 |
| Greece         | 90.8  | 88.0  | 84.1  | 81.5  | 81.6  | 82.9  | 84.4  | 86.1  | 88.1  | 89.7  |
| Spain          | 94.9  | 93.4  | 92.2  | 91.5  | 91.5  | 92.3  | 93.3  | 94.7  | 95.8  | 97.1  |
| France         | 103.4 | 103.3 | 103.2 | 103.9 | 104.2 | 103.7 | 104.1 | 104.9 | 105.6 | 106.1 |
| Croatia        | 95.3  | 94.0  | 92.6  | 92.8  | 93.9  | 94.7  | 96.2  | 96.1  | 97.5  | 99.3  |
| Italy          | 94.5  | 93.6  | 92.7  | 92.2  | 92.3  | 93.0  | 93.6  | 94.1  | 94.2  | 94.8  |
| Cyprus         | 97.4  | 98.5  | 96.9  | 94.4  | 94.6  | 95.5  | 96.6  | 97.6  | 98.6  | 99.3  |
| Latvia         | 92.4  | 93.6  | 94.3  | 95.5  | 95.2  | 96.2  | 96.5  | 97.9  | 97.7  | 98.9  |
| Lithuania      | 93.9  | 94.9  | 95.6  | 95.7  | 96.4  | 95.9  | 96.8  | 97.9  | 98.7  | 100.5 |
| Luxembourg     | 104.9 | 105.4 | 104.5 | 105.9 | 104.6 | 105.3 | 103.7 | 105.3 | 104.7 | 105.0 |
| Hungary        | 97.1  | 96.2  | 95.9  | 96.8  | 97.9  | 99.0  | 99.5  | 100.6 | 101.8 | 102.0 |
| Malta          | 96.7  | 97.4  | 97.4  | 99.6  | 100.3 | 100.4 | 100.1 | 102.5 | 102.7 | 103.2 |
| Netherlands    | 107.9 | 108.1 | 107.7 | 108.1 | 107.9 | 108.1 | 108.0 | 108.5 | 108.9 | 109.6 |
| Austria        | 103.1 | 104.4 | 104.3 | 104.6 | 106.3 | 106.1 | 106.9 | 107.6 | 107.9 | 108.5 |
| Poland         | 94.0  | 94.1  | 93.8  | 94.0  | 94.7  | 95.4  | 96.6  | 98.0  | 99.4  | 99.8  |
| Portugal       | 95.2  | 94.1  | 92.8  | 93.2  | 93.5  | 94.3  | 94.1  | 95.7  | 96.9  | 97.6  |
| Romania        | 87.4  | 86.9  | 86.8  | 85.6  | 85.1  | 85.7  | 87.2  | 89.8  | 90.5  | 90.8  |
| Slovenia       | 104.6 | 104.3 | 103.0 | 102.9 | 102.7 | 103.1 | 105.2 | 106.0 | 107.2 | 108.1 |
| Slovakia       | 96.6  | 96.1  | 94.7  | 95.8  | 95.8  | 96.5  | 97.7  | 98.8  | 101.0 | 101.5 |
| Finland        | 106.8 | 107.2 | 107.1 | 108.1 | 107.2 | 107.4 | 108.1 | 108.5 | 108.6 | 109.4 |
| Sweden         | 107.1 | 106.3 | 106.7 | 107.3 | 107.5 | 107.7 | 107.9 | 108.5 | 108.8 | 109.2 |
| United Kingdom | 101.6 | 101.4 | 101.7 | 102.4 | 102.4 | 102.8 | 102.7 | 102.8 | 102.2 | 102.5 |
| EU 28          | 100.0 | 99.6  | 98.3  | 98.5  | 99.8  | 100.3 | 100.7 | 100.7 | 101.2 | 101.8 |

