ThE Papers

Dpto. Teoría e Historia Económica
Universidad de Granada

Working Paper n. 01/16

Europe 2020 Strategy Under the Scope of Life Satisfaction

Mª José Ruiz Martos and Ángeles Sánchez-Domínguez

January 10, 2016

Europe 2020 Strategy Under the Scope of Life Satisfaction

Ángeles Sánchez-Domínguez
Universidad de Granada
María J. Ruiz-Martos
Universidad de Granada

Abstract: Europe 2020 Strategy aims to convert the European Union into a smart, sustainable and inclusive economy by setting eight targets that the Members should met by 2020. This paper measures how far European Member States are to Europe 2020 Strategy targets, discusses the treatment of inequalities in the Strategy and the extent to which Europe 2020 Strategy captures citizens' subjective wellbeing. We first construct an index that synthesizes the eight targets of the Europe 2020 Strategy into a one-dimensional target –EU 2020 synthetic target- and the situation of each EU28 Member State in 2012 with respect to them –2012 synthetic situation-. Hence we can measure the distance of each EU Member State synthetic situation in 2012 from the EU 2020 synthetic target. We find that none of the Member States meets the EU 2020 synthetic target; Denmark is the closest to and Malta is the furthest from it; and identify clusters of Member States in terms of the distances from the EU 2020 synthetic target, the North EU region is closer to and the Mediterranean region is further away from it.

We then discuss that setting aside inequalities –just overall poverty is targeted- makes the Europe 2020 Strategy unable to accomplish its own priority of "smart, sustainable and inclusive growth": it does not only prevent inclusive but also smart and sustainable growth. In fact, when we extent the distance analysis above by adding five inequality targets -income distribution, gender (male and female) employment gap, long-term unemployment, young employment and child poverty- to the Europe 2020 Strategy, we find that all Member States, except for Austria, Cyprus, Germany, Malta and Netherlands, increase their distance to the inequality-extended EU 2020 synthetic situation.

Finally, we analyse each Member State's relationship between its objective positions regarding, on the one hand, the EU 2020 synthetic target versus the inequality-extended EU2020 synthetic target and, on the other hand, its life satisfaction level, inhabitants' subjective position. We find that the life satisfaction index is more correlated with the inequality-extended EU 2020 index than with the EU 2020 index.

Keywords: Inequality, Composite Index, Crisis, Life Satisfaction, 2020 Europe.

JEL codes: C43, O47, I31, R11, R58

1. Introduction

The great recesion has inflicted a huge shock on millions of citizens, exposing some fundamental weaknesses of the European Union (EU) economy and social and territorial cohesion. In the EU28, the Gross Domestic Product (GDP) (current prices, Purchasing Power Standards) fell by 5.7% in 2009, the industrial production dropped back to the levels of the 1990s and the unemployment rate increased from 7% in 2008 to 8.9% in 2009 and, since then, has continued to grow until 10.8% in 2013) (Eurostat). Research and Development (R&D) spending in Europe in 2009 is 2%, compared to 2.8% in the United States (US) and 3.4% in Japan, mainly resulting from lower levels of private investment (Eurostat). A quarter of all pupils have poor reading competences and one in seven young people leave education and training too early (OECD statistics). Only 69% of EU28 working age (20-64) population is employed in 2009, compared to 71.3% in the US and 74.5% in Japan; these differences are greater in 2013 (Eurostat). Moreover, the combination of an accelerating demographic ageing together with a shrinking EU's active population in the next years will place additional strains on the welfare systems.

Concurrently, inequality concerns have increased because socio-economic inequalities are high and have been rising within the majority of Member States in the last three decades, similarly to trends elsewhere in the world (Berg and Ostry, 2011; Eurostat, 2010; Galbraith, 2012; IMF, 2007; OECD, 2008; Piketty and Saez, 2013; Sjoberg, 2009). Economic and social inequalities make economic growth unsustainable because they generate instability and economic inefficiencies that reduce economic growth (Bofinger, 2013; Brown, 2004; Jayadev, 2013; Stiglitz, 2012a, 2012b). Hence, combating socio-economic inequalities is actually essential not only for an inclusive EU but also for growth (Perrons and Plomien, 2010).

On June 2010, the European Council approved the Europe 2020 Strategy to coordinate all of the Member States' efforts to collectively exit stronger from the crisis and turn the EU into a smart, sustainable and inclusive economy characterised for high levels of employment, productivity and social cohesion (European Commission, 2010a, preface). To accomplish these priorities, the Commission establishes eight targets that Member States should meet by 2020. Targets are important in public policy to express the ambitions in concrete terms and to make progress measurable (Andor, 2014). However, we consider that the absence of specific targets for the reduction of social and economic inequalities, except for poverty, is the major deficiency of the Europe 2020 Strategy.

OBJECTIVES. The aims of this paper are (1) to evaluate Member States' degree of overall accomplishment of Europe 2020 Strategy targets; (2) to analyze the effect of including in the model additional inequality indicators on income, gender, long-term unemployment, young employment and child poverty; and (3) to analyze the extent to which the eight targets of the Europe 2020 Strategy meet EU citizens' expectations in a context of rising economic and social inequalities. We are aware that

the Europe 2020 targets are not indicators to measure the happiness of people, but we think that public policies should be aimed to improve it.

With that purpose, first, we construct a composite index that synthesizes the position of each country in 2012 with respect to the eight Europe 2020 targets set by European Commission (2010a), Europe 2020 Strategy Target Distance (TDI). Next, we develop a second composite index, Inequality Extended Europe 2020 Strategy Target Distance (ETDI), that extents the distance analysis above by adding five inequality targets related to specific groups of European citizens that require attention -income distribution, child poverty, women disadvantages in employment, long-term unemployment and young employment- and we analyse each Member State position with respect to this ETDI. Both composite indexes are calculated by applying the DP2 methodology or DP2 distance method (see Sánchez-Domínguez and Ruiz-Martos, 2014). These so constructed indexes allow to make spatial comparisons (benchmarking) because they synthesize in an unique value the distance of each Member State to the combination of Europe 2020 targets and, subsequently, one can also observe distance between Member States. We then analyze the relationship between the objective position of each Member State in each composite index, TDI and ETDI, and the subjective position of each Member State as measured by the life satisfaction level (subjective wellbeing) of its inhabitants.

The remainder of this paper is organised as follows. In Sect. 2 we discuss Europe 2020 Strategy. First, we present the selected targets and the governance rules in which Europe 2020 Strategy is based to guarantee a successful completion of the targets. We then discuss the weaknesses that the actual selection of targets has for achieving the smart, sustainable and inclusive economy pursued by Europe 2020 Strategy, specifically: (1) there is not a specific target on inequality in income distribution, despite income inequality is both cause and consequence of crises; and (2)

the growth paradigm of the strategy assumes that social cohesion follows from economic growth. This discussion justifies the inclusion of additional inequality targets on Europe 2020 Strategy to explicitly incorporate the social and territorial cohesion goal. In Sect. 3 we analyze the statistical information used and discuss the selection of indicators to construct the composite indexes. Sect. 4 analyzes the advantages and disadvantages of using composite indexes instead of simple indicators, and describes the methodology applied to elaborate the composite indexes. In Sect. 5 we report the empirical results. Sect. 6 summarises the principal conclusions of the paper.

2. A review of Europe 2020 Strategy

2.1. Targets

Lisbon Strategy, approved by the Lisbon European Council on March 2000, expired in 2010. The objective of the Lisbon Strategy for the EU was "to become the most dynamic and competitive knowledge-based economy in the world by 2010 capable of sustainable economic growth with more and better jobs and greater social cohesion and respect for the environment" (Council of the European Union, 2000). To attain this goal, Lisbon Strategy sets specific targets on employment, education and R&D. However, the European Commission's assessment of the accomplishment reveals that Lisbon targets have not been met by the majority of Member States (European Commission 2010b). On December 2009, the European Council attempted to revise Lisbon Strategy with the crisis impact and future challenges as starting point. On the 17th of June 2010, the European Council approved the Europe 2020 Strategy, successor of Lisbon Strategy.

The Europe 2020 Strategy aims to coordinate all of the Member States' efforts to collectively exit stronger from the crisis and turn the EU into a smart, sustainable and inclusive economy characterised for high levels of employment, productivity and social

cohesion (European Commission 2010a, preface). To accomplish these priorities, the Commission establishes eight targets that the Member States should met by 2020 on employment, investment in R&D, CO_2 emission, renewable energy, energy consumption, early school leaving, tertiary education and poverty (targets from 1 to 8, Table 1). The European Commission (2010a, p. 8) selects these targets because they represent the theme of smart, sustainable and inclusive growth; they are capable of reflecting the diversity of Member States situations; and they are based on sufficiently reliable data for comparison purposes. The Europe 2020 is an initiative developed under the movement "GDP and beyond. Measuring progress in a changing world" (Commission of the European Communities, 2009). Its aim is to identify indicators that could complement GDP in policy making and that include social and environmental achievements and losses.

Insert Table 1 here

2.2. Governance

Europe 2020 Strategy is executed under a governance framework that benefits from the existing instruments in the Stability and Growth Pact (SGP). That pursues to guarantee the efficacy in the achievement of targets, as well as evaluating Member States progress throughout time. Specifically, the governance framework uses two coordination instruments. On the one hand, a thematic approach that compels both Member States and EU to commit to undertake public policies in line with Europe 2020 flaghship initiatives (see European Commission, 2010a, Section 2 and Annexes 1 and 2). On the other hand, there will be country reporting evaluations on the degree of accomplishment of Europe 2020 targets, together with the SGP reporting and evaluation, to bring the means and aims together in the framework of the European Semester. This means proposing at the same time the annual stability or convergence

programmes and the streamlined reform programmes which each Member State will draw up to set out the Europe 2020 targets. Both these programmes should be submitted to the Commission and other Member States during the last quarter of the year. The Commission will assess these programmes and report on progress made with their implementation. At the end of the European Semester (first semester per year) and after the assessment of those programs, the European Council gives recommendations to each Member State before it establishes its final budget for next year. Policy recommendations will be addressed to Member States in the context of both the country reporting and the thematic approach of Europe 2020. For instance, when the assessment of a country results in ~~a or~~ a risk of disequilibria in terms of achieving Europe 2020 targets, the European Council will give this Member State precise recommendations providing a time-frame within which this Member State is expected to act (e.g. two years). The Member State would then set out what action it would take to implement the recommendation. After the time-frame has expired, if a Member State has not adequately responded to a Council policy recommendation or develops policies against the advice, the Commission could issue a policy warning (Treaty on the Functioning of the European Union, Article 121.4). This warning might include an execution mechanism by which the Member State should make a deposit of up to 0.2% of its GDP with interests' right.

