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World Child Well-Being Index: A Multidimensional Perspective

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Abstract
This work aims to understand the situation of children within a particular territory and assess the different dimensions of this scenario. To this end we develop a multidimensional indicator to synthesize the most relevant dimensions and indicators around the world at a country level. Our results not only identify the aspects exerting the greatest impact on infant well-being, but also provide a full international comparison. The ranking obtained allows us to compare among countries, thus highlighting differences in the transformation of wealth into infant well-being. Moreover, incorporating gender into the analysis provides a new and relevant perspective.

Keywords Synthetic indicator · Multidimensionality · Well-being · Child capabilities · Education · Health · Gender

1 Introduction

As stated by Sen (2015), much is left to fear in a day that begins without anything to eat, without a friendly school to go to, or without proper healing from diseases constantly present in a precarious childhood. In the same vein, Eekelaar (2017) defines children's well-being as the fulfilment of children's rights and their opportunity to develop and attain their full potential.

To operationalize these definitions, the literature has identified a number of dimensions and requirements. In particular, Ben-Arieh (2008) identifies three vectors (rights, well-being and relationship with the environment) and affirms the following five pillars must be met: recognition of the Convention on the Rights of the Child (CRC);

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a new sociology of childhood; the ecology of child development; new methodological perspectives and collection and dissemination of improved data in all areas of children life. The CRC were approved by the United Nations General Assembly in 1989 and are acknowledged to be a milestone in the legal consideration of children's rights (UNICEF, 1989).

This paper, framed in line with UNICEF's studies through its synthetic indicators and firmly grounded in the CRC, focuses on the latter. According to FRA (2009), it also adopts the definition followed by the UNDP on indicators for monitoring compliance with international human rights instruments. Additionally, addressing infant well-being from a multidimensional perspective allows us to combine different aspects into a single measure (O'Hare and Gutierrez 2012; Casas et al., 2013).

Even though economic variables, such as household income or per capita Gross Domestic Product (GDP), are often used as a proxy of well-being in general and infant well-being in particular (Cooper & Stewart, 2013; Pickett & Wilkinson, 2015), we are aware that this represents a rough measure for many reasons (Frones, 2007; Main, 2019). As UNICEF (2013; 3) states "there is no obvious relationship between levels of child well-being and GDP per capita"- Therefore, the use of more sophisticated indicators is a must to identify good and bad records, and differences in country dynamics over time. And this identification is key for the definition and implementation of the right policies (Ben-Arieh, 2008; Casas, 2000; Chaudry & Wimer, 2016).

Our contribution to the literature is threefold. First, the scope of study of the synthetic indicators of UNICEF extends to a broader set of countries. Specifically, our contribution covers practically all the members of the United Nations, and its information synthesis methodology is more sophisticated than the methodologies employed to date. Secondly, we step beyond the mere elaboration of a country classification to identify the nations that best transform economic growth into child well-being and detect the dimensions or variables responsible for the changes in their rankings. As a third contribution, the incorporation of a gender dimension in the study is noteworthy. This reflects the importance of the situation of women in child well-being; this is especially important with respect to girls, given that they are especially vulnerable throughout their early stages of life.

The paper is structured as follows. The second section contextualises child well-being, paying special attention to all matters concerning its quantification and the identification of major dimensions. The third section uses homogeneous data provided by the United Nations to develop a child well-being synthetic indicator from a multidimensional perspective aligned with social indicators. The fourth section presents the results and the different perspectives for their analysis, and the final section concludes.

2 Child Well-Being: Context and Quantification

Tracking the well-being of children is as important to a country as monitoring the economy (Moore, 2020). As Ben-Arieh and Goerge (2001) note the actual practice of measuring and monitoring the state of children is changing. From the basis of wealth, it is necessary to move towards quantifications allowing for the integration of components that are not strictly economic, thus encompassing what UNICEF

(2007) describes as the extent to which children feel loved, valued and integrated in the families and societies where they are born.

Accordingly, Sandel (2011) suggests that a measure of child well-being should consider different aspects such as the level of children's health, quality of their education, or the joy of their games. This measure seeks to identify this vector of social progress, which does not necessarily relate to an improvement in the country's level of wealth (Bilbao-Ubillos, 2013; Stiglitz et al., 2010), but to its level of well-being and the quality of life (Jiang et al., 2013).

2.1 Context

After reviewing the literature on the subject (Dittmar et al., 2014; Kovacevic, 2011; Mankiw, 2012; Prados, 2015; UNICEF, 2013), it cannot be stated that there is a strong relationship between wealth (GDP) and well-being. Hence, as Viegas and Antunes (2013) suggest, the hypothesis claiming that more GDP guarantees greater economic development and well-being should be reconsidered.

Three considerations may be derived from this approach. The first is not to associate the wealth level with the degree of well-being (UNICEF, 2013). The second is to assume that growth does not necessarily improve social aspects, as McKee and Todd (2011) point out. Finally, in line with Main (2019) certain social aspects (leisure, inequality or environmental quality) are likely to deteriorate as growth increases.

Regarding children well-being, the same principle applies and the relationship between children well-being and GDP only holds up to a fairly low level. It should be noted that richer countries gains in GDP are not accompanied by relevant gains in children well-being (Gross-Manos, 2017).

Additionally, the most relevant international institution for children, UNICEF, asks for improvements when considering the relationship between national wealth and children conditions. Particularly, it is important to highlight the need for advances in studies "which have used income poverty as a proxy measure for overall child well-being" (UNICEF, 2007: 2).