Figure 11 – Map of #EUSDG8 composite indicator. Year 2019

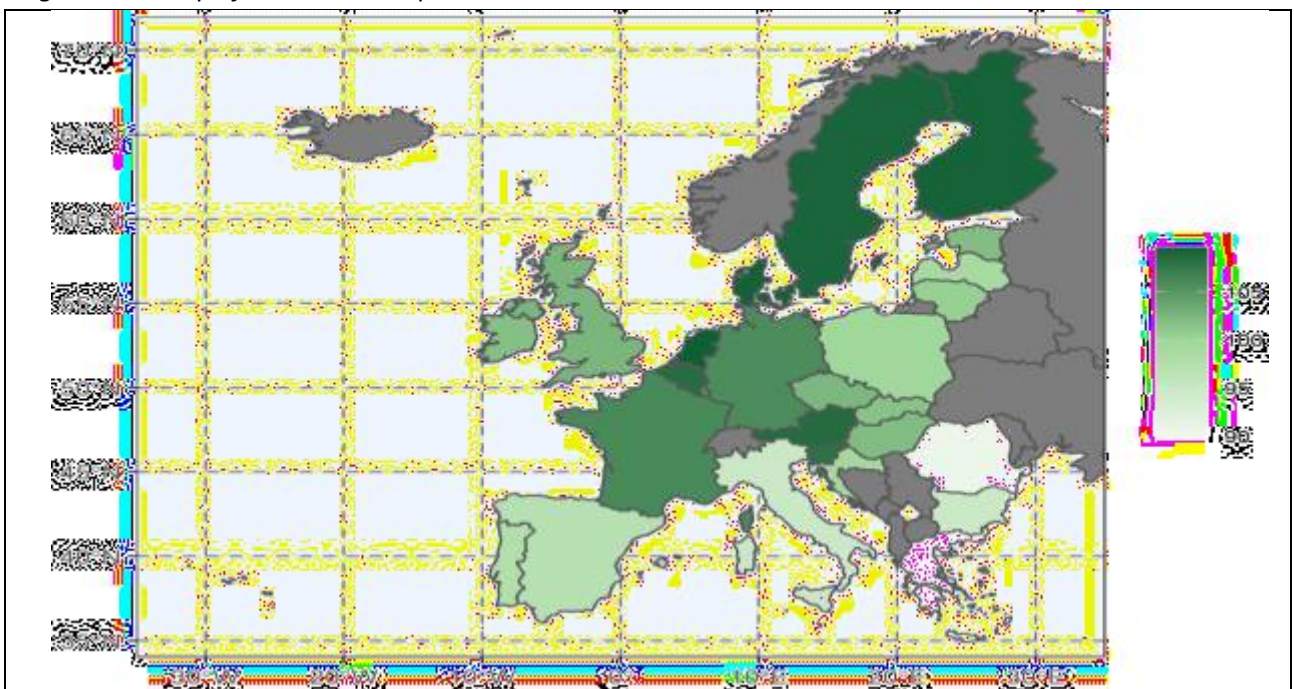
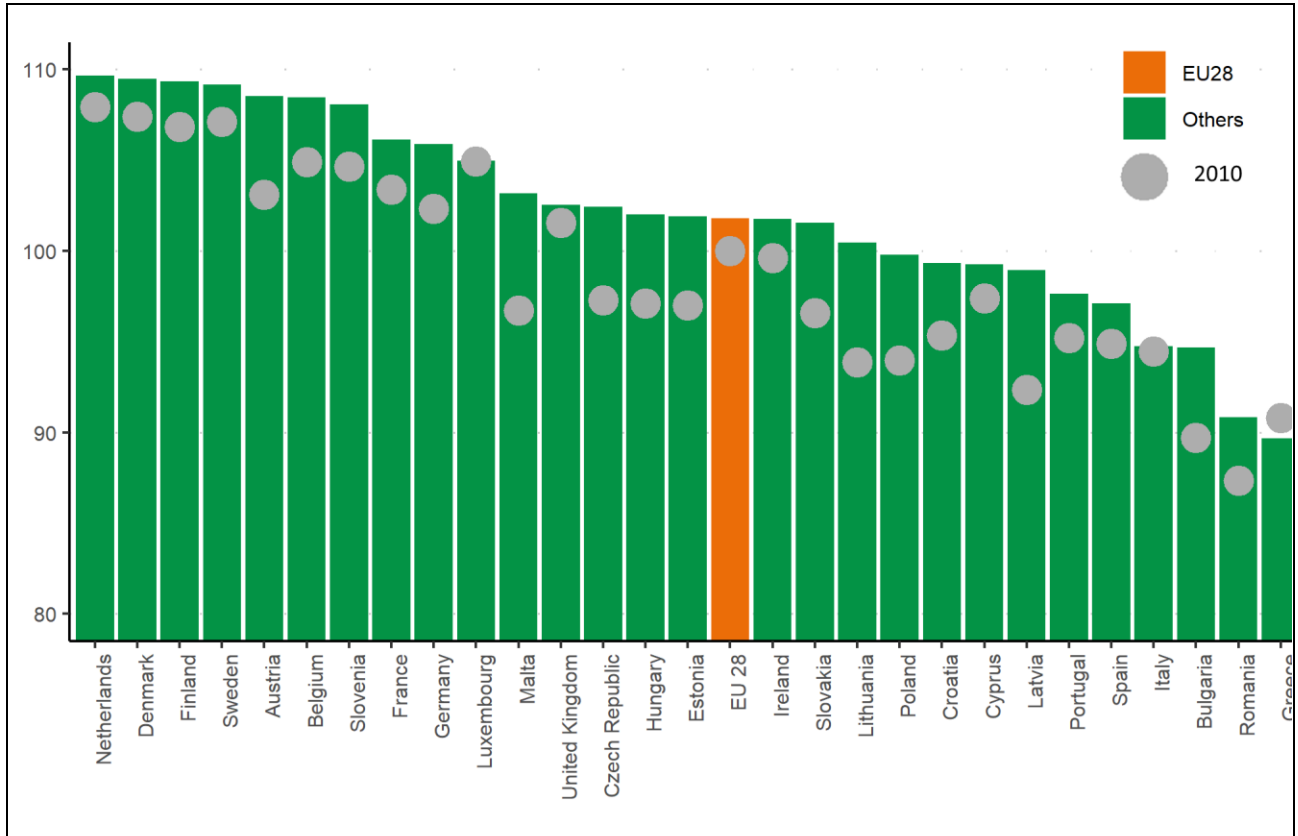


Figure 12 – Results of the #EUSDG8 composite index by countries. Year 2010 and 2019