2.3. Weaknesses of the Europe 2020 Strategy: why the selected targets are insufficient to achieve a smart, sustainable and inclusive economy

Europe 2020 is conceived of as a strategy to exit stronger from the crisis and turn the EU into a smart, sustainable and inclusive economy that delivers high levels of employment, productivity and social cohesion. Smart growth refers to economic development based on knowledge and innovation; sustainable growth pursues a more

resource efficient, greener and more competitive economy; and inclusive growth requires to foster a high-employment economy that delivers social and territorial cohesion (European Commission, 2010a, p. 3). The underlying assumption is that these three priorities are mutually reinforcing: an improvement on the education level and an on investment in R&D will reduce unemployment and poverty. A greater capacity for research and development, combined with increased resource efficiency will improve competitiveness and foster job creation (European Commission, 2010a, p. 9).

With respect to the Lisbon Strategy targets, Europe 2020 Strategy represents a step forward as it includes three targets to promote a more environmental respectful economy (targets 3, 4 and 5, Table 1), and social targets for education and the fight against poverty (targets 6, 7 and 8, Table 1). However, the growth paradigm upon which Europe 2020 Strategy is based and the eight selected targets, which do not include specific indicators on income and social inequalities, make us suggest two sources of weaknesses intrinsically related that seriously question the efficacy of Europe 2020 Strategy to attain its desired smart, sustainable and inclusive economy. First, inequality in income distribution is a cause and consequence of crises, and second, Europe 2020 Strategy assumes that social cohesion follows from economic growth.

2.3.1. Inequality in income distribution is a cause and consequence of crises

In the selection of Europe 2020 Strategy targets, EU policy-makers do not take into account the analyses of researchers and international organizations (Fitoussi and Saraceno, 2014; Piketty, 2014; Piketty and Saez, 2013; Stiglitz, 2012a, 2012b; United Nations, 2009) that conclude that inequality in income distribution 1) is one of the main triggering factors of the recent economic crisis, and 2) impacts negatively on a wide variety of crucial areas for individuals well-being (Wilkinson and Pickett, 2009).

Regarding the first point, inequality in income distribution has a negative impact on economic growth because it causes economic instability and inefficiency. The links between inequality and economic instability are complex, though they could be synthesized as follows. The increasing inequality redistributes income from those with a high marginal propensity to consume (low-income individuals) to those with a low marginal propensity to consume (upper-income individuals). That reduces aggregate demand. This insufficient aggregate demand generates unemployment and low economic growth (Bofinger, 2013; Brown, 2004; Jayadev, 2013; Stiglitz, 2012a, 2012b, pp. 84-86). Historically, the economic policies developed to counteract low economic growth and create employment have not hit the mark (i.e. low interest rate and tax regulation) leading to bubbles. When the bubble breaks, the economy goes into a downturn. That increases unemployment, which causes poverty and, thus, contributes to increase inequality in income distribution: one of the vicious circles identified by Stiglitz (2012b, p. 89-92). That is, inequality is a cause and consequence of crises.

Moreover, high inequality makes for a less efficient and productive economy. As various economic growth models show (i.e. Aschauer, 1989; Lucas, 1988; Munnell, 1992; Romer, 1990), the investment in infrastructure, basic research and education at all levels generates broad societal benefits and, therefore, economic growth. Since these benefits cannot be captured by any private investor, leaving this investment to the market will result in underinvestment. This type of investments on public goods must be accomplished by the public sector, but the more divided a society becomes in term of wealth, the more reluctant the wealthy are to invest in these goods, because they can buy the majority of them by themselves (Stiglitz, 2012b, pp. 92-94). Simultaneously, insufficient investment in infrastructures, public education and R&D contributes to the decline of economic mobility (the poor cannot stop being poor because they can't access education) and this has negative consequences on the country economic growth

because the country is not making use of its more valuable resource, "its people" (Stiglitz, 2012b, p. 94).

Furthermore, income inequality is related to indicators of health and social well-being. More equal societies have longer life expectancy, and lower rates of mortality, infant mortality, mental illness and drug abuse (Babones, 2008; Wilkinson and Picket, 2007, 2009). More unequal countries report higher rates of crime (Elgar and Aitken 2011). As Sen (1992, p. 28) pointed out, "the extend of real inequality of opportunities that people face be readily deduced from the magnitude of inequality of incomes". Therefore, development or progress programs should consider the distributive effects, especially in income (Anand and Sen, 1994; Herrero et al., 2012; Hicks, 1997; Pickett, 2013; Piketty, 2014; Seth, 2009; Stiglitz et al., 2009).

Data show the substantial level of inequality in income distribution reached in the US. Based upon Eurostat data, there are considerable differences in the distribution of income between the Member States (EU28): since 2010, the first quartile of population owns 10.9% of income -share of national equivalised income-, while the fourth quartile receives 44.9%. In 2010, the 23.8% of the population of the EU28 were considered at-risk-of-poverty or social exclusion; this rate has increased until 24.5% in 2013. In addition, the negative effects of the economic crisis have been larger in households with children causing a special impact on childhood, so that the rates at-risk-of-poverty or social exclusion in children less than 16 years report the highest values in the population (27.2% in 2013, Eurostat). Hence, Europe 2020 Strategy should have incorporated a target on inequality in income distribution because as long as there is an income inequality problem in the EU it would be very difficult, if not impossible, to achieve a sustainable and inclusive economic growth.

2.3.2. Europe 2020 Strategy assumes that social cohesion follows from economic growth

The social and territorial cohesion goal has been left to a secondary level in the Europe 2020. Though there are targets on employment and education, the corresponding policies on employment and education in the EU are not distinctively directed at socio-economic inequality, despite these policies impact on social and economic inequalities (Perrons and Plomien, 2010, p. 12).

The growth paradigm of the strategy hinges to a great extent on the idea that employment creation will be the key variable to attain social and territorial cohesion in the EU. That is, Europe 2020 assumes that social cohesion follows from economic growth. However, empirical evidence reveals that employment policies should go with other social policies, since the last decades have witnessed a growing imbalance between pay increases and productivity increases (workers' productivity has increased larger than their salaries), which has resulted in a decline in labour´s share of value added (IMF, 2007). In Europe, specially the lower paid workers have not benefitted from increases in productivity in recent decades and have experienced a decline in total income-wages plus social contributions. This shift in the distribution of value added is source of income inequality and constitutes a major problem in Europe because, although people of working age in employment are less likely to be at risk of poverty than those who are unemployed, employment does not provide a guarantee against poverty and exclusion (Perrons and Plomien, 2010). In fact, the poor workers category – measured by Eurostat as in-work at-risk-of-poverty rate from 18 to 64 years- has risen over the last years in the majority of Member States and in some of them reaches unacceptable levels in 2012 (i.e. 19.1% in Romania, 15.1% in Greece, 11% in Italy, 10.8% in Spain, 10.4% in Poland, and 18.9% and 10.2% in Luxemburg). The situation

worsens when we consider young workers from 18 to 24 years: in EU28 12% of employed are at risk of poverty in 2012, against 9% from 18 to 64 years.

An additional aspect that justifies the inclusion of further cohesion targets is that, in EU 2020 Strategy, economic restructuring, innovation and highly educated and well trained workforce are critical to the development of a competitive, smart and knowledge economy. However, as distinct research projects in the US[1] have revealed, employment and educational changes are associated with wage polarisation, primarily due to the expansion of earnings at the top of the distribution relative to those lower down and the inability of labour (especially lower paid labour) to capture an adequate share of productivity gains. Moreover, the European educational system often participates actively in various forms of social segregation (Perrons and Plomien, 2010, p. 29). The knowledge economy paradigm should not focus only on economic growth, but should include social cohesion goals (Perrons and Plomien, 2010, pp. 25-26).

All of these disequilibria are inflicting a great pressure on EU economic, social and territorial cohesion, which all of them are core EU objectives since its foundation. Since social and economic inequalities tear the social fabric, affect social cohesion and prevent nations, communities and individuals from flourishing, reducing inequality is the essential step for development and well-being of rich and poor (Pickett, 2013; Wilkinson and Pickett, 2009). We consider that all of these reasons justify our proposal to extend the distance analysis of Member States to EU 2020 Strategy by incorporating additional targets on inequality, which take especially sensitive groups of European citizens into account. Moreover, since the crisis effects were not known when the Europe 2020 targets were approved, the addition of targets could help to deal with complexity or unexpected developments.

[1] Projects funded by the European Commission Directorate-General for Research Socio-economic Sciences and Humanities are: INEQ, RESIST, LoWER3 and EQUALSOC. Perrons and Plomien (2010) analize their principal results.

3. Selection of indicators and targets

3.1. Indicators for TDI

With indicators 1 to 8 (Table 1) in Sect. 5.1, we calculate the composite index Target Distance (TDI) that allows to analyse the Member States degree of achievement of the Europe 2020 Strategy targets in 2012 (last year with statistical information for all variables), taking the EU headline target on employment, innovation, education, social inclusion and climate/energy as reference point. Although we take the EU headline targets generally set for the EU as the reference point for comparison purposes, Member States have been allowed to set their own national targets in each of these areas[2] according to their particular circumstances.