Thus, different authors such as Beaumont (2013) or Conti and Heckman (2012) emphasize that no single dimension of well-being stands as a reliable proxy for child well-being. Even more, they conclude that satisfactory measurements must quantify children's well-being as a multifaceted concept that needs to take into account the many areas that affect their well-being. In this line, Stiglitz et al. (2008) recommend the collection of well-being measurements to complement national measures of other aspects of well-being and the OECD (2013) issue guidance on how to implement this.

A relevant example in this field is provided by Wilkinson and Pickett (2010) when demonstrating that subjective well-being, along with many domains of objective well-being (such as health and criminality), are strongly related to the level of inequality in a society rather than the level of wealth, with more equal societies faring better. Therefore, conceptual considerations might lead towards alternative measures, taking into account "services that households deliver to themselves such as child care, cooking or parents' education services to children" (Jean-Paul & Martine, 2018: 4).

2.2 Quantification

Academic concern for the quantification of children's situation (which Ben-Arieh (2008) called the "child indicator movement") is a relatively recent phenomenon that began in the 1960s and was not consolidated until the beginning of this century. Framed within the so-called "social indicators",[1] these indicators mainly attempt to obtain relevant information about children that agents bearing responsibility in this issue can easily handle. As UNICEF (2010: 6) points out, they are supposed to serve to "assess progress, identify problems and provide information on its evolution". In this sense, the two fundamental aspects that emerge are the convenience of communicating the data in a given way, and the comparability of the data between territories (Bradshaw, 2016; Casas et al., 2013).

Any child indicator intending to make the analysis as thorough as possible must incorporate different dimensions. As Moore et al. (2014) note, when it comes to well-being, "few would propose that any single indicator could adequately capture what is an inherently multidimensional concept". Therefore, it would be reasonable to adopt a multidimensional perspective (Ben-Arieh & Frønes, 2007; Turbeville et al., 2019; Maya Matallana et al., 2020). Furthermore, social awareness is created as disaggregated information becomes available. In line with UNICEF (2006), the provisions of the CRC urge in its concluding observations that member countries implement systems to evaluate the impact of policies on children. Thus, decision-making to improve the situation of children becomes easier, as does the necessary subsequent evaluation by the responsible agents (Bradshaw & Richardson, 2009; Vandivere & McPhee, 2008).

As Casas (2011) states, the current indicators quantifying child well-being are limited to specific territorial areas or to particular childhood sectors, such as sectors with certain health problems. Specifically, the most quantified aspects in this regard focus on children's quality of life, well-being, and satisfaction. However, a limited number of studies cover wide territories and, especially, make comparisons between countries or regions (Cho, 2015). These include the reports of Pollard and Lee (2003), Huebner (2004), Chung and Muntaner (2006), Arndt et al. (2012) and Blanco-Arana (2019).

UNICEF combined these efforts into a child well-being indicator through a synthetic indicator (UNICEF, 2007, 2013). Synthetic indicators took advantage of this measure by allowing the inclusion of the multidimensionality of reality, compared to one-dimensional indicators that are more limited in terms of the information they handle (Rodríguez Martín et al. 2012). Several authors such as Dijkstra (2009), Heshmati et al. (2008) or Richardson and Ali (2014) have used different approaches and included more countries in their studies to re-calculate the UNICEF indicator,

Following an international approach, the work of other institutions should also be noted. Prominent among them are the Health Behaviour in School-aged Children (HBSC), the International Society for Child Indicators (ISCI) and the Organisation for Economic Co-operation and Development (OECD). HBSC forms the most international initiative, which takes place in 43 countries

[1] The purpose of the movement is to measure the well-being of society in its different dimensions and provide valuable information to those responsible for public policies (UNICEF 2010).

throughout Europe, Central and Western Asia, North America and the Middle East. It surveys young people between 11 and 15 years of age in schools every four years. They answer questions about their health, their health behaviours and their social context. These comparative statistics between countries are published in quadrennial international reports in collaboration with the World Health Organization.

The ISCI develops children's well-being indicators through the "Survey of Children's Well-Being". This measurement work collects representative data on children's daily lives and activities, their use of time and their own perceptions and assessments of their well-being. Seeking to learn their opinions, it performs direct surveys of children and adolescents. Its main objective is child well-being and it attempts to achieve this by creating awareness among children and society in general.

Likewise, child well-being is high on the policy agenda across the OECD. Under its so-called program "Doing Better for Children", this multinational institution compares policy-focused measures of child well-being in different dimensions chosen to cover the major aspects of children's lives. As OECD (2009) points out, "it is at the individual level that the indicators can best inform policy and comparisons can be most readily made". It applies the study to its 37 countries even though only a few them have country-specific information.[2]

Moreover, the Opportunity Index,[3] the Inter-American Institute for Children and Adolescents (IIN),[4] Bradshaw et al. (2007) and the Annie E. Casey Foundation (AECF)[5] are also worth mentioning in terms of a continental approach. In addition, the European Union Agency for Fundamental Rights´ work on children's rights should be highlighted (FRA, 2009). Table 1 summarises the different dimensions considered by each child indicator.

All these indicators and their dimensions provide a suitable basis for the development of children synthetic indicators.[6] As Lippman et al. (2011) indicate an adequate selection of dimensions facilitates monitoring by governments, international agencies, and funders.

3 Methodology

Our basis for the development of a synthetic indicator of child well-being is the previous and valuable work done by UNICEF in this field. Therefore, it is relevant to review the characteristics of its main indicator, namely those aspects which we pretend to improve with the new synthetic child well-being index designed for a worldwide analysis.