## Appendix B. Results of the sub-composite indicators

Table 3– Economic Well Being composite indicator

| Countries      | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Belgium        | 105.9 | 105.6 | 106.3 | 107.2 | 108.2 | 108.8 | 109.1 | 109.5 | 109.7 | 111.5 |
| Bulgaria       | 89.8  | 88.4  | 89.6  | 91.1  | 91.3  | 91.7  | 88.6  | 88.3  | 89.5  | 89.4  |
| Czech Republic | 99.5  | 100.5 | 100.5 | 100.7 | 99.9  | 101.9 | 101.7 | 103.7 | 103.7 | 104.5 |
| Denmark        | 103.0 | 103.6 | 104.9 | 105.5 | 106.2 | 106.6 | 107.0 | 108.1 | 107.2 | 107.9 |
| Germany        | 100.3 | 100.5 | 100.5 | 100.8 | 100.1 | 100.8 | 102.2 | 103.4 | 103.0 | 104.6 |
| Estonia        | 99.0  | 97.7  | 96.9  | 96.5  | 92.2  | 94.4  | 95.8  | 97.3  | 97.6  | 98.0  |
| Ireland        | 104.7 | 104.4 | 103.6 | 104.6 | 104.6 | 105.9 | 102.1 | 103.7 | 105.0 | 105.5 |
| Greece         | 91.3  | 90.4  | 88.4  | 90.3  | 92.0  | 92.6  | 92.5  | 94.9  | 96.1  | 97.2  |
| Spain          | 95.1  | 94.8  | 94.4  | 95.6  | 94.0  | 94.2  | 94.2  | 95.0  | 95.3  | 96.5  |
| France         | 104.7 | 105.4 | 105.5 | 107.0 | 108.3 | 109.0 | 109.9 | 111.0 | 111.5 | 112.0 |
| Croatia        | 93.0  | 93.7  | 93.3  | 94.6  | 96.7  | 98.6  | 98.6  | 97.7  | 98.9  | 100.9 |
| Italy          | 95.0  | 93.9  | 94.6  | 95.7  | 97.4  | 97.7  | 97.5  | 97.7  | 97.9  | 97.6  |
| Cyprus         | 98.7  | 99.3  | 98.6  | 97.0  | 98.5  | 98.7  | 100.3 | 101.0 | 102.3 | 101.9 |
| Latvia         | 91.8  | 95.3  | 95.2  | 95.4  | 94.9  | 94.4  | 95.3  | 95.2  | 94.8  | 95.6  |
| Lithuania      | 92.6  | 96.8  | 98.7  | 96.0  | 97.4  | 93.2  | 94.4  | 93.8  | 94.3  | 96.8  |
| Luxembourg     | 104.2 | 105.2 | 105.1 | 104.9 | 104.9 | 104.7 | 104.6 | 103.7 | 103.0 | 102.1 |
| Hungary        | 101.8 | 99.3  | 99.6  | 100.6 | 101.4 | 101.3 | 99.8  | 100.6 | 101.8 | 101.9 |
| Malta          | 96.8  | 96.7  | 99.3  | 99.3  | 99.9  | 100.0 | 99.3  | 101.0 | 100.5 | 101.2 |
| Netherlands    | 107.8 | 108.1 | 109.2 | 110.0 | 109.5 | 109.8 | 109.1 | 109.6 | 109.7 | 110.8 |
| Austria        | 100.9 | 101.7 | 101.9 | 102.8 | 106.6 | 106.8 | 106.9 | 107.2 | 108.5 | 109.6 |
| Poland         | 93.7  | 94.1  | 94.3  | 95.0  | 96.2  | 96.5  | 97.1  | 99.4  | 100.5 | 100.6 |
| Portugal       | 91.7  | 91.1  | 90.8  | 91.8  | 91.6  | 92.5  | 93.3  | 94.1  | 96.1  | 96.6  |
| Romania        | 83.9  | 83.2  | 82.4  | 82.2  | 80.8  | 80.9  | 81.8  | 85.2  | 85.5  | 85.9  |
| Slovenia       | 104.1 | 105.0 | 104.8 | 105.2 | 105.8 | 106.2 | 107.5 | 108.0 | 108.6 | 109.5 |
| Slovakia       | 101.3 | 99.5  | 99.0  | 101.4 | 100.1 | 100.2 | 100.3 | 101.6 | 104.6 | 105.4 |
| Finland        | 110.2 | 110.3 | 110.4 | 112.0 | 111.5 | 112.2 | 113.7 | 113.7 | 112.9 | 113.5 |
| Sweden         | 106.3 | 105.5 | 105.5 | 106.4 | 106.6 | 106.8 | 106.9 | 107.4 | 107.3 | 106.6 |
| United Kingdom | 99.0  | 99.6  | 100.4 | 101.8 | 101.2 | 101.3 | 100.9 | 100.1 | 98.6  | 99.1  |
| EU 28          | 100.0 | 99.5  | 96.5  | 97.1  | 100.5 | 100.7 | 101.0 | 99.5  | 99.6  | 100.2 |

Figure 13 – Map of Economic Well Being composite indicator. Year 2019

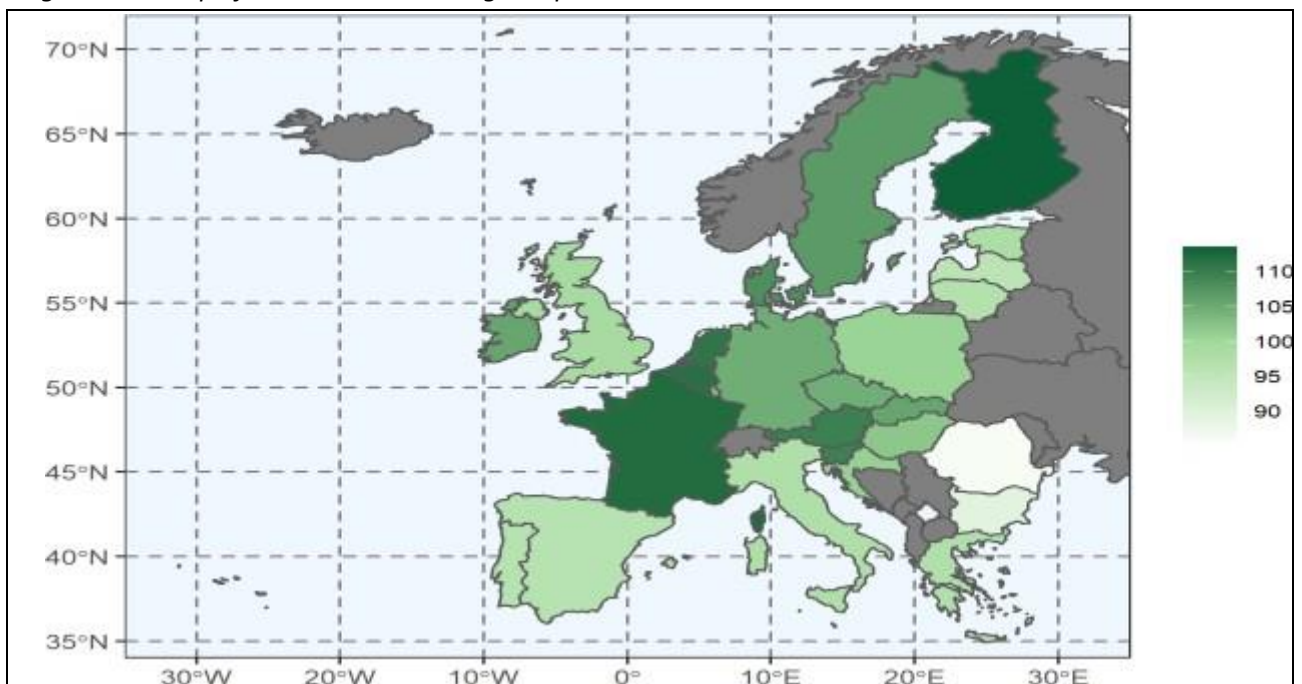


Figure 14 –Economic Well Being composite indicator by countries. Year 2010 and 2019