Specifically, the targets of the indicators 1, 2, 4, 6 and 7 were established by the European Commission (2010a). For the indicators 3 and 5, Eurostat has estimated the targets by using the methodologies that permit comparisons across countries. We have estimated the target for the indicator 8. The EU headline target is set out as a reduction of the total number of population at risk of poverty or social exclusion by 20 million (European Commission, 2010a, p. 3). Hence, we have estimated the percentage of the population that should be at risk of poverty or social exclusion by 2020 as illustrated below. In 2010 116,300 thousand people were at risk of poverty and the target is to reduce this number by 20 million people in 2020; thus, the target is that only (116,300-20,000) 96,300 thousand people should be at risk of poverty by 2020. Next, dividing 96,300 thousand people over the estimated population for 2020, we get 514,365 thousand people, i.e., the 2020 targeted percentage of population at risk of poverty is 18.72%. Table 2 shows the descriptive statistics of the indicators.

[2] For instance, Member States with worse situations have been allowed to set less demanding targets on employment rate and leavers, whereas others have been allowed to set more ambitious targets on areas such as renewable energy and tertiary education.

3.2. Indicators for ETDI

In Sect. 5.2 we analyse the Member States' degree of achievement of the targets when incorporating inequality targets in addition to seven out of the eight targets of Europe 2020 Strategy (indicators from 2 to 8, Table 1). More concretely, we propose five additional inequality targets, captured by six indicators for which there is data availability and that meet the required technical criteria (Advisory Committee on Official Statistics, 2009; Bell and Morse, 2003): income distribution, child poverty, inequality in gender employment, long-term unemployment and young employment (indicators from 2 to 14 Table 1). We then calculate the Extended Target Distance composite index (ETDI) that measures the distance of each Member State from the inequality-extended Europe 2020 (Inequalities-sensitive Europe 2020). We next briefly justify the selection of these additional targets. Table 2 shows the descriptive statistics of the indicators.

Insert Table 2 here

3.2.1. Inequality in Income Distribution

As noted in previous sections, considerable differences persist in the distribution of income between the EU28 Member States. In developed countries, income inequality is a source of economic instability and, therefore, prevents economic growth (Bofinger, 2013; Brown, 2004; Stiglitz, 2012a, 2012b) and negatively affects people well-being (Wilkinson and Picket, 2007, 2009). We introduce inequality in income distribution in our model by means of the income quintile share ratio indicator of Eurostat. This indicator is the ratio of total income received by the 20 % of the population with the highest income (top quintile) to that received by the 20 % of the population with the lowest income (lowest quintile). Contrastingly to inequality indexes such as Gini or Theil, our chosen indicator provides complete information on income distribution as it

compares richest with poorest population income. This way, an increase in the income quintile share ratio implies that the rich are richest in comparison to the poorest and, thus, inequalities increase (see Piketty, 2014, pp. 290-292).

The selection of the target on income distribution inequality considers inequality distribution in the EU28 and takes the mean value of first quartile countries (3.64), that is the mean of the seven more egalitarian countries or that report the lowest income inequality in EU28 (from lowest to higher income inequality in 2012: Slovenia, Czech Republic, Netherlands, Slovakia, Finland, Sweden and Malta).

3.2.2. Child Poverty

Poverty is seen as the deprivation of some minimum fulfilment of elementary capabilities (Sen, 1992, p. 9). To take into account the capability handicap derived from income, the Europe 2020 Strategy includes a target for poverty. However, we think that it is necessary to include an additional indicator, child poverty. Firstly, to grow up in poverty can have a lasting impact on a child. We must prevent poor children from becoming poor adults. In the environment of childhood poverty, children are exposed to a confluence of psychosocial and physical environmental risk factors that impact on the development of social and emotional competences. For instance, compared with other children, low-income children are disproportionately exposed to greater family turmoil, violence, more chaotic households, and greater instability (Evans, 2004). The early exposure to poverty may impact long-term neural functions such as cognitive processes (attention, executive function, and working memory) (Kim et al., 2013). Likewise, poverty in childhood has profound effects on the health of children, and their impact on health continues to reverberate throughout the life course into late adulthood. So that, compared to other children, those from households with low income or lower socio-economic status are: more likely to suffer infant mortality, more likely to have pre

school conduct and behavioural problems, more likely to experience bullying and take part in risky behaviours as teenagers, less likely to do well at school, less likely to stay on at school after 16, and more likely to grow up to be poor themselves (Field, 2010, p. 28). Child poverty can be definitively considered a source of economic inefficiency because it implies that society potential resources are not taken advantage of and diminishes productivity and competitiveness (Stiglitz, 2012b, pp. 102-104).

Secondly, economic crisis has impacted tougher on childhood than general population. In 2013, 27,1% of the population less than 16 years of the EU28 is considered at-risk-of-poverty or social exclusion against 24,5% of the whole population (Eurostat). Thus, when considering the 28 Member States, in 2013 child poverty is statistically higher than total population poverty (Wilcoxon test: $Z = -2.595$, $p = 0.009$). And thirdly, despite higher employment and longer weekly hours of work tend to reduce child poverty rates as reported in the United Kingdom (Reed and Portes, 2014), this is not enough by itself to reduce child poverty to the levels required to meet the 2020 targets[3]. Other anti-poverty measures such as increased net expenditure on transfer payments, tax cuts or childcare support are necessary.

In line with Europe 2020 Strategy and acknowledging than child poverty rate is higher than total population poverty rate, we set the same target to child poverty than to total population poverty (18.72%).

3.2.3. Gender inequality in employment

Besides income inequality and child poverty, other kinds of inequality very related should be brought into the model. Gender inequalities in employment persist despite the Lisbon strategy also requires the EU to promote equality between men and

[3] In the Child Poverty Act 2010 the UK Government has set as target: less than 10% of children living in households with equivalised net income below 60% of median equivalised net household income for the financial year 2020/21.

women in pay, labour market segregation and decision-making jobs. In 2013, only 62.6% of women work compared to 74.3% of men. In all Member States male employment rate is higher than female employment rate, and in some cases the differences in percentage points are very high (32.6 in Malta, 21.1 in Italy, 19.8 in Greece, around 15 points in Czech Republic, Slovakia, Romania, Poland and Luxemburg, and around 10 in Belgium, Germany, Netherlands, Austria, Hungary and Spain). That is, what a person can do depends, to some extent, on her gender. But, furthermore, employment inequalities together with a women lower pay (in 2012 the gender pay gap in the EU28, calculated by Eurostat, is 16.5%) and higher concentration in part-time contribute to women lower pension entitlements. In the EU, the average gender gap in pension entitlements stands at 39% and in many countries women pensions primarily rest on rights derived from those of their husbands (European Commission, 2013). These circumstances in conjuction with the higher women longevity are very related with the fact that women are much more exposed to the risk of poverty in old age than men in all Member States except Malta (particularly, in 2012, 21.7% of women of 65 years or over are at risk of poverty or social exclusion in EU against 16.3% of men, -Eurostat-).

Based upon an optimal situation of no differences between men and women in employment rates, we have set the same target of 75% for both men and women, as already set in Lisbon Strategy, and that Europe 2020 Strategy has set for total employment.

3.2.4. Long-term unemployment

Unemployment is a large source of unhappiness (Argyle, 1999; Oswald, 1997; Winkelmann and Winkelmann, 1998). The mental health of the unemployed deteriorates, with higher rates of depression, suicide, and alcoholism. Their health also

worsens, and their death rate increases (Argyle, 1989). Exclusion from the labour market is a main form of exclusion, most visible in the form of unemployment, which has a direct impact on income inequalities (Eurostat, 2010). In particular, long-term unemployment can have a large negative effect on feelings of well-being and self-worth and result in a loss of skills, further reducing employability. In fact, the longer people are unemployed, the more difficult it is to re-employ them, at least at wages comparable with what they received in the past. That, in turn, increases income inequalities. This is one of the reasons why it is important to promote that this people get employed the sooner the better (Stiglitz, 2012a, p. 38). Long-term unemployment is an indicator of social exclusion for the Human Poverty Index of United Nations Development Program and of social cohesion for the Strategy of Sustainable Development of European Union.

The selection of the long-term unemployment target has taken into account the complete empirical distribution in EU28 and takes the mean value of the seven Member States that report the lowest long-term unemployment rates (1.73), that is the first quartile (from lowest to highest in 2012: Austria, Sweden, Finland, Luxembourg, Netherlands, Denmark and Germany).

3.2.5. Young employment

In the EU27 in 2012, the young employment rate from 15 to 24 years (32.6%) is much lower than total employment rate (68.4%) and, in addition, has diminished uninterruptedly from 37.3 in 2008 to 32.2 in 2013 (last available data in Eurostat). In this indicator, women also report worse (30.6% in 2012) than men (34.5% in 2012). Stiglitz (2012a) identifies the lack of young employment together with long-term unemployment as the two key long-term effects that are likely to make a quick return to full employment particularly difficult. The low young employment rates negatively affect human development because young people who see a society without good

prospects will become alienated from the rest of society. Besides, in the EU and taking into account their educational level, young people are certainly the best human resource Europe possesses in order to increase its productivity (Rodrigues, 2014). We then believe that a new target should be introduced into the Europe 2020 Strategy, because it would also contribute to increase the efficacy of the education targets encompassed in the strategy.

As target for this indicator we take the mean of those Member States that form the fourth quartile in this variable distribution (50.06), that is the average of the seven Member States with the highest rates of young employment of EU28 (from highest to lowest in 2012: Netherlands, Denmark, Austria, Germany, United Kingdom, Malta and Finland).

Insert Table 2 here

3.3. Association between TDI, ETDI and Life Satisfaction

Subjective well-being is another approach to determining human well-being (societal progress) based on the experience of individuals (Bruni and Porta, 2007; Diener and Suh, 1997; Helliwell 2008, among others). Explicitly, subjective well-being is a person's cognitive and affective evaluations of his or her life experience (Diener et al., 2009). A vast literature investigates the determinants of subjective well-being, both economic conditions such as income, unemployment and inequality (Easterlin, 1974, 1995; Clark et al., 2008; Distante, 2013 among others) and non-economic conditions such as social and cultural capital (see, e.g., Conciecao and Bandura, 2008; Helliwell, 2006; Klein, 2012).