[2] Namely: Australia, Austria, Canada, France, Germany, Italy, Japan, Mexico, New Zealand, Switzerland, United Kingdom and United States.

[3] Opportunity Index—The Opportunity Index measures 16 key indicators to produce an overall opportunity score and grade for all 50 states, Washington DC & over 2,900 counties.

[4] Inter-American Children´s Institute | Welcome (oea.org).

[5] Ensuring the Future of At-Risk Youth—The Annie E. Casey Foundation (aecf.org).

[6] An in-depth review and discussion of child well-being measurements can be found in Conti & Heckman (2012), Fernandes et al (2012) or Pollard & Lee (2003).

Table 1 Child indicators dimensions

Indicator / Source	Dimensions						
	Material Situation	Health & Safety	Education	Relationship & interactions	Housing & environment	Social participation and risks	Subjective Well-being
UNICEF (2007)	x	x	x	x		x	x
UNICEF (2013)	x	x	x	x	x		
HBSC		x		x		x	
ISCI	x			x	x		x
OECD	x	x	x (*)		x	x	
Opportunity Index	x	x	x			x	
IIN		x		x		x	
AECF	x	x	x	x			
Bradshaw et al. (2007)	x	x (**)	x	x	x	x	x

Source: Authors' elaboration

(*)Considered as two different dimensions: educational well-being and quality of school life.

(**) Considered as two different dimensions: health and safety.

3.1 UNICEF´s Synthetic Child Well-Being Index

UNICEF (2013) has developed a synthetic child well-being index: UNI_{26}.[7] As it is shown in Table 2, this index, calculated as an arithmetic mean, comprises 5 dimensions and 26 indicators and the score for each dimension is calculated "by establishing an average of the scores for each component. Similarly, component scores are reached by establishing an average of the scores for each indicator" (UNICEF, 2013: 5).

The group of the 29 countries of the world with the highest child well-being according to UNICEF (2013) is headed by (in this order) the Netherlands, Norway, Iceland, Finland and Sweden. If we represent (Fig. 1), the estimated UNI_{26} score for these 29 countries as compared to the average wealth per inhabitant (UNPD, 2016), it is worth noting that several countries within this child well-being index have no direct relation with the country's wealth (seen as points that are not on the trend line). Likewise, it is possible to identify how countries with similar levels of wealth reach different levels of child well-being. We may also observe that child well-being levels achieved at lower levels of wealth are akin to those achieved in much richer countries.

It is important to highlight that the UNICEF report presents no graph of this type. However, it brings to light a significant fact in stating that in general, there does not appear to be a close relationship between GDP per capita and general child well-being. The Czech Republic is better ranked than Austria; Slovenia better than Canada; and Portugal, better than the United States" (UNICEF, 2013: 3).

For instance, Iceland ranks 15th for wealth ($29,354 per capita), but it is 3rd in terms of child well-being (which is 12 positions higher). By contrast, the United Kingdom ranks 12th for wealth ($33,296), and 16th for child welfare (falling four notches). Table 3 visualizes these asymmetries by summarizing the position differences between the rankings for gross national income per inhabitant (GNI) and the UNICEF child welfare index (UNI_{26}).

Table 3 shows that the most child-friendly economic growth countries[8] for transforming wealth into child well-being are Iceland and Finland, while the United States, Austria and Canada are the least child-friendly economic growth countries. Furthermore, four countries (Norway, Lithuania, Latvia and Romania) score a perfect balance between their level of wealth and their level of child well-being. Moreover, Finland behaves inversely to Canada, with the former rising nine positions and the latter falling nine positions. Luxembourg and Hungary do the same, although the change is less intense.

The main limitation of previous UNI_{26} relies on the fact that it applies to a very small number of countries, 29 rich countries from the Netherlands to Romania. This allows UNICEF to handle a very large number of indicators (26 indicators in 5 dimensions) from various data sources. Yet it is only available to these rich countries.

[7] A more sophisticated approach to this index can be found in Heshmati et al. (2008) or Martorano et al. (2014).

[8] The term child-friendly economic growth identifies the countries that best transform their wealth into children's well-being.

Table 2 UNI_{26}: Dimensions and indicators

Dimensions	Indicators
Material well-being	Relative child poverty rate
	Relative child poverty gap
	Child deprivation rate
	Low family affluence rate
Health and safety	Infant mortality rate
	Low birthweight rate
	Overall immunization rate
	Child death rate, age 1 to 19
Education	Participation rate: early childhood education
	Participation rate: further education, age 15–19
	NEET rate (% age 15–19 not in education, employment or training)
	Average PISA scores in reading, maths and science
Behaviours and risks	Being overweight
	Eating breakfast
	Eating fruit
	Taking exercise
	Teenage fertility rate
	Smoking
	Alcohol
	Cannabis
	Fighting
	Being bullied
Housing and environment	Rooms per person
	Multiple housing problems
	Homicide rate
	Air pollution

Source: UNICEF (2013)

3.2 Synthetic Child Well-Being Worldwide Index

As it has been noted in the previous section, achieving a global vision of children well-being requires a broader worldwide study. For this purpose, we create an *ad-hoc* children well-being index which pretends to improve UNI_{26}´s limitations. By doing so, we intend to expand the territorial scope to cover all the countries of the world (not only 29 of the richest countries).

Our own research design relies on the purpose to analyse the nature of the transformation of wealth into children's well-being worldwide. Specifically, we intended to evaluate how countries transform their average wealth level per inhabitant into child well-being.