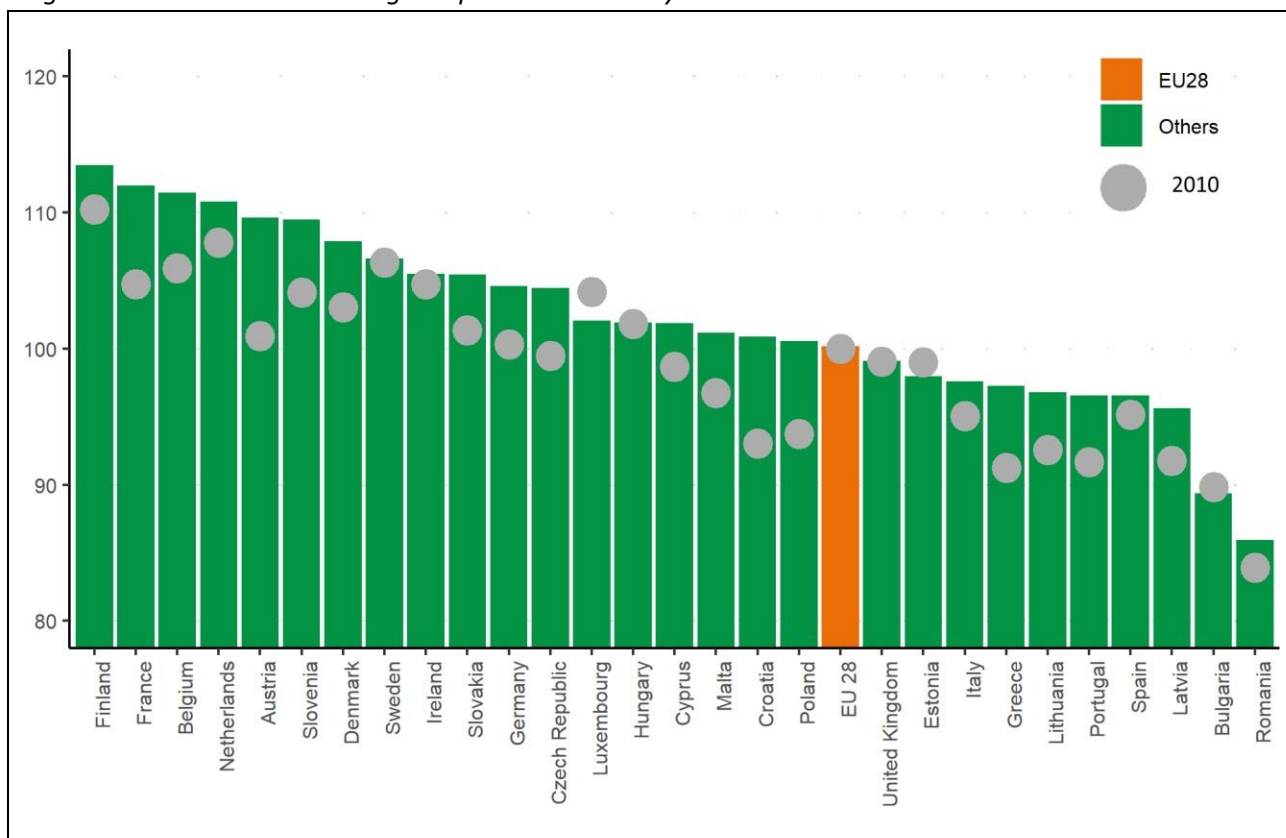




Table 4– Employment Quality composite indicator

| Countries      | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Belgium        | 103.9 | 104.3 | 104.3 | 104.0 | 103.9 | 104.0 | 104.0 | 104.5 | 105.5 | 106.9 |
| Bulgaria       | 91.9  | 87.9  | 88.9  | 89.4  | 89.9  | 92.9  | 94.2  | 95.8  | 98.8  | 101.4 |
| Czech Republic | 99.3  | 98.8  | 98.6  | 98.4  | 99.3  | 100.4 | 101.0 | 102.9 | 103.1 | 102.1 |
| Denmark        | 108.7 | 107.5 | 106.9 | 106.8 | 106.8 | 106.9 | 107.2 | 108.4 | 107.9 | 108.8 |
| Germany        | 104.7 | 105.7 | 105.2 | 105.4 | 106.3 | 106.3 | 106.6 | 107.1 | 107.2 | 107.4 |
| Estonia        | 93.2  | 93.9  | 96.0  | 97.3  | 99.0  | 99.4  | 100.5 | 101.6 | 102.7 | 103.6 |
| Ireland        | 94.6  | 92.3  | 90.3  | 91.4  | 94.5  | 94.9  | 93.6  | 95.6  | 95.2  | 94.2  |
| Greece         | 91.7  | 86.6  | 78.8  | 71.9  | 69.4  | 71.2  | 73.7  | 76.2  | 78.8  | 81.2  |
| Spain          | 97.1  | 94.6  | 91.4  | 88.0  | 88.9  | 91.4  | 93.9  | 96.6  | 98.7  | 100.5 |
| France         | 104.5 | 104.5 | 103.5 | 103.4 | 104.1 | 103.1 | 103.1 | 103.9 | 104.9 | 105.0 |
| Croatia        | 95.9  | 92.4  | 89.2  | 87.5  | 88.4  | 90.0  | 95.3  | 95.9  | 97.9  | 100.0 |
| Italy          | 94.5  | 93.6  | 91.4  | 89.7  | 88.3  | 90.1  | 91.4  | 92.3  | 92.9  | 94.6  |
| Cyprus         | 101.8 | 101.3 | 98.8  | 93.7  | 93.4  | 94.7  | 96.3  | 96.9  | 98.4  | 99.8  |
| Latvia         | 89.6  | 90.4  | 91.5  | 93.8  | 95.3  | 96.6  | 97.9  | 98.6  | 99.9  | 101.6 |
| Lithuania      | 91.6  | 89.6  | 91.2  | 93.0  | 94.0  | 95.5  | 96.6  | 99.7  | 101.3 | 103.1 |
| Luxembourg     | 102.4 | 101.2 | 100.2 | 101.2 | 101.7 | 102.4 | 102.7 | 102.5 | 103.9 | 104.2 |
| Hungary        | 91.8  | 91.7  | 91.2  | 92.2  | 93.6  | 95.1  | 96.2  | 97.7  | 98.7  | 98.9  |
| Malta          | 89.6  | 90.2  | 92.6  | 95.0  | 97.1  | 98.2  | 98.2  | 99.1  | 100.2 | 102.4 |
| Netherlands    | 109.9 | 109.4 | 107.7 | 108.0 | 107.7 | 106.8 | 107.8 | 108.6 | 109.3 | 110.2 |
| Austria        | 108.1 | 108.6 | 108.2 | 108.0 | 108.6 | 107.9 | 108.8 | 109.3 | 109.4 | 109.9 |
| Poland         | 94.0  | 93.1  | 91.9  | 91.6  | 92.8  | 94.1  | 95.5  | 96.9  | 98.0  | 98.3  |
| Portugal       | 102.7 | 100.3 | 96.7  | 95.4  | 95.8  | 97.8  | 95.2  | 97.5  | 98.8  | 99.4  |
| Romania        | 95.4  | 96.7  | 95.9  | 91.8  | 91.9  | 92.6  | 93.5  | 96.1  | 96.3  | 96.6  |
| Slovenia       | 104.0 | 102.4 | 100.0 | 99.8  | 99.8  | 100.5 | 102.8 | 104.2 | 106.4 | 107.4 |
| Slovakia       | 90.1  | 89.2  | 87.9  | 88.4  | 89.1  | 91.5  | 93.9  | 95.6  | 97.3  | 98.1  |
| Finland        | 107.4 | 107.5 | 106.9 | 107.4 | 106.3 | 106.2 | 106.5 | 106.4 | 107.2 | 108.4 |
| Sweden         | 108.7 | 107.7 | 108.0 | 108.9 | 108.9 | 109.8 | 109.5 | 109.6 | 109.8 | 109.9 |
| United Kingdom | 101.1 | 100.6 | 100.2 | 100.8 | 100.9 | 101.7 | 101.7 | 102.6 | 102.3 | 102.5 |
| EU 28          | 100.0 | 99.4  | 98.3  | 97.9  | 98.2  | 99.1  | 99.5  | 100.6 | 101.3 | 102.1 |