We study the extent to which Europe 2020 Strategy captures EU citizens' subjective well-being. That is, do the citizens of Member States closer to attaining the Europe 2020 Strategy targets report higher levels of subjective well-being? If that were

the case, one could claim that Europe 2020 Strategy mirrors to some extent EU citizens' expectations of well-being. We further investigate the impact of inequalities on subjective well-being, specifically whether our proposal to extend Europe 2020 Strategy with the selected inequality targets makes citizens of Member States closer to the inequality-extended Europe 2020 Strategy report higher levels of subjective well-being. If inequalities do matter to individuals' subjective well-being, we should observe that the ranking of Member States resulting from the well-being indicator (see below) is more correlated with the Member States ranking resulting from the ETDI than with the Member States ranking resulting from the TDI index.

Though income inequality has been extensively investigated as a determinant of subjective well-being, results are inconclusive (Berg and Veenhoven, 2010; Dolan et al. 2008, Wang et al., 2015). Given the nature of our data -country level-, we focus on the empirical evidence relative to between countries studies, which can also involve individual level data or average level data. A negative relationship between income inequality and subjective well-being is found by Alesina et al. (2004) in 12 European countries from 1975-1992 with individual level data from pooled surveys; Graham and Felton (2006) with survey –Latinobarómetro- individual level data from 18 Latin America countries in 2004; Hagerty (2000) using average level data of eight nations over 25 years; Veenhoven (1984) with average level data of 13 countries in the seventies (p. 157-159); Verme (2011) with individual data compiling the European and World Values Surveys from 1981 to 2004, and Hadju and Hadju (2014) using four waves of the European Social Survey in 29 countries.

Other studies report, however, no relationship between income inequality and subjective well-being: Bjornskov et al. (2007) with 60 nations in 1999-2004, Fahey and Smith (2004) in 33 European countries in 1999, Helliwell (2003) with individual level data from three successive waves (80-82, 90-91 and 95-97) of the World Values Survey

and Veenhoven (2002, cited in Berg and Veenhoven, 2010) with 45 nations in the 90s. Yet, Veenhoven (2002), updating his 1984 analysis, observes a curvilinear relationship between the wealth of nations and subjective well-being, concluding that "we can apparently live with relative income differences but not with poverty in an absolute sense" (Berg and Veenhoven, 2010, p.3).

A positive relationship between income inequality and subjected well-being is reported by Haller and Hadler (2006) with the World Values Survey and O'Connell (2004) with Eurobarometer data. Rozer and Kraaykamp (2013), with individual level data from 85 countries from the World Values Survey and the European Values Survey, also report a general but with shades positive relationship.

Particularly striking is Berg and Veenhoven' (2010) study of 119 nations over 2000-2006: it does not observe nor a significant correlation between the country average level of subjective well-being and income inequality, neither a non-linear relationship in line with an optimal level of income inequality; however, controlling for wealth, does observe a positive correlation and declares that "income-inequality tends to work out positively on" subjective well-being (p.10). More specifically for our data, splitting the 119 countries sample into subgroups, Berg and Veenhoven (2010) find a strong negative relationship between income inequality and subjective well-being in the Western World (United States, Canada, Australia, New-Zealand and Western-European countries).

Different theories fit the distinct results. The negative relationship between income inequality and subjective well-being is supported by, first, the assumption of an inequality-averse social preference (Bolton and Ockenfels, 2000; Fehr and Smith, 1999; Kahneman and Krueger, 2006), also observed by Tricomi et al.' (2010) functional magnetic resonance imaging study of the human brain. Second, Yitzhaki (1979) applies the social justice theory (Runciman, 1966), based on the idea of an individual' sense of

relative deprivation[4], to income and states that income inequality increases relative deprivation and, hence, decreases subjective well-being. Third and in line with the second framework, Frank (2007) claims that, with upward social comparison, inequality means discrepancies between aspirations and actual incomes of poorer individuals and imposes a psychological cost on them (Hadju and Hadju, 2014, p. 2).

The positive relationship between income inequality and subjective well-being is supported by Hirschmand and Rothschild's (1973) idea that people may value inequality if it signals social mobility (phenomenon also called the "tunnel effect", Wang et al., 2015). As Dolan et al. (2008) claim, the meanings of income inequality will depend on the perceptions of social mobility: for instance, inequality is found to have a negative impact in Europe where mobility is perceived low. Likewise, the impact of inequality may well depend on whether the countries are transitioning to a market economy, such as China, or not, such as the United States (Wang et al., 2015). In fact, Sanfey and Teksoz (2007) find that income inequality has a positive effect on transitioning countries but a negative effect on stable and prosperous countries.

Among the several indicators of subjective well-being (Sacks et al., 2010), we select life satisfaction rather than, for instance, happiness for theoretical and empirical reasons. The life satisfaction concept agrees with an economic perspective on well-being and represents a possibility to satisfy own preferences (Diener, 1984). Empirically, the life satisfaction indicator is more commonly found in data sets and, consequently, the main focus of economics research on subjective well-being.

Thus, we analyse the correlation between, on the one hand, the Member States ranking resulting from the TDI index and from the ETDI index and, on the other hand, the Member States ranking resulting from the life satisfaction index.

[4] The individual feels relative deprivation when he compares his position to others and realizes that he has less (Bayert, 1999 and Walker and Smith, 2002 cited in Wang et al., 2015, p. 416).

4. Methodology

4.1. Advantages and disadvantages of composite indexes

The estimation of each Member State distance in 2012 to the Europe 2020 Strategy targets may be approached through two distinct methods. One that calculates the distance of each of the eight indicators separately, as the European Commission in the Europe 2020 web whereby one can see the progress towards 2020 targets for each Member State. The other method provides an integrated measure of the distance in the eight indicators by generating a synthetic or composite index or value for each Member distance. An index is a dimensionless measure resulting from a combination of several indicators through a mathematical function that synthesises them (European Environment Agency, 2002). Indicator integration into a single index is, basically, a means by which individual and quite different indicators in a framework can somehow be viewed together to provide an holistic view (Bell and Morse, 2003, p. 39).

The main pros of using composite indexes are (Michalos et al., 2011; Nardo et al., 2005; OECD et al., 2008, pp. 13-14) that they summarise complex, multi-dimensional realities with a view to supporting decision-makers, are easier to interpret than a battery of many separate indicators, assess progress of territories over time, facilitate communication with general public and promote accountability. The most troubling issues concerning the elaboration of composite indexes (Booysen, 2002; Cherchye et al., 2008; Michalos et al., 2011; Nardo et al., 2005; Permanyer, 2011; Ravallion, 2010) are the treatment of measurement units (how to aggregate variables expressed in different units), and the allocation of weights among variables in the composite index (how to aggregate the variables into a single index). As methodological disadvantages, they can, be resolved by selecting the appropriate method to construct the composite index. Given the advantages of composite indexes, in this study we develop a composite index for measuring the Member States distance to the Europe

2020 Strategy targets. Specifically, we use the P2 Distance method that solves methodological disadvantages just mentioned.

4.2. The P2 Distance Method

4.2.1. P2 Distance Formula

The P2 Distance method or DP2 proposed by Pena Trapero (1977) and applied in subsequent studies (see Table 3) constructs a composite index to measure how far countries are from the Europe 2020 Strategy targets, in a manner that focuses on the distance to the Europe 2020 Strategy targets for the eight indicators instead of the absolute values of the indicators. That is, the DP2 synthesizes the eight Europe 2020 Strategy targets into a value, the reference point or synthetic target, as well as the situation of each Member State with respect to these eight targets; and likewise for the inequality-extended Europe 2020 case. Thus, DP2 allows to study the distance both of each Member State to the synthetic target and between Member States.

Consider

- n the number of Member States,
- m the number of indicators,
- $d_j=d_j(i,*)=|x_{ij}-x_{*j}|$ the difference between the value taken by the j-th indicator in the i-th Member State and the vector of reference $X_*=\{x_{*1}, x_{*2}, \ldots, x_{*m}\}$,
- σ_j the standard deviation of the indicator j,
- $R^2_{j,j-1,\ldots 1}$ the coefficient of determination in the multiple linear regression (Ordinary Least Squares, OLS) of x_j over x_{j-1}, x_{j-2}, ... x_1, and expresses the variance or variation of x_j linearly explained by the variables x_{j-1}, x_{j-2}, ... x_1,

then the composite index P2 Distance for a Member State i is defined as follows:

$$DP2_i = \sum_{j=1}^{m} (d_j / \sigma_j)\left(1 - R^2_{j,j-1,\ldots 1}\right) \quad (1)$$

with R_1^2=0.

4.2.2. Application of P2 Distance to the Europe 2020 Strategy

In this application, the P2 Distance is worked out by taking as the reference vector the Europe 2020 targets for indicators 1 to 8 for the TDI and the targets for indicators 2 to 12 for the ETDI (Table 1 right column). Hence, had a Member State reached all of the targets it would get a zero value in the composite index (TDI or ETDI), that is, its distance from the Europe 2020 targets or Inequalities-sensitive Europe 2020 is zero. As we aim to quantify the distance of each Member State in 2012 from the eight Europe 2020 targets (or eleven Inequalities-sensitive Europe 2020 targets), we need to establish some restrictions on the data matrix X.

1. We assign the value of the target j to the indicator j in the Member State i that has already met the target. For instance, say that in 2012 a Member State (e.g., Finland) has invested 3.5% of GDP in R&D, larger than 3% target set for 2020. Without any transformation, the distance $d_j = d_j(i,*) = |x_{ij} - x_{*j}|$ would be 0.5. Since the DP2 index is calculated as the sum of the distances weighted by the correction factor and divided by the standard deviation, this result would be misleading. Specifically, this Member State would obtain in the TDI a larger distance from the Europe 2020 targets than its actual one. To overcome this problem, we propose to set its indicator value as the target value, i.e., x_{ij}=3%, so that d_j would be zero (the target is met). Similarly for greenhouse gas emissions with a target of not surpassing the 80 level: if say, Bulgaria would report a value of 56 in 2012, we would assign it a value of 80 in the data matrix to prevent it from having a non-sensitive distance (|56 – 80| = 24) in the composite index.