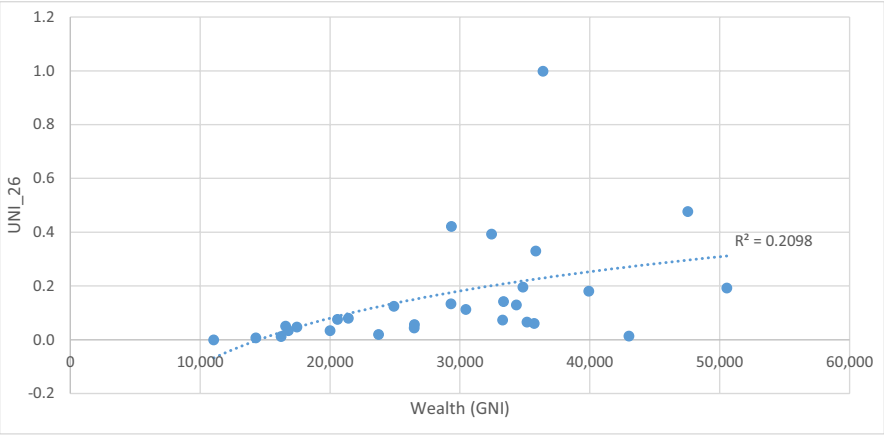

Fig. 1 Relationship between national wealth and $UNI_{26.}$ Source: Authors' elaboration from UNPD (2011) and UNICEF (2013: 2)

Following the basis of Ben-Arieh´s (2008) so-called "child indicator movement", our index aims to rank countries on a scale of children well-being conceptualized in terms of their capacity to function within the countries (Lank 2015; Sen, 1985). Therefore, taking Sen's understanding, child well-being can be seen as "an expansion of their capabilities" (Kellock & Lawthom, 2011).

To this end, our synthetic Child Well-being Index (hereinafter, the CWI_{14}) includes 4 dimensions and 14 children indicators. The selection of the dimensions is grounded on the research of previous authors and institutions and, in particular, of Bradshaw et al. (2007), UNICEF (2007) and O'Hare and Gutierrez (2012). Bradshaw et al. (2007) identified the following eight dimensions determining child well-being within a territory: material situation; housing; health; subjective well-being; education; interactions and relationships; participation; and security and risk.

Subsequently, UNICEF (2007) reduced the number of dimensions to five: material well-being; health and safety; educational well-being; relationships, behaviours and risks; and subjective well-being. Finally, of all the dimensions incorporated in the different indicators (Tab. 1), O'Hare and Gutierrez (2012) emphasize that education, health and material well-being may be crucial in a synthetic indicator.

In our case, the first two of these are directly included, while the third – material well-being – is collected through more direct indicators related to social and labour aspects. An additional dimension is included following Casas et al. (2018) and Kaye-Tzadok et al. (2017) given its importance in this kind of research: gender. In other words, the specific perspective of the situation of girls becomes part of the synthetic indicator. Thus, our CWI_{14} includes the following four dimensions:

1. Education
2. Health
3. Social and labour
4. Gender

Table 3 Differences between UNI_{26} position and wealth level (GNI)

Differences	GNI-UNI_{26}
Iceland	12
Finland	9
Slovenia	7
Czech Rep	7
Portugal	7
Ireland	6
Hungary	6
Netherlands	4
Germany	3
Poland	3
Belgium	2
Estonia	2
Sweden	1
France	1
Norway	0
Lithuania	0
Latvia	0
Romania	0
Denmark	-1
Slovakia	-1
Spain	-2
Switzerland	-4
United Kingdom	-4
Italy	-4
Greece	-5
Luxembourg	-6
Canada	-9
Austria	-11
United States	-23

GNI: Gross National Income per inhabitant

Source: Authors' elaboration from UNPD (2011) and UNICEF (2013)

In terms of the selection of variables, we decided to use a single source of information to maintain the desirable homogeneity and uniformity. Given the global scope of the study, the selected source was the United Nations, which provides 14 indicators for all the dimensions. We therefore exclusively use official data from the UNDP (2016); this allows us to work with a total of 188 countries by contrast to the 29 countries covered by UNICEF's UNI_{26}.

Table 4 shows the dimensions and the indicators jointly with the year of the data and the direct or inverse character of each indicator.[9] The aggregation method selected is the

[9] Some of the indicators are directly related with child well-being while others are inversely related (both situations are shown).

Table 4 CWI_{14}: Dimensions and indicators

Dimension	Acronym	Indicator	Relationship	Year(s)
Education	*Educ_dim*	Gross Preschool Enrollment Rate	direct	2015
		Gross primary enrollment rate	direct	2014
		Dropout rate in primary	reverse	2015
		Students per teacher in primary	reverse	2010–2015
Health	*Health_Dim*	Maternal mortality rate	reverse	2015
		Unvaccinated infants measles	reverse	2014
		Infant mortality rate	reverse	2015
Social	*Soc_dim*	Young people who neither study nor work	reverse	2010–2014
		Child labor	reverse	2009–2015
		Maternity leave	direct	2015
		Malnutrition	reverse	2010–2015
Gender	*Gender_dim*	Female students in preschool	direct	2015
		Female primary school students	direct	2015
		Teen birth rate	reverse	2015

Source: Authors' elaboration from UNPD (2016)

geometric mean of the four dimensions and the arithmetic mean for variables within each dimension. It is thereby possible to avoid faulty performances or compensations in some of the dimensions because better performance in other dimensions neutralizes them. (Giambona & Vassallo, 2014; Prada and Sanchez-Fernandez, 2019).