Figure 15 – Map of Employment Quality composite indicator. Year 2019

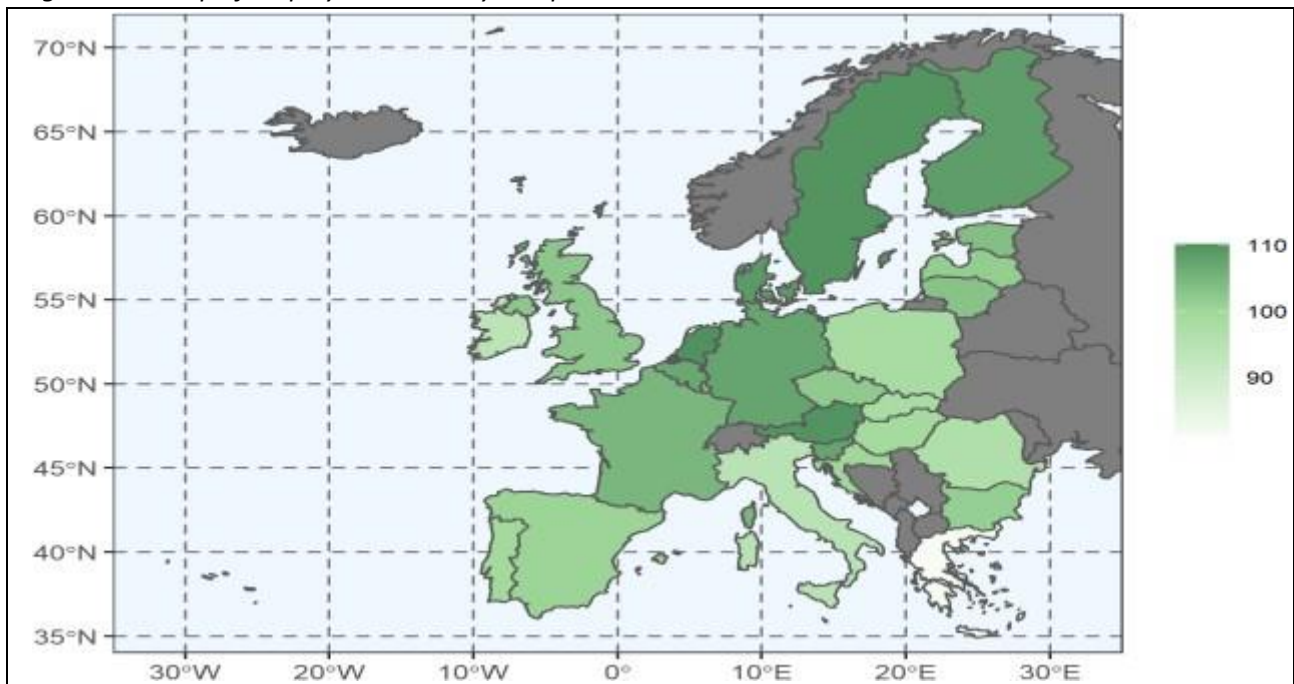


Figure 16 – Employment Quality composite indicator by countries. Year 2010 and 2019