2. After adjusting countries' values in the targets and before the aggregation stage, indicators are normalized to be in the same scale. This way, we solve the problem

of aggregating distinct dimensions measured in distinct scales. The normalization formula is:

$$I_{ij} = \frac{x_{ij} - worse(x_j)}{target_j - worse(x_j)} \quad (2)$$

where I_{ij} is the normalized indicator j of Member State i.

Note that it is the re-scaling normalization method (Nardo et al. 2005, pp. 47-48). We take as the maximum value (best value) of the indicator the corresponding target y and as the minimum value the worst value of the indicator across Member States. I_{ij} have values ranging from 0 (laggard, x_{ij} = worse (x_j), country furthest away from this target), to 1 (leader, $x_{ij} = target_j$, country has reached the target). As indicators are normalized, the reference base for the distance calculus is the unit vector.

Given these two transformations, a $DP2_i = 0$ means that Member State "i" has met all of the targets; and a $DP2_i > 0$, that it has not met all of them.

4.2.3. Weighting and aggregation

Once indicators are normalized, equation (1) amounts to:

$$DP2_i = \sum_{j=1}^{m} [(I_{ij} - 1)/\sigma_j)]\left(1 - R^2_{j,j-1,\ldots 1}\right) \quad (3)$$

where σ_j is the standard deviation of the normalized indicator j, and $R^2_{j,j-1,\ \ldots\ 1}$ the coefficient of determination in the OLS multiple linear regression of I_j over I_{j-1}, I_{j-2}, ... I_1,

From (3) we can deduce that the weight of the distance in each indicator is the ratio of the correction factor to the standard deviation of that indicator. For example, in the eight indicators case (m = 8), Member State i's TDI is calculated as follows:

$TDI_i = (1/\sigma_1)(I_{i1}-1) + [(1-R^2_{2,1})/\sigma_2](I_{i2}-1) + [(1-R^2_{3,2,1})/\sigma_3](I_{i3}-1) + \ldots + + [(1-R^2_{8,7,6,5,4,3,2,1})/\sigma_8](I_{i8}-1)$

Recall that $R_1^2 = 0$ and the reference vector or target vector is the unit vector. The first component in each addend captures the indicator weight that the statistical method DP2 assigns to each one of the distances that each Member State has from the targets. Note that despite the indicators weights are the same across all Member States, as each Member State is in a different relative position with respect to the targets, TDI will result in a distinct value for each Member State.

Two factors determine the weights: the standard deviation σ_j and the coefficient of determination R^2. As distance is divided by σ_j, distance is weighted by the inverse of the standard deviation. That guarantees that the distances of those indicators with a higher dispersion to the mean are less important for determining the composite index[5]. The coefficient of determination, $R^2_{j.j-1, \dots 1}$, measures the percentage of the variance of each indicator explained by the linear regression estimated using the preceding indicators (I_{j-1}, I_{j-2}, ... I_1). As a result, the correction factor ($1-R^2_{j.j-1, \dots 1}$) avoids the duplication of information by eliminating indicators whose information was provided by the preceding indicators. That is, as ($1-R^2_{j,j-1, \dots 1}$) expresses the part of variance of I_j not explained by x_{j-1}, x_{j-2}, ... x_1, the part already explained by the preceding indicators is obtained by multiplying each indicator by the corresponding coefficient of determination $R^2_{j.j-1, \dots 1}$. This way, the problem of correlation among indicators is solved and the model will not have redundant information.

On the determination coefficients, important is to take into account that the entry order of the indicators in the composite index formula will determine distinct values of R^2 and, thus, will affect the indicators weights and the composite index values. The entry order of the indicators is determined by the absolute values of the coefficients of linear correlation between the values of the indicators and the composite index. We follow the ranking method proposed by Pena Trapero (1977), which is an iterative

[5] This weighting scheme, which is similar to that used in heteroscedastic models, concedes less importance to those distances with more variability, and vice versa (Montero et al., 2010, p. 444).

method based on the Fréchet Distance (DF) where all the coefficients of determination R^2 are set to zero:

$$DF = \sum_{j=1}^{m}(d_j / \sigma_j) = \sum_{j=1}^{m}(|\,I_{ij} - 1\,| / \sigma_j)\ ; \qquad i = 1, 2, ..., n \tag{4}$$

DF is the maximum value DP2 may reach. We then estimate the linear correlation coefficients r between each indicator and the Fréchet distance, and sort the indicators from highest to lowest according to the absolute values of the linear correlation coefficients. Next, we calculate the first P2 distance for each Member State, incorporating the indicators in the resulting order. Hence, indicators are ranked from highest to lowest absolute value of the linear correlation coefficient between each indicator and the DP2. The process continues iteratively until the difference between two adjacent DP2s is zero.

That is, the weighting scheme of P2 Distance is explicit and transparent and, besides, the calculated index verifies the mathematical properties required to provide an acceptable measure: existence and determination, monotony, uniqueness, quantification, invariance, homogeneity, transitivity, exhaustiveness, additivity, and invariance compared to the base of reference (see Zarzosa Espina and Somarriba Arechavala, 2013). The DP2 method index is a cardinal measure, and on the basis of the additive property it is also capable of analyzing disparities between territories. Table 3 summarizes the principal advantages and disadvantages of DP2 as a composite index-elaboration method, and some examples of use.

Insert Table 3 here

5. Results

5.1. Target Distance Europe 2020 Strategy

Based on the statistics information provided by the eight indicators for the EU28, and applying the DP2 methodology, we calculate the composite index of Target

Distance Europe 2020 Strategy (TDI). This index allows to identify those Member States closer to attaining Europe 2020 targets and, also, to benchmark Member States. Table 4 shows the TDI results and ranking of Member States by the degree of accomplishment of Europe 2020 targets.

First, none of the Member States meets all of the Europe 2020 targets in 2012 as all of them Member States have a positive TDI value. As the reference vector is selected to measure distances, had a country met all of the targets, its TDI would have equalled zero. Denmark has the best situation in terms of Europe 2020 targets, having the smallest distance (TDI = 0.66). In contrast, Malta is the Member State most distant from Europe 2020 targets with a TDI = 12.70. The DP2 property of additivity allows us to deduce that there are large disparities between Member States in the degree of achievement of Europe 2020 targets (approx. 19 times larger, 12.70/0.66).

Table 5 shows the eight indicators ranked by entry order in the DP2 according to their absolute linear correlation with the TDI, the correction factor ($1-R^2$) and the weights of the distances. Since R^2 captures the information of each indicator that has already been explained by the preceding indicators, an indicator's correction factor ($1-R^2$) represents the new information explained by this indicator. For example, *R&D* is the most closely correlated with the composite index TDI and contributes all of its information to the TDI; the correction factor of the indicator *employment* is 0.53, because, approximately, the 47% of this indicator's information has already been explained by *R&D*; and *education* supplies 74% new information, once information previously incorporated by the preceding five indicators has been discounted. Note that *energy*, despite being the least correlated indicator with TDI -hence last one entering- provides 67% new information to TDI.

On the distances weights, results show that *leavers*, *R&D* and *energy* indicators have the uppermost weights in determining TDI. That is, ceteris paribus, the further

away a Member State is from the targets on early leavers from education and training, gross domestic expenditure on research and development and primary energy consumption, the more likely will be that this Member State is further away from attaining Europe 2020 targets (likewise, the less likely will be that its TDI is zero).

In 2012, 13 Member States meet the target of a rate of early leavers from education and training of at most 10%, against countries with very high rates such as Spain (24.7%), Malta (21.1%) and Portugal (20.5%). Denmark, Sweden and Finland surpass in 2012 the 3% GDP expenditure in R&D target, whereas 10 Member States still do not reach the 1%. Regarding the increase in energy efficiency target, that primary energy consumption falls below the 87 level (index 2005 = 100), only Lithuania, Hungary and Mediterranean Member States (Greece, Italy and Portugal) meet the target in 2012 with levels below 87.

5.2. Inequality Extended TDI

With the purpose of incorporating dimensions explicitly related to inequalities, we apply the DP2 methodology to the corresponding 13 indicators (indicators 2 to 14, Table 1). Table 4 shows the results of this inequalities-sensitive Europe 2020 DP2 analysis (ETDI). None of the Member States would meet all of the targets in 2012. Moreover, the majority of Member States increase their distance –except Germany, Austria, Netherlands, Cyprus and Malta-, that is the value of the ETDI increases for the majority of Member States with respect to the TDI as none of the Member States reaches all of the additional targets. The rankings of Member States resulting from both the TDI and the ETDI are pretty similar, as shows the Spearman's correlation coefficient ($rho = 0.96$, $p < .001$). However, one can observe that, moving from the TDI to the ETDI, 7 countries worsen their ranking whereas 12 countries improve their relative position and 9 countries remain constant. The maximum change is on the

negative side, Lithuania and Greece slip six places, followed by three places in Latvia and Croatia. On the positively affected group, Netherlands and Cyprus recover four places, Spain three places and Belgium, Slovakia and Malta three places (see difference in rank relative TDI in column eight Table 4).

Table 6 displays the thirteen indicators ranked by entry order in the DP2 according to their absolute linear correlation with the ETDI, the correction factor ($1-R^2$) and the weights of the distances. Now, *R&D*, *fememployment* and *childpoverty* are the most correlated indicators with the ETDI and, consequently, have the highest distance weights in determining its value. *Poverty* enters after *childpoverty*, in exactly the same place as in the TDI, and adds 10% new information to the ETDI. The remaining inequality indicators -*youngemploy*, *malemploy*, *longunemp* and *incomeineq*- follow up. *Renewable* is now the least correlated indicator but still provides 29% new information to the ETDI.

Insert table 6 here

5.3. Association between TDI, ETDI and Life Satisfaction

The most recent data for all of the EU28 countries is provided by question 30 in the Eurofound Quality of Life Survey (2012). Column 7 in table 4 reports the life satisfaction index (LS) of Member States.