The synthetic index is constructed with these variable using two approaches. The first follows the methodology employed by the United Nations (UNDP 1990). All the variables of our four dimensions are normalized to values between 0 and 1. Let us note that normalization is executed directly from the original data in the case of variables directly associated with favourable child well-being. For rest of the variables, normalization is performed after inverting the value of the variable.

We calculate the arithmetic mean of the included variables in each dimension and subsequently, estimate the geometric mean of the four dimensions so that better performance does not compensate poor performance. In so doing, we obtain the synthetic index of children well-being.

In sum, our objective is to verify—on a global scale—whether the wealth level derived from economic growth (GNI) in each country matches the level of child development in that country quantified by the fourteen indicators synthesized by CWI_{14}.

4 Results

The results are presented as follows. First, the overall results of the study are collected. Thus, a general overview of all the countries are obtained. Next, a selection of countries is made. By doing so, we are able to delve into clearly differentiated

situations based on similar levels of wealth which, however, show very uneven behavior in terms of their performance in child well-being.

Moreover, the global results obtained can also be disaggregated according to the dimensions considered in the CWI_{14}. This perspective complements the analysis of the performance of each country in terms of their level of education, health, employment and, especially, gender. Due to its relevance and notoriety, this last dimension is dedicated to a specific sub-section within this section.

4.1 Child Well-Being Worldwide

The analysis results in a significant decoupling between economic growth and well-being in the World. It confirms the initial hypothesis about the presence of great heterogeneity between these territories in contrast to the results using income or revenue as the traditional territorial growth measurements.

Analogously to Fig. 1, we present Fig. 2, which includes the relationship between the level of wealth for the 188 countries and the CWI_{14} result (the geometric mean of the four dimensions in Table 4).

In absolute terms of child well-being (UNI_{26}), the Netherlands, Norway, Iceland, Finland and Sweden led (in this order) the group of the 29 richest countries in the world. The CWI_{14}, presents Belarus, Liechtenstein, the Czech Republic, Germany and South Korea as the first five countries. In this case, The Netherlands now comes in at 13^{th} place, Norway at 16^{th}, Iceland at 10^{th}, Finland at 9th and, finally, Sweden at 17^{th} place.

It is relevant to note that the logarithmic regression line places many countries in very distant positions, both below and above the line. This fact suggests that – as is seen in Table 3 – many countries with the same level of wealth have very different levels of child well-being. Likewise, we should point out that the relationship increases up to the level of $20,000, but figure beyond this level present greater economic growth accompanied by smaller growth in child well-being.

The next step in our analysis consists in revisiting the data from Table 3. These data are the basis for creating Table 5, which compares the results of our indicator with those of UNICEF's child well-being measure (albeit only for the ranking of the small number of countries covered by the latter source).

Despite the differences in the dimensions, indicators and methodologies, the two countries presenting the most child-friendly economic growth (those in which child well-being rises the most with respect to wealth per inhabitant: Iceland and Finland) and the two presenting the least child-friendly economic growth (those which fall the most: Canada and the United States) present similar results. Something similar happens in countries holding an intermediate position i.e., countries that do not modify their position when evaluating their level of material wealth and their level of child well-being. Latvia and Romania are two good examples.

Therefore, our CWI_{14} confirms the overall diagnosis of UNI_{26}. However, the child-friendly economic growth diagnosis is sometimes reinforced (the Czech Republic, Hungary and Poland are cases in point), while the transformation

Fig. 2 Relationship between national wealth and CWI_{14}. Source: Authors' elaboration from UNPD (2016). Note: Evaluated by GNI for 2015, in 2011 dollars in purchasing power parities. Qatar's $129,000 average income per inhabitant did not fit the same scale as the rest of the countries in the world; so it was eliminated

diagnosis is worsened in others (the United Kingdom and Canada are good examples). We believe this constitutes a supplementary argument to consider IDI14 (no longer just for the 29 UNICEF countries but for the 188 included in our estimation) a solid multidimensional indicator of child well-being worldwide.

Regarding particular situations, it should be remembered that in the UNI_{26}, the United States fell 23 positions in the world ranking of child well-being with respect to its position in terms of wealth (for 29 countries). Something similar happens with CWI_{14}, since the United States falls 34 positions in the group of 188 countries analysed (see Table 6).[10] On the other hand, the opposite happens in the case of Iceland: while it rises 12 positions with UNI_{26}, it does so by 18 positions with our indicator (an increase of 10 positions for the 29 countries with our CWI_{14}).

The most significant conclusion is that again, with a much higher average level of wealth per inhabitant, the United States falls below Iceland in child well-being (45th and 10th respectively). Thus, the level of child well-being in the United States is very much akin to that of a country like Albania, whose average income per inhabitant is a fifth of that of the United States.

As we show in Table 6, the United States is one of a large group of countries with the least child-friendly economic growth when it comes to transforming wealth

[10] It would have only fallen by 22 places if we had evaluated $ChDI_{14}$ for the 29 UNICEF countries in Table 5.