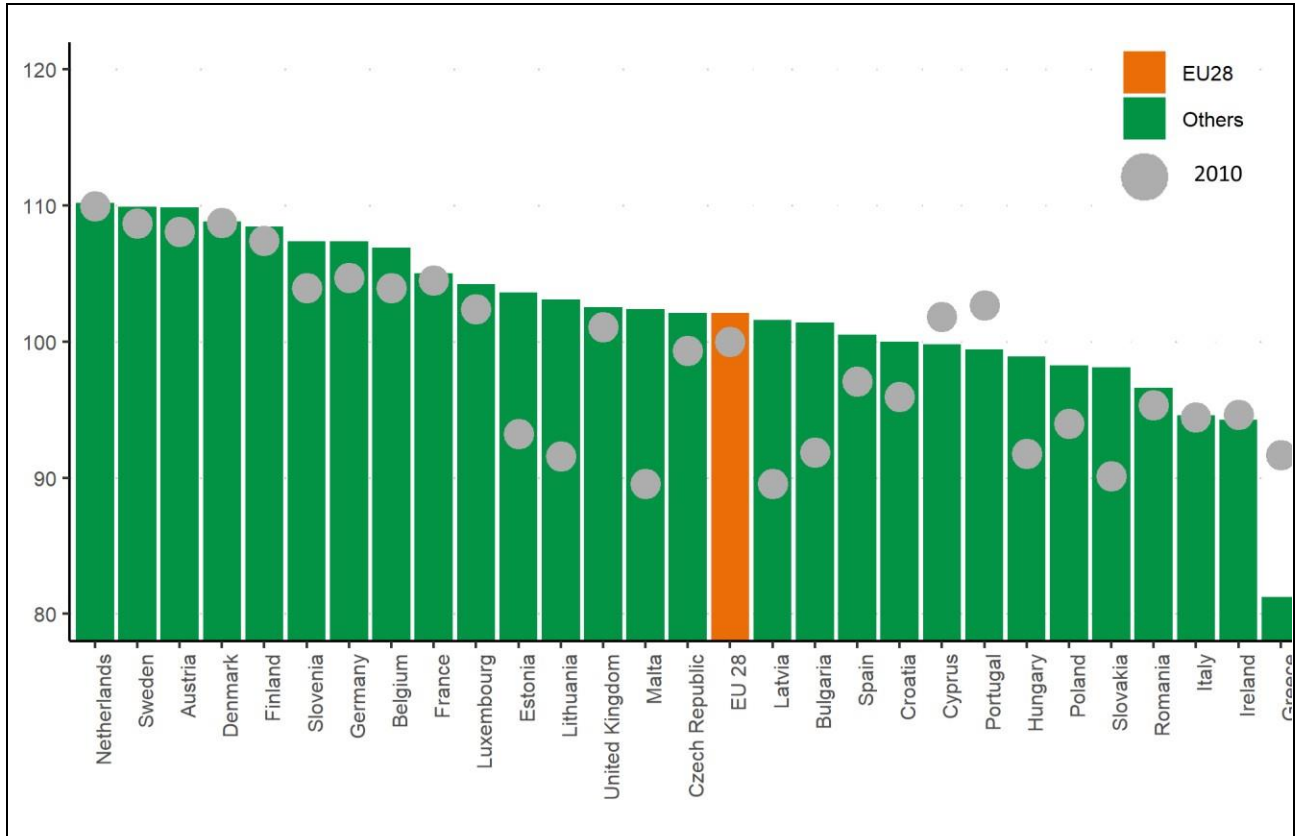




Table 5– Labour vulnerability composite indicator

| DES_TERRITORIO | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Belgium        | 104.8 | 103.7 | 105.4 | 104.5 | 106.4 | 106.2 | 106.4 | 107.0 | 107.0 | 107.1 |
| Bulgaria       | 87.5  | 87.1  | 85.3  | 86.6  | 87.3  | 88.8  | 91.1  | 91.4  | 93.1  | 93.7  |
| Czech Republic | 93.2  | 96.9  | 96.1  | 96.3  | 91.8  | 100.1 | 100.3 | 102.3 | 101.0 | 100.8 |
| Denmark        | 110.5 | 110.8 | 110.5 | 111.4 | 112.0 | 112.6 | 111.0 | 111.6 | 111.4 | 111.7 |
| Germany        | 102.0 | 102.9 | 103.0 | 103.8 | 103.6 | 104.0 | 104.4 | 104.9 | 105.3 | 105.7 |
| Estonia        | 98.9  | 100.4 | 100.6 | 98.8  | 99.4  | 99.9  | 97.7  | 103.6 | 103.1 | 104.3 |
| Ireland        | 99.7  | 98.2  | 98.2  | 99.2  | 99.2  | 99.9  | 101.5 | 104.1 | 105.5 | 105.9 |
| Greece         | 89.5  | 87.2  | 85.4  | 83.5  | 85.2  | 86.4  | 88.2  | 88.3  | 90.3  | 91.3  |
| Spain          | 92.6  | 90.8  | 90.8  | 91.0  | 91.8  | 91.4  | 91.9  | 92.6  | 93.6  | 94.4  |
| France         | 100.9 | 100.1 | 100.8 | 101.4 | 100.5 | 99.3  | 99.7  | 99.9  | 100.7 | 101.6 |
| Croatia        | 97.1  | 96.0  | 95.4  | 96.6  | 97.0  | 95.8  | 94.7  | 94.7  | 95.7  | 97.2  |
| Italy          | 93.9  | 93.2  | 92.2  | 91.4  | 91.3  | 91.3  | 92.2  | 92.3  | 91.8  | 92.2  |
| Cyprus         | 92.0  | 94.9  | 93.3  | 92.5  | 92.0  | 93.2  | 93.4  | 94.9  | 95.2  | 96.3  |
| Latvia         | 95.8  | 95.3  | 96.3  | 97.5  | 95.5  | 97.8  | 96.4  | 99.8  | 98.5  | 99.7  |
| Lithuania      | 97.6  | 98.6  | 96.9  | 98.2  | 97.8  | 99.0  | 99.4  | 100.3 | 100.8 | 101.6 |
| Luxembourg     | 108.3 | 109.9 | 108.6 | 112.0 | 107.2 | 108.8 | 103.7 | 109.8 | 107.4 | 108.8 |
| Hungary        | 98.0  | 97.7  | 97.1  | 97.8  | 98.9  | 100.8 | 102.7 | 103.6 | 105.1 | 105.3 |
| Malta          | 104.4 | 106.0 | 100.6 | 104.6 | 104.0 | 103.1 | 102.8 | 107.6 | 107.7 | 106.0 |
| Netherlands    | 106.0 | 106.8 | 106.3 | 106.5 | 106.4 | 107.6 | 107.2 | 107.5 | 107.6 | 108.0 |
| Austria        | 100.5 | 103.1 | 103.1 | 103.1 | 103.8 | 103.8 | 105.1 | 106.3 | 105.9 | 106.1 |
| Poland         | 94.2  | 95.2  | 95.2  | 95.6  | 95.2  | 95.7  | 97.2  | 97.9  | 99.8  | 100.6 |
| Portugal       | 91.7  | 91.2  | 91.0  | 92.6  | 93.0  | 92.8  | 93.9  | 95.4  | 95.9  | 96.9  |
| Romania        | 83.3  | 81.7  | 82.6  | 83.0  | 82.9  | 84.1  | 86.6  | 88.4  | 89.9  | 90.2  |
| Slovenia       | 105.8 | 105.5 | 104.4 | 103.7 | 102.5 | 102.7 | 105.3 | 105.7 | 106.5 | 107.3 |
| Slovakia       | 98.7  | 99.9  | 97.8  | 98.2  | 98.5  | 98.0  | 99.0  | 99.4  | 101.1 | 101.2 |
| Finland        | 103.0 | 103.9 | 104.3 | 105.0 | 104.0 | 103.8 | 104.3 | 105.6 | 105.8 | 106.3 |
| Sweden         | 106.3 | 105.8 | 106.6 | 106.7 | 107.1 | 106.7 | 107.5 | 108.5 | 109.3 | 111.0 |
| United Kingdom | 104.6 | 104.0 | 104.5 | 104.7 | 105.0 | 105.4 | 105.5 | 105.8 | 105.8 | 106.1 |
| EU 28          | 100.0 | 100.0 | 100.1 | 100.7 | 100.8 | 101.1 | 101.6 | 102.2 | 102.7 | 103.1 |