First, we observe a wider variation in the LS ranking with respect to the rankings derived from both the TDI and the ETDI (last two columns in Table 1). The Spearman's rank correlation coefficient is equal to 0.96 ($p < .001$) between TDI and ETDI, equals 0.47 between TDI and LS ($p = 0.011$) and equals 0.60 ($p < .001$) between ETDI and LS. Thus, results show a very strong and significant (at 1% level) relationship between the two distance indexes –TDI and ETDI-; a moderate and 5% significant relationship between Member States citizens' subjective well-being and their distance from Europe

2020 targets (TDI), and a moderate-almost strong and 1% significant relationship between Member States' LS and the inequality-sensitive Europe 2020. So it does seem that inequalities do matter to EU citizens.

5. Conclusions

Inequalities in income distribution always exist. The critical issue is, however, to determine how much inequality is acceptable or fair. Positions on the "fair" income distribution entail value judgments that engender political conflicts no scientific method can solve (Piketty, 2014, p. 16). Nevertheless, there is a relationship between inequalities and economic growth largely ignored by the dominant macroeconomics. Economic and social inequalities produce instability and economic inefficiencies that lessen economic growth (Bofinger, 2013; Brown, 2004; Jayadev, 2013; Stiglitz 2012a, 2012b).

Europe 2020 Strategy, however, relies heavily on the dominant macroeconomics paradigm. The strategy aims to transform the EU into a smart, sustainable and inclusive economy with high levels of employment, productivity and social cohesion (European Commission, 2010a, preface). The Commission, to bring about these priorities, establishes eight targets on employment, R&D investment, CO_2 emission, renewable energy, energy consumption, early school leaving, tertiary education and poverty that Member States should meet by 2020. This multidimensionality constitutes a positive step in the direction of searching for alternative indicators to the GDP as a measure of socioeconomic performance (Commission of the European Communities, 2009; Stiglitz et al. 2009; Van den Berg 2007, among others). Nevertheless, we argue that the lack of more specific targets for reducing social and economic inequalities -except poverty- is the major deficiency of the Europe 2020 Strategy. In particular, Europe 2020 Strategy presents two fundamental weaknesses.

First, it does not incorporate that inequality in income distribution causes and results from crises. Inequality redistributes income from low-income individuals with high marginal propensity to consume to upper-income individuals with a low marginal propensity to consume. That reduces aggregate demand. This insufficient aggregate demand generates unemployment and low economic growth (Bofinger, 2013; Brown, 2004; Jayadev, 2013; Stiglitz, 2012a, 2012b, pp. 84-86). That is, fighting socio-economic inequalities is actually essential not only for an inclusive EU but also for growth (Perrons and Plomien, 2010).

Second, Europe 2020 assumes that social cohesion follows from economic growth. But employment is not enough to tackle poverty (Perrons, 2012). Nowadays the main source of poverty is the current wage inequality between high paid and low paid workers. Here again, though the Commission has stated good intentions towards reducing wage inequality (European Commission, 2011), no target has been set to effectively address this problem. "So the social inequality inherent in the current model of the economy remains unaddressed in policies designed to promote cohesion" (Perrons, 2012, p. 18).

Given all the damaging effects of inequality, the EU should both monitor inequality and commit to realistic but courageous targets to reduce it. As Fitoussi and Saraceno (2014) claim, there are reasons to believe that an inequality increase is one of the factors that boost disequilibria in the global economy, where the crisis deepens inequality and has created a vicious circle that imposes large social costs, especially in EU countries.

The concern for inequality and poverty by researchers and politicians has increased since the outset of the yet recent crisis, as it is observed in international congresses, political speeches and published reports (IMF, 2007; OECD, 2008; Oxfam,

2013) as well as high impact studies (e.g., Galbraith, 2012; Piketty, 2014; Stiglitz, 2012a; Wilkinson and Pickett, 2009).

We have applied the DP2 methodology of Pena Trapero (1977) to calculate the distance between each Member State synthetic situation in 2012 and the Europe 2020 Strategy targets synthetic situation. We find that none of the Member States meets all of the targets, Denmark is the closest to and Malta is the furthest from the targeted situation and large disparities among Member States. Results show that *leavers*, *R&D* and *energy* indicators are the crucial determining factors of the distance between the Member States and the Europe 2020 targets. Thus, European Community policy should focus on these disparity factors.

Our application of the P2 Distance method provides a weighting scheme, based on a statistical model, explicit and transparent, that solves the aggregation problem of different dimensions measured on different scales, and the existence of correlations among indicators.

We extend the analysis by adding five inequality targets relative to income distribution, gender employment, child poverty, long-term unemployment and young employment. The extended index shows that, though the ranking of Member States is pretty similar to that obtained with the eight targets index, the majority of Member States increase their distance –except Germany, Austria, Netherlands, Cyprus and Malta- as no Member State meets all of the additional targets. Results show that now *R&D*, *fememployment* and *childpoverty* are the most influential indicators on the disparities between Member States in the ETDI.

Our results could help each Member State think about its relative position regarding the Europe 2020 targets in comparison to other Member States. Particularly, those low TDI rank countries may identify their relatively strong and weak areas and

revise the policies undertaken to achieve the growth target following the Commission's recommendations.

Next and within subjective wellbeing approach, we examine the ranking of Member States resulting from the country average level of life satisfaction, and compare it with both the TDI and ETDI rankings. The result supports Sen's view that what people care about might be substantially different from what standard economics assumes they care about. Specifically, inequalities do matter to EU citizens.

References

Advisory Committee on Official Statistics (2009). *Good practice guidelines for the development and reporting of indicators*. Wellington: Statistics New Zealand.

Alesina, A., Di Tella, R. and MacCullloch, R. (2004). Inequality and happiness: Are Europeans and Americans different? *Journal of Public Economics*, 88(9), 2009-2042.

Anand, S., and Sen, A. (1994). Human Development Index: methodology and measurement. *Human Development Report Office Occasional Paper 12*. New York: PNUD.

Andor, L. (2014). Conditions for the Achievement of the Europe 2020 Targets. *Journal for a Progressive Economy*, 04-December 2014, pp. 16-19.

Argyle, M. (1989). *The social psychology of work*. London: Penguin.

Argyle, M. (1999). Causes and Correlates of Happiness. In D. Kahneman, E. Diener, N. Schwarz (eds.). *Well-Being: The Foundations of Hedonic Psychology*. New York: Russell Sage Foundation, 353-373.

Aschauer (1989). Is public expenditure productive?. *Journal of Monetary Economics*, 23, 177-200.

Babones S.J. (2008). Income inequality and population health: Correlation and causality. *Social Science Medicine*, 66(7), 1614-26.

Bell, S., and Morse, S. (2003). *Measuring Sustainability: Learning by Doing*. London: Earthscan.

Berg, M. and Veenhoven, R. (2010). Income inequality and happiness in 119 nations. In: BentGreve (Ed.). Social Policy and Happiness in Europe. Edgar Elgar Chettenham UK, chapter 11: 174-194.

Bjornskov, C., Dreher, A. and Fischer, A. (2007). The relation between inequality and happiness. Do Subjective Perceptions Matter? Paper, Aarhus School of Business, Denmark.

Bofinger, P. (2013). The Impact of Inequality on Macroeconomic Dynamics. *Annual Plenary Conference of the Institute for New Economic Thinking* (INET). http://ineteconomics.org/sites/inet.civicactions.net/files/bofinger-peter-berlin-paper.pdf [Accessed October 2014].

Bolton, G.E., and Ockenfels, A. (2000). ERC: A theory of equity, reciprocity, and competition. *American Economic Review*, 90(1), 166-193.

Booysen, F. (2002). An overview and evaluation of composite indices of development. *Social Indicators Research*, 59(2), 115–151.

Brown, C. (2004), Does Income Distribution Matter for Effective Demand? Evidence from the United States, *Review of Political Economy*, 16, 291-307.

Bruni, L. and Porta, P.L. (eds.) (2007). Handbook on the Economics of Happiness. Cheltenham, UK and Northampton, MA, USA: Edward Elgar.

Cherchye, L., Ooghe, E., and Van Puyenbroeck, T. (2008). Robust human development rankings. *Journal of Economic Inequality*, 6(4), 287–321.

Clark, A., Frijters, P. and Shields, M. (2008). Relative Income, Happiness, and Utility: An Explanation for the Easterlin Paradox and Other Puzzles. *Journal of Economic Literature* 46(1), 95-144.

Commission of the European Communities (2009). Communication from the Commission to the Council and the European Parliament. *GDP and beyond. Measuring progress in a changing world*. COM(2009) 433 final. Brussels.

Conceicao, P. and Bandura, R. (2008). Measuring Subjective Wellbeing: A Summary Review of the Literature. Office of Development Studies, United Nations Development Programme (UNDP) Research Paper, New York.

Council of the European Union (2000). Lisbon European Council of 23-24 March 2000: Presidency Conclusions.

Diener, E. (1984). Subjective Well-being. *Psychological Bulletin*, 95(3), 542-75.

Diener, E. and Suh, E. (1997). Measuring quality o life: economic, social and subjective indicators. *Social Indicators Research*, 40, 189-216.

Diener, E., Lucas, R.E. and Oishi, S. (2009). Subjective Well-Being. The Science of Happiness and Life Satisfaction. In Lopez, S.J. and Sneider, C.R. (Eds). *The Oxford Handbook of Positive Psychology* (2 ed), chapter 5, 63-73.

Distante, R. (2013). Subjective Well-Being, Income and Relative Concerns in the UK. *Social Indicators Research,* 113 (1),81-105.

Dolan, P., Peasgood, T. and White, M. (2008). Do we really know what make us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, 29, 94-122

Easterlin, R.A. (1974). Does Economic Growth Improve the Human Lot? In David, P.A., Reder, M.W. (Eds.). *Nations and Households in Economic Growth: Essays in Honour of Moses Abramowitz*. New York: Academic Press.

Easterlin, R.A. (1995). Will Raising the Incomes of All Increase the Happiness of All? *Journal of Economic Behavior and Organisation*, 27(1), 35-47.

Elgar FJ, Aitken N. Income inequality, trust and homicide in 33 countries. *Eur J Public Health* 2011;21(2):241-6.