Table 5 CWI_{14} for UNI_{26} countries

Differences	GNI-UNI_{26}	GNI-CWI_{14}
Iceland	12	10
Finland	9	9
Slovenia	7	-1
Czech Rep	7	20
Portugal	7	8
Ireland	6	5
Hungary	6	10
Netherlands	4	-2
Germany	3	7
Poland	3	18
Belgium	2	-8
Estonia	2	2
Sweden	1	-4
France	1	-7
Norway	0	-7
Lithuania	0	3
Latvia	0	1
Romania	0	1
Denmark	-1	-2
Slovakia	-1	6
Spain	-2	-5
Switzerland	-4	-4
United Kingdom	-4	-17
Italy	-4	3
Greece	-5	2
Luxembourg	-6	-2
Canada	-9	-18
Austria	-11	-6
United States	-23	-22

Source: Authors' elaboration from UNPD (2011; 2016)

into child well-being (the worst is Equatorial Guinea). On the opposite side, Iceland is a country within the block of countries that transform their level of wealth into child well-being more efficiently Cuba is shown to have the best performance in the world. Despite having a level of wealth eight times lower, this country beats the child well-being level of the United States.

If we compare the situations of Iceland and the United Kingdom (with very similar levels of wealth) we verify with the CWI_{14} that the former is in the 10th position, while the latter is in the 80th position (which makes it drop 58 places in Table 6).

Both Fig. 2 and Table 6 bring us to the conclusion that the same level of child well-being can be achieved with very different levels of income, especially at an

Table 6 Changes in CWI_{14} position versus wealth level. Major differences. This table shows only countries that ascend or descend more than thirty positions

Differences	GNI-CWI_{14}
Cuba	82
Sri Lanka	77
Belarus	69
Solomon Islands	63
Nicaragua	61
China	58
Ukraine	58
Albania	56
Saint Lucia	56
Rwanda	55
Saint Vincent and the Grenadines	53
Palestina	52
Kiribati	52
Morocco	51
Uzbekistan	49
Mongolia	48
Gambia	47
Guyana	46
Viet Nam	46
Tajikistan	45
Burundi	44
Moldavia	38
Dominica	37
Micronesia	36
Zimbabwe	36
Czech Republic	35
Tanzania (United Republic of)	35
Poland	34
Nepal	33
Malawi	33
Bosnia and Herzegovina	32
Djibouti	-31
Indonesia	-32
Côte d'Ivoire	-32
Argentina	-33
Kuwait	-34
United States	-34
Colombia	-34
Papua New Guinea	-34
Venezuela	-35
Libya	-36
Turkey	-39
Malaysia	-43

Table 6 (continued)

Differences	GNI-CWI_{14}
Suriname	-44
Bahamas	-45
Dominican Republic	-45
Swaziland	-45
Trinidad and Tobago	-46
Botswana	-47
South Africa	-48
Namibia	-49
Qatar	-53
Nigeria	-55
United Arab Emirates	-58
United Kingdom	-58
Panama	-58
Brunei Darussalam	-66
Saudi Arabia	-74
Singapore	-80
Gabon	-83
Iraq	-95
Equatorial Guinea	-119

Source: Authors' elaboration from UNPD (2011; 2016)

average income over $20,000 per inhabitant, while levels of child well-being can be very distant for the same income level.

Finally, as it is shown in Table 7, only 32 of the 188 countries (which means the 17% of the total) remains a stable situation when analysing the wealth level in comparison with their children well-being. This fact implies than more than the 80% of the countries show differences in both magnitudes.

4.2 Child Well-Being in Selected Countries

Incorporating a large number of countries allows us to analyse some pairs of countries to illustrate the aforementioned asymmetries concerning the transformation of wealth into child well-being.

Our first example focuses on high-income countries: Australia and Canada. Both countries slightly exceed $42,000 for average individual income, and they are in almost identical positions in terms of economic ranking: 20th and 21st, respectively. However, for child well-being Canada falls to 47th position, while Australia rises to 6th place in CWI_{14} worldwide. Figure 3 shows their respective CWI_{14} scores together with their CWI_{14} dimensions.

Australia's higher synthetic child well-being index is the result of its superiority in every single component. However, its worst scores are in the health and gender

Table 7 Changes in CWI_{14} position versus wealth level. Stable situations. This table shows only countries that ascend or descend less than five positions

Differences	GNI-CWI_{14}	Differences	GNI-CWI_{14}
Israel	5	Ireland	0
Estonia	5	Serbia	0
Brazil	5	Eritrea	0
Armenia	5	Austria	-1
Guinea-Bissau	5	Lithuania	-1
Slovenia	4	Afghanistan	-1
Barbados	3	Sweden	-2
Fiji	3	Denmark	-2
Bhutan	3	Spain	-2
Burkina Faso	3	Lesotho	-3
Guinea	3	Malta	-4
Niger	3	Senegal	-4
Liechtenstein	2	Benin	-4
Andorra	2	Switzerland	-5
Costa Rica	2		
Central African Republic	2		
Luxembourg	1		
Netherlands	1		

Source: Authors' elaboration from UNPD (2011; 2016)

dimensions. In other words, Canada's greatest relative inefficiencies in transforming wealth into child well-being lie in the educational, social and employment dimensions.

Another pair of countries are selected from among the low-income countries worldwide, Cuba and Swaziland. Both have slightly over $7,000 average income per inhabitant and occupy the 114th and 113rd positions, respectively. However, as previously noted, Cuba is the country that most improves its relative position from its wealth level to its child well-being level: it climbs 82 positions (Table 5). Swaziland falls 45 positions, so the result in CWI_{14} is that Cuba is in 32nd position while Swaziland is in 158th position. The levels of wealth are similar, but they are 126 positions apart in the world ranking of child well-being.