Figure 17 – Map of Labour vulnerability composite indicator. Year 2019

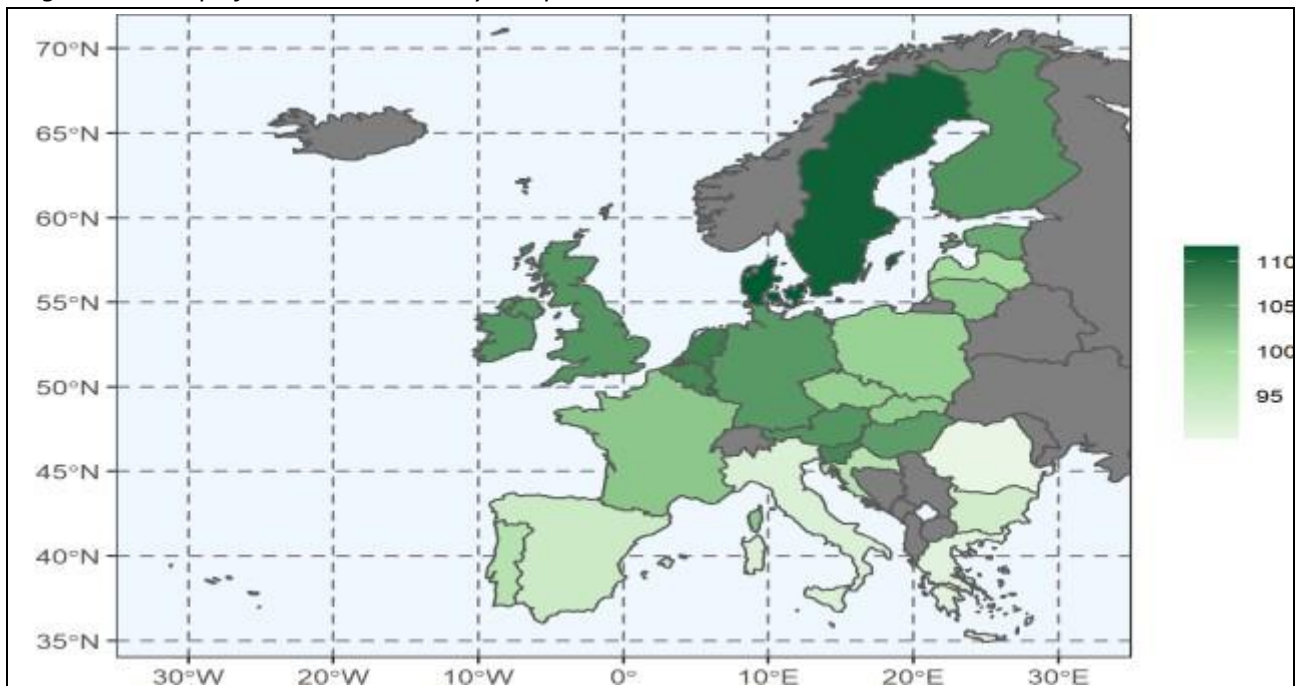
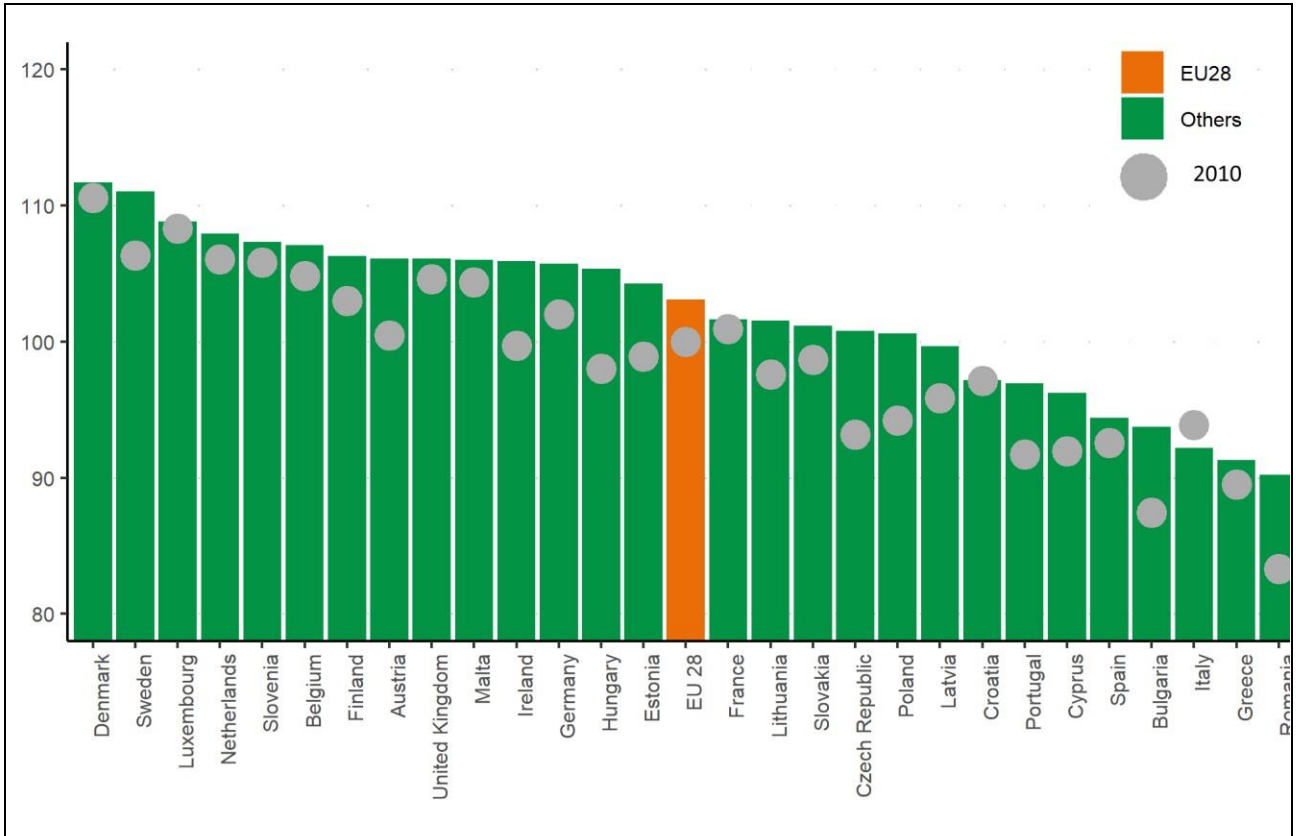