Eurofound. European Quality of Life Survey 2012: https://eurofound.europa.eu/surveys/european-quality-of-life-surveys-eqls/european-quality-of-life-survey-2012

European Commission (2010a). *EUROPE 2020 A strategy for smart, sustainable and inclusive growth*. COM(2010) 2020. Brussels.

European Commission (2010b). *Lisbon Strategy evaluation document*. Commission Staff Working Document. SEC(2010) 114 final. Brussels.

European Commission (2013). *The Gender Gap in Pensions in the EU*. Luxembourg: Publications Office of the European Union

European Environment Agency (2002). Towards an urban atlas: Assessment of spatial data on 25 European cities and urban areas. *Environmental issue report* no. 30, Copenhagen.

Eurostat (2010). *Combating Poverty and Social Exclusion 2010 Edition. A Statistical Portrait of the European Union*. Luxembourg: Publications Office of the European Union.

Evans, G.W. (2004). The Environment of Childhood Poverty. *American Psychologist*, 59(2), 77-92.

Fahey, T. and Smyth, E. (2004). Do subjective indicators measure welfare? Evidence from 33 European societies. *European Societies*, 6(1), 5–27.

Fehr, E. and Schmidt, K.M. (1999). A theory of fairness, competition, and cooperation. *The Quartely Journal of Economics*, 114(3), 817-868.

Field, F. (2010). *The Foundation Years: preventing poor children becoming poor adults. The report of the Independent Review on Poverty and Life Chances*. HM Government.

Fitoussi, J.P. and Saraceno, F. (2014). Drivers of inequality: Past and present challenges for Europe. *Journal for a Progressive Economy*, 02-March 2014, pp. 34-37.

Galbraith, J.K. (2012). *Inequality and instability: A study of the world economy just before the great crisis.* New York: Oxford University Press.

Graham, C. and Felton, A. (2006). Inequality and happiness: Insights from Latin America. *The Journal of Economic Inequality*, 4(1), 107-122.

Hajdu, T. and Hajdu, G. (2014). Reduction of Income Inequality and Subjective Well-Being in Europe. Economics Discussion Papers, No 2014-22, Kiel Institute for the World Economy.

Hagerty, M.R. (2000). Social comparisons of income in one's community: Evidence from national surveys of income and happiness. *Journal of Personality and Social Psychology*, 78(4), 764.

Haller, M., & Hadler, M. (2006). How social relations and structures can produce happiness and unhappiness: An international comparative analysis. *Social Indicators Research*, 75, 169–216.

Helliwell, J. F. (2003). How's life? Combining individual and national variables to explain subjective well-being. *Economic Modelling*, 20, 331–360.

Helliwell, J.F. (2006). Well-Being, Social Capital and Public Policy: What's New? *The Economic Journal*, 116(510), C34-C45.

Helliwell, J.F. (2008). Life Satisfaction and Quality of Development. NBER Working Papers 14507, National Bureau of Economic Research, Inc.

Herrero, C., Martínez, R., and Villar, A. (2012). A Newer Human Development Index. *Journal of Human Development and Capabilities*, 13(2), 247-268.

Hicks, D. A. (1997). The inequality-adjusted Human Development Index: A constructive proposal. *World Development*, 25(8), 1283–1298.

ILO (2008). *World of Work Report 2008: Income Inequalities in the Age of Financial Globalisation.* Geneva: International Labour Office.

IMF (2007). *World Economic Outlook: Globalization and Inequality*. International Monetary Fund.

Jayadev, A. "Distribution and Crisis: Reviewing Some of the Linkages" in The Oxford Handbook of the Political Economy of Financial Crises.Oxford University Press, Gerald Epstein and Marty Wolfson eds. Forthcoming (2013).

Kahneman, D. and Krueger, A.B. (2006). Developments in the measurement of subjective well-being. *The Journal of Economic Perspectives*, 20(1), 3-24.

Kim, P., Evans, G.W., Angstadt, M., Hoc, S.S., Sripadac, C.S., Swainc, J.E., Liberzonc, I., and Phan, K.L. (2013). Effects of childhood poverty and chronic stress on emotion regulatory brain function in adulthood. *PNAS*, 110(46), 18442–18447.

Klein, C. (2012). Social Capital or Social Cohesion: What Matters For Subjective Well-Being? *Social Indicators Research*, DOI 10.1007/s11205-011-9963-x.

Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22, 3-42.

Montero, J.M., Chasco, C., and Larraz, B. (2010). Building an environmental quality index for a big city: a spatial interpolation approach combined with a distance indicator. *Journal of Geographical Systems,* 12, 435-59.

Michalos, A.C., Smale, B., Labonté, R., Muharjarine, N., Scott, K., Moore, K., … & Hyman, I. (2011). *The Canadian Index of Wellbeing. Technical Report 1.0.* Waterloo, ON: Canadian Index of Wellbeing and University of Waterloo.

Munnell, A. (1992). Infraestructure investment and productivity growth. *Journal of Economics Perspectives*, 6-4, 189-198.

Nardo, M., Saisana, M., Saltelli, A., and Tarantola, S. (2005). *Tools for Composite Indicators Building*. European Commission, Joint Research Centre.

O'Connell, M. (2004). Fairly satisfied: Economic equality, wealth and satisfaction. *Journal of Economic Psychology*, 25, 297–305.

OECD (2008). *Growing Unequal?: Income Distribution and Poverty in OECD Countries Distribution*. Paris: OECD publishing. DOI:10.1787/9789264044197-en

OECD, European Commission, Joint Research Centre (2008). *Handbook on Constructing Composite Indicators. Methodology and User Guide*. OECD publishing. DOI:10.1787/9789264043466-en

Oswald, A.J. (1997). Happiness and economic performance. *The Economic Journal*, 107, 1815–31.

Pena Trapero, J.B. (1977). Problemas de la medición del bienestar y conceptos afines (Una aplicación al caso español). Madrid, España: INE.

Permanyer, I. (2011). Assessing the robustness of composite indices rankings. *Review of Income and Wealth*, 57(2), 306–326.

Perrons, D. (2012) Regional Performance and Inequality: linking Economic and Social Development through a Capabilities Approach. *Cambridge Journal of Regions, Economy and Society*, 5, 15-29.

Perrons, D. and Plomien, A. (2010). *Why socio-economic inequalities increase? Facts and policy responses in Europe*. European Commission, Directorate-General for Research Socio-economic Sciences and Humanities EUR 24471 EN. Luxembourg: Publications Office of the European Union. doi: 10.2777/94928

Pickett, K. (2013). Reducing inequality: an essential step for development and wellbeing. *Journal for a Progressive Economy*, 1-November 2013, 39-43.

Piketty, T. (2014). *Capital in the Twenty-First Century*. Cambridge, Massachusetts London, England: The Belknap Press of Harvard University Press.

Piketty, T. and Saez, E. (2013). Top Incomes and the Great Recession: Recent Evolutions and Policy Implications. *IMF Economic Review*, 61, 456-78.

Ravallion, M. (2010). Mashup Indices of Development. *Policy Research Working Paper,* 5432. World Bank, Development Research Group.

Reed, H., and Portes, J. (2014). *Understanding the parental employment scenarios necessary to meet the 2020 Child Poverty Targets. Research report*. Social Mobility & Child Poverty Commission. London.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/318073/3b_Poverty_Research_-_Final.pdf

Romer, P. (1990). Endogenous Technological Change. *Journal of Political Economy*, 98(5), 71-102.

Rözer, J., & Kraaykamp, G. (2013). Income Inequality and Subjective Well-being: A Cross-National Study on the Conditional Effects of Individual and National Characteristics. *Social Indicators Research*, 113(3), 1009-1023.

Runciman, W. G. (1966). Relative deprivation and social justice: A study of attitudes to social inequality in twentieth-century England. California: University of California.

Sánchez Domínguez, A., and Ruiz Martos, M. (2014). A progressive approach to the measurement of regional performance in the European Union. *Journal for a Progressive Economy*, 3, 62-64.
Extended version: http://www.progressiveeconomy.eu/content/progressive-approach-measurement-regional-0

Sacks, D.W., Stevenson, B. and Wolfers, J. (2010). Subjective well-being, income, economic development and growth. National Bureau of Economic Research Working Paper (NBER Working Paper Series) 16441.

Sen, A. (1992). *Inequality Re-examined*. Oxford: Clarendon Press.

Seth, S. (2009). Inequality, interactions, and human development. *Journal of Human Development and Capabilities*, 10(3), 375-396.

Sjoberg, O. (2009). Corporate Governance and Earnings Inequality in OECD Countries, 1979-2000. *European Sociological Review*, 25(5), 519-533.

Stiglitz, J., Sen, A., and Fitoussi, J.P. (2009). *Report of the commission on the measurement of economic performance and social progress (CMEPSP*).
http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf [Accessed May 2013].

Stiglitz J.E. (2012a). Macroeconomic Fluctuations, Inequality, and Human Development. *Journal of Human Development and Capabilities*, 13(1), 31-58.

Stiglitz J.E. (2012b). *The price of inequality: How today's divided society endangers our future*. New York: W.W. Norton & Company, Inc.

Stutzer, A. and Frey, B.S. (2010). Recent Advances in the Economics of Individual Subjective Well-being. IZA Discussion Paper 4850.

Tricomi, E., Rangel, A., Camerer, C.F. and O'Doherty, J.P. (2010). Neural evidence for inequality-averse social preferences. Nature, 463(7284), 1089-1091.

United Nations (2009). *Report of the Commission of Experts of the President of the United Nations General Assembly on Reforms of the International Monetary and Financial System* (The Stiglitz Commission), September, New York: United Nations. Published in 2010 as *The Stiglitz Report*, New York: The New Press.

Van den Bergh, J. (2007). *Abolishing GDP*. TI 019/3. Amsterdam: Tinbergen Institute Discussion Paper.

Veenhoven, R. (1984). Conditions of happiness. In D. Reidel, Dordrecht/Boston.

Verme, P. (2011). Life satisfaction and income inequality. *Review of Income and Wealth*, 57(1), 111-127.