Figure 4 draws attention to Cuba's balanced and excellent evaluation in all dimensions. The distance in achievement between one country and the other, at similar levels of wealth, are remarkable.

We previously highlighted in the tables that although Bulgaria and Canada are very unequal in wealth level, they do enjoy a similar level of child well-being,[11] but now we can observe that Cuba surpasses Canada for child well-being, and it does so with only 17% of the wealth available in that country. Therefore, this aspect of child well-being obviously shows enormous potential for improvement, without the need for the same levels of growth and wealth as the richest countries in the world. Cuba and Canada are good examples.[12]

[11] The same happens for Bulgaria and the United States.

[12] The same happens for Cuba and the United States, where the level of wealth of the former is 14% of the latter's.

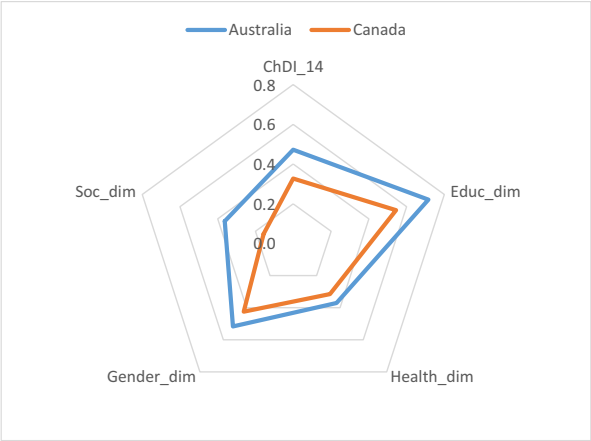

Fig. 3 CWI_{14} for Australia and Canada. Source: Authors' elaboration

4.3 Child Well-Being Dimensions

From the global analysis carried out for CWI_{14} and the pairs of countries selected in the previous section, it is clear that the same level of child well-being may be associated with very different levels of economic wealth in different countries.

We check this using the dimensions of CWI_{14}. We start with the education dimension (*Educ_dim*), as reflected in Fig. 5.

This profile is very similar to that of Fig. 2 for the global CWI_{14}, although this case presents a lower correlation coefficient between the two variables (0.70 vs. 0.62). The educational level of childhood clearly seems to improve up to an

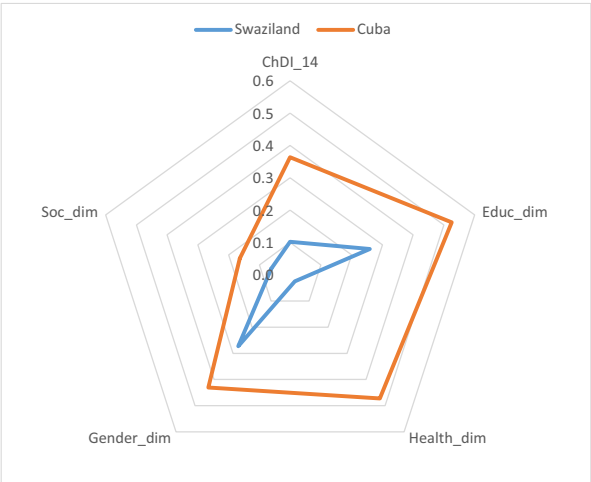

Fig. 4 CWI_{14} for Cuba and Swaziland. Source: Authors' elaboration

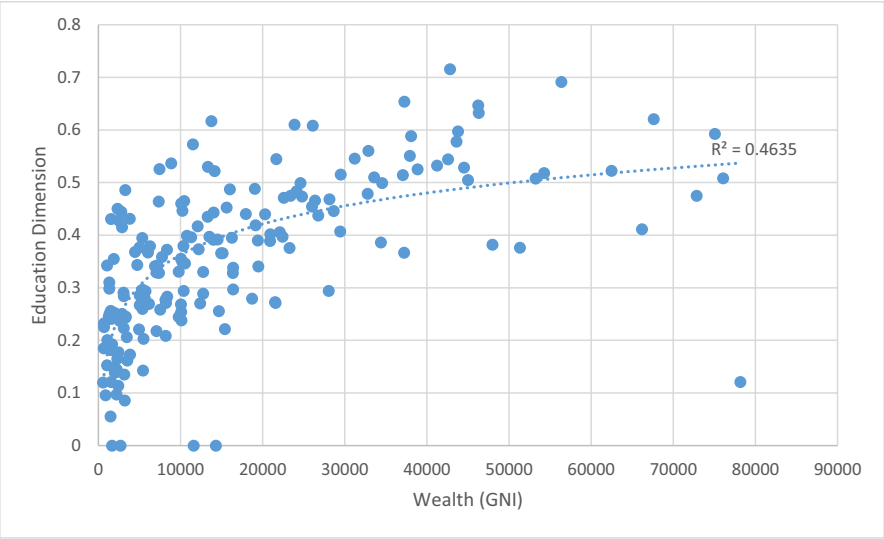

Fig. 5 Wealth and education dimension in $CWI_{14.}$ Source: Authors' elaboration

average income level of $20,000 per inhabitant, but the child-friendly economic growth coupling is greatly weakened beyond this threshold.

An exemplary country is Cuba, which has the same educational level (*Educ_dim* = 0.53) as Luxembourg, but an average income of $7,455 as compared to Luxembourg's $62,471 per inhabitant. The opposite of Cuba is Armenia, with $8,189 (*Educ_dim* = 0.21).