Figure 18 – Labour vulnerability composite indicator by countries. Year 2010 and 2019



## Appendix C. Pre-treatment of data and the composite methodology used

### *Pre-treatment of the data*

To build a composite indicator, no country can have missing for the complete time series considered: in the case of the #EUSDG8 the period 2010-2019. According to the Handbook on the Construction of Composite Indices “there are three ways of dealing with missing data: deleting the case listwise or pairwise if any of the variables are missing, single imputation, or multiple imputation” (Oecd, 2008). This means that either we exclude an indicator whenever there are any missing values, or we exclude any country with at least one missing value, or we impute data.

For the #EUSDG8 only four indicators required substantial imputation due to the high percentage of missing data (around 10% or higher) and two solutions were used to solve the problem. When the missing data was between observed data, we imputed it using linear regression models. When the missing data where related to the last year (2019) we duplicated the values of the previous year.

*Table 6– Distribution of missing data in the elementary indicators*

| Cod                              | Name                                                                             | Missing |       |
|----------------------------------|----------------------------------------------------------------------------------|---------|-------|
|                                  |                                                                                  | n       | %     |
| <b>E01 - Economic well-being</b> |                                                                                  |         |       |
| A05_poverty                      | People at risk of income poverty after social transfers                          | 14      | 4.8%  |
| A06_bottom                       | Income share of the bottom 40 % of the population                                | 5       | 1.7%  |
| A07_workpov                      | In-work at-risk-of-poverty rate                                                  | 5       | 1.7%  |
| A09_socialp                      | Positions held by women as board members                                         | 28      | 9.7%  |
| <b>E02-Employment Quality</b>    |                                                                                  |         |       |
| B05_varlab                       | Labour income share as a percent of GDP                                          | 58      | 20.0% |
| <b>E03-Labour Vulnerability</b>  |                                                                                  |         |       |
| C01_fatal                        | People killed in accidents at work                                               | 32      | 11.0% |
| C02_poor65                       | People 65 and over at risk of poverty or social exclusion                        | 4       | 1.4%  |
| C04_invptime                     | Involuntary part-time employment as percentage of the total part-time employment | 1       | 0.3%  |
| C07_paygap                       | Gender pay gap in unadjusted form                                                | 41      | 14.1% |
| C08_inactive                     | Female/male ratio of inactive population due to caring responsibilities          | 1       | 0.3%  |

### *Composite methodology*

Before proceeding with the analysis, one should note that the different indicators initially have different units of measurement. This feature is corrected by applying a normalization that allows all indicators to move across a unique scale. Before scaling the indicators, we observed the distribution of the indicators and we set the best and worst performances at the 95th-percentile and at the 5th-percentile of empirically observed values in the distribution. Trimming off the tails of the underlying

distribution was helpful because it prevented outliers from having undue influence on the resulting scores<sup>8</sup>.

The normalization methodology adopted in this research is an adaptation of the AMPI methodology (Mazziotta & Pareto, 2016) that ASviS uses regularly to monitor the 2030 Agenda at the Italian and European levels. The AMPI is a non-compensatory composite index based on a normalization of the data, at the reference time, that converts the indicators to a common scale with mean=100 and standard deviation=10. In this way, only relative comparisons over time are allowed. This characteristic could prove particularly useful in the next editions of this work that will aim to monitor the developments with respect to the 2030 Agenda Targets. In order to perform absolute comparisons over time, AMPI proposes a re-scaling of the data in the range (70; 130) according to a goalpost which, in this case, is set as the world average of each elementary indicator. In this way it is quite straightforward to interpret the results of the composite. If a country has a value higher than 100 it performs better than the world average while the contrary is true for countries with a value lower than 100. This method proves particularly useful as it allows a higher differentiation among countries by widening the range of indicators lying within a small interval. According to the logic of non-compensatory approach, the aggregation technique uses the simple mean to aggregate the normalized indicators, but it assigns an increasing penalty to countries with an unbalanced situation among the elementary indicators.

The AMPI methodology also considers the so-called polarity of elementary indicators or the theoretical relationship between elementary indicators and the Goal. Polarity is crucial to interpret in a correct way elementary indicators' trend. If the polarity of the elementary indicator is positive, an increase of an elementary indicator is a contribution in the right direction in achieving the Goal's Targets (i.e. annual growth rate of real GDP per capita) on the contrary, for indicators with negative polarity, a decreasing trend must be considered as a step in the right direction (i.e. unemployment). The normalization performed by the AMPI methodology transforms all elementary indicators into positive normalized indicators where an increase can always be considered as positive.

In this study we used the AMPI methodology to calculate the four composite indicators of the four domains (Economic well-being, Labour Market Efficiency, Employment Vulnerability and Labour rights) while the final composite indicator of Goal 8 is calculated as a geometric mean of the previous four composites.

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<sup>8</sup> For more details, see Appendix C.