Wang, P., Pan, J. and Luo, Z. (2015). The Impact of Income Inequality on Individual Happiness: Evidence from China. *Social Indicators Research* 121, 413-435.

Wilkinson R.G. and Pickett, K.E. (2007). The problems of relative deprivation: Why some societies do better than others. *Social Science Medicine*, 65(9), 1965-78.

Wilkinson, R. and Pickett, K. (2009). *The Spirit Level. Why More Equal Societies Almost Always Do Better*. London: Allen Lane.

Winkelmann, L. y Winkelmann, R. (1998). Why are the unemployed so unhappy? Evidence from panel data. *Economica*, 65, 1–15.

Yitzhaki, S. (1979). Relative deprivation and the Gini coefficient. *The Quartely Journal of Economics*, 93(2), 321-324.

Zarzosa Espina, P., and Somarriba Arechavala, N. (2013). An Assessment of Social Welfare in Spain: Territorial Analysis Using a Synthetic Welfare Indicator. *Social Indicators Research*, 111(1), 1-23.

Table 1. Indicators and targets for building Target Distance Index and Extended Target Distance Index.

Indicator		Description	Target
1	employment	The employment rate is calculated by dividing the number of people aged 20 to 64 in employment by the total population of the same age group (in %).	75
2	R&D	Gross domestic expenditure on research and development as a percentage of GDP.	3
3	greenhouse	Greenhouse gas emissions (index 1990=100). This index shows trends in total man-made emissions of the 'Kyoto basket' of greenhouse gases.	80
4	renewable	Renewable energy (in %). Share of renewable energy in gross final energy consumption.	20
5	energy	Primary Energy Consumption is meant the Gross Inland Consumption excluding all non-energy use of energy carriers (index 2005=100).	87
6	leavers	Early leavers from education and training (in %). This indicator shows the percentage of 18-24 year old students who have dropped out of primary, lower or upper secondary education and who therefore declared that they had not received any education or training in the four weeks preceding the survey.	10
7	education	Tertiary educational attainment (in %). The share of the population aged 30-34 years who have successfully completed university or university-like (tertiary-level) education with an education level ISCED 1997 (International Standard Classification of Education) of 5-6.	40
8	poverty	This indicator corresponds to the sum of people who are: at risk of poverty or severely materially deprived or living in households with very low work intensity (% of total population). People are only counted once even if they are present in several sub-indicators. At risk-of-poverty are people with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers). Material deprivation covers indicators relating to economic strain and durables. Severely materially deprived people have living conditions severely constrained by a lack of resources. People living in households with very low work intensity are those aged 0-59 living in households where the adults (aged 18-59) work less than 20% of their total work potential during the past year.	18.72
9	incomeineq	Inequality of income distribution (income quintile share ratio) is the ratio of total income received by the 20 % of the population with the highest income (top quintile) to that received by the 20 % of the population with the lowest income (lowest quintile). Income must be understood as equivalised disposable income. Equivalised disposable income is the total income of a household, after tax and other deductions, that is available for spending or saving, divided by the number of household members converted into equalised adults.	3.64
10	childpoverty	Population at risk of poverty but not severely materially deprived and not living in a household with low work intensity less than 18 years (% of total population). People at risk of poverty or social exclusion less than 16 (% of total population).	18.72
11	fememploy	The females employment rate is calculated by dividing the number of females aged 20 to 64 in employment by the total females of the same age group (in %).	75
12	malemploy	The males employment rate is calculated by dividing the number of	75

		males aged 20 to 64 in employment by the total males of the same age group (in %).	
13	longunemp	Long-term unemployed (12 months and more) comprise persons aged at least 15, who are not living in collective households, who will be without work during the next two weeks, who would be available to start work within the next two weeks and who are seeking work (have actively sought employment at some time during the previous four weeks or are not seeking a job because they have already found a job to start later). The total active population (labour force) is the total number of the employed and unemployed population. The duration of unemployment is defined as the duration of a search for a job or as the period of time since the last job was held (if this period is shorter than the duration of the search for a job).	1.73
14	youngemploy	The young employment rate is calculated by dividing the number of people aged 15 to 24 in employment by the total population of the same age group (in %).	50.06

Note. Indicators 1 to 8 and corresponding targets have been set by the EU in the Europe 2020 Strategy. TDI is calculated with indicators 1 to 8. Extended-TDI is calculated with indicators 2 to 14. Indicators 9 to 14 and corresponding targets are proposed in this paper.
Source: European Commission (2010a); Eurostat, Europe 2020 indicators; and the authors.

Table 2. Descriptive statistics of indicators 2012, EU28 (n = 28).

Indicator	Mean	Standard deviation	Minimum	Maxim
employment	67.93	6.43	55.00	79.40
R&D	1.61	0.91	0.43	3.43
greenhouse	86.08	28.53	42.92	156.90
renewable	16.87	11.51	2.70	51.00
energy	93.35	7.31	74.10	112.00
leavers	11.00	5.18	4.20	24.70
education	36.59	9.90	21.70	51.10
poverty	25.59	8.41	15.00	49.30
incomeineq	4.78	1.01	3.40	6.60
childpoverty	27.91	10.08	14.70	52.20
fememploy	73.49	5.95	60.60	82.50
malemploy	62.40	8.23	45.20	76.80
longunemp	5.10	3.40	1.10	14.50
youngemploy	30.58	13.05	13.00	63.30

Source: Eurostat, Europe 2020 indicators; Eurostat, Population and Social Conditions; and the authors.

Table 3. Advantages and disadvantages of P2 Distance method.

Advantages	Disadvantages
It verifies all mathematical properties for aggregation method. It is a cardinal measure. It measures distances and disparities. Objective weighting scheme. It avoids redundant information. Objective variables selection.	Investigator defines variables with positive/negative impact on the model. It only analyzes linear relationships between variables.
Examples of use: Regional Development Index (Sánchez-Domínguez and Ruiz-Martos 2014). Social Welfare Index (Zarzosa Espina and Somarriba Arechavala 2013). Enviromental Quality Index (Montero, Chasco and Larraz 2010). Indexes of Quality of Life (Somarriba and Pena 2009).	

Table 4. Contrasting ranks of EU28.

							Difference		
Member States	Rank	TDI	Rank	ETDI	Rank	Life Satisfaction	TDI-ETDI	TDI-Life Satisfaction	ETDI-Life Satisfaction
Denmark	1	0.66	1	1.03	1	8.32	0	0	0
Sweden	2	1.34	2	1.53	3	7.96	0	-1	-1
Finland	3	1.64	3	1.76	2	8.08	0	1	1
Germany	4	2.74	4	2.54	14	7.16	0	-10	-10
Slovenia	5	3.17	7	4.04	16	7.04	-2	-11	-9
France	6	3.56	8	4.49	12	7.28	-2	-6	-4
Austria	7	3.56	6	3.43	5	7.74	1	2	1
Lithuania	8	3.87	14	6.09	20	6.8	-6	-12	-6
Netherlands	9	4.42	5	3.43	6	7.68	4	3	-1
United Kingdom	10	4.50	9	4.61	10	7.34	1	0	-1
Estonia	11	4.51	11	5.58	24	6.38	0	-13	-13
Belgium	12	4.60	10	5.08	9	7.4	2	3	1
Czech Republic	13	5.11	12	5.72	22	6.48	1	-9	-10
Luxembourg	14	5.45	13	6.08	4	7.78	1	10	9
Ireland	15	6.08	15	7.29	7	7.46	0	8	8
Latvia	16	6.19	19	8.49	25	6.32	-3	-9	-6
Hungary	17	6.48	17	8.09	27	5.86	0	-10	-10
Slovakia	18	6.51	16	8.02	23	6.46	2	-5	-7
Poland	19	7.30	18	8.48	15	7.14	1	4	3
Portugal	20	7.62	20	8.56	19	6.86	0	1	1
Croatia	21	7.97	24	10.82	18	6.92	-3	3	6
Greece	22	8.06	28	11.31	26	6.24	-6	-4	2
Italy	23	8.47	22	9.75	17	6.94	1	6	5
Bulgaria	24	8.78	25	10.88	28	5.68	-1	-4	-3
Cyprus	25	9.13	21	8.78	13	7.16	4	12	8
Spain	26	9.21	23	10.66	8	7.46	3	18	15
Romania	27	9.34	27	11.11	21	6.74	0	6	6
Malta	28	12.70	26	10.91	11	7.3	2	17	15

Table 5. Target Distance Index Structure in EU28 Member States, 2012.

Position	Indicator	|r|	Correction factor ($1-R^2$)	Distances Weights[a]
1	R&D	0.84	1.00	2.99
2	employment	0.74	0.53	1.77
3	leavers	0.63	0.84	3.06
4	poverty	0.58	0.45	1.74
5	greenhouse	0.55	0.59	2.21
6	education	0.52	0.74	1.89
7	renewable	0.33	0.63	1.79
8	energy	0.22	0.67	2.82

Note. |r| is the absolute linear correlation between normalized indicators and the TDI.
[a] From the DP2 formula, it is the ratio of the corrector factor to the standard deviation of the normalized indicator.

Table 6. Estructura del Extended Target Distance Index in EU28 Member States, 2012.

Position	Indicators	|r|	Correction factor ($1-R^2$)	Distances weights[a]
1	R&D	0.90	1.00	2.99
2	fememploy	0.87	0.53	1.95
3	childpoverty	0.79	0.43	1.54
4	poverty	0.74	0.10	0.39
5	youngemploy	0.71	0.43	1.40
6	malemploy	0.66	0.29	1.06
7	longunemp	0.65	0.23	0.87
8	incomeineq	0.64	0.30	0.90
9	education	0.53	0.58	1.50
10	leavers	0.52	0.45	1.66
11	greenhouse	0.34	0.35	1.32
12	energy	0.29	0.57	2.40
13	renewable	0.14	0.29	0.83

Note. |r| is the absolute linear correlation between normalized indicators and the TDI.
[a] From the DP2 formula, it is the ratio of the corrector factor to the standard deviation of the normalized indicator.