From UNICEF's UNI_{26}, we knew that the United States was the country presenting the least child-friendly economic growth. For this dimension, the United States (with an average income of $53,245) scores 0.51 for child educational well-being, the same level as Cuba. By contrast, the country showing the most child-friendly economic growth is Iceland, which at an average income of $37,065 has an education dimension score equal to that of the United States, with an income of $53,245 (which in this context has a favourable transformation). However, Iceland does not exceed the score for Cuba, which only has $7,455 for the average income but the same 0.51 child educational well-being score.

Cuba, Iceland and the United States are therefore three countries with the same child educational well-being; yet they reach it with unequal levels of wealth.

Something similar happens with the dimension of child health well-being (*Health_dim*). Figure 6 records a correlation coefficient (with the level of income) lower than that of the CWI_{14}. In this case, too, the transformation relationship between the two variables weakens beyond the $20,000 threshold.

Once again Cuba, with an average per capita income of $7,455, has a score for child health well-being of 0.473, far better than that of Kuwait or Singapore, whose average income surpasses $70,000. For this case, the complete opposite to Cuba is Swaziland, with an average income of $7,522 and a score of 0.029 in child health well-being.

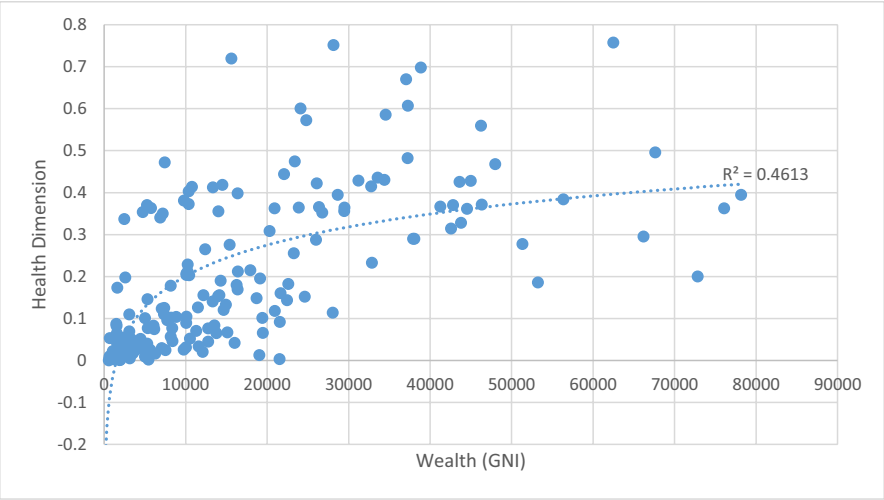

Fig. 6 Wealth and health dimension in CWI_{14}. Source: Authors' elaboration

As for the previous dimension, we can see that the United States, with an average income of $53,245, scores much lower (with 0.186) than does Cuba in the health dimension. The United States would have the same level of child health as Tajikistan, which only has a $2,600 per capita income. Furthermore, through the UN_{26} we knew that the country showing the most child-friendly economic growth was Iceland; here, it scores 0.67 for *Health_dim*, and an average income of $37,000, beating Norway, which scores 0.49 with an average income of $67,000.

No less important is the social and labour dimension (*Soc_dim*), which is shown in Fig. 7. In this case, the correlation collapses to 0.36 (remember that for IDI14 in Fig. 2 it was 0.70), with a distribution in which the trend line is practically flat, leaving many countries far from the line.

In this dimension, we have countries reaching a similar level (approximately 0.20) with average incomes ranging from $2,475 to $78,162. Conversely, countries with a similar level of income (around $45,000) have scores for the social and labour dimension ranging from 0.12 to almost quadruple that Fig. (0.46).

4.4 Gender Perspective and Child Well-Being

The dimension of child gender inclusiveness (*Gender_dim)* is included in Fig. 8. In this case, the correlation coefficient with respect to the level of income falls to 0.55. The income threshold up to which gender improvement is notable drops below $20,000. This means we are witnessing an aspect of child well-being that is especially difficult to overcome in association with the mere improvement of economic wealth.

In this case, the United States, with its average income of $53,245, reaches the same score for the gender dimension as Kenya, with an average income of $2,881.

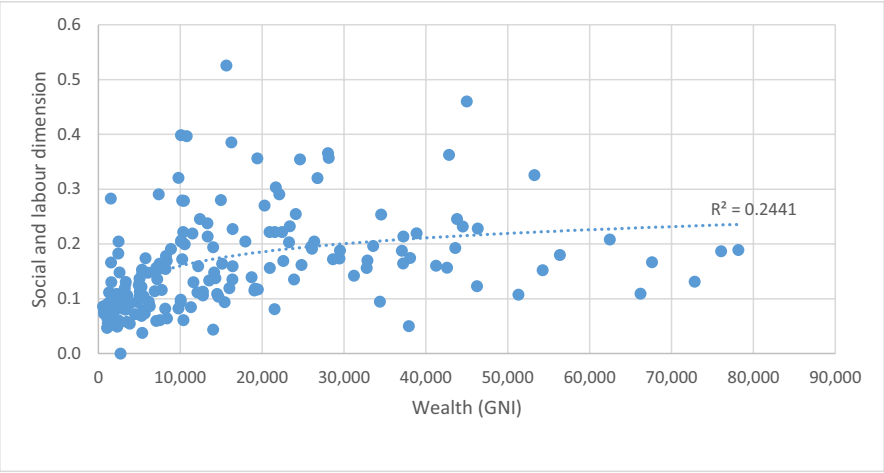

Fig. 7 Wealth and social and labour dimension in CWI_{14}. Source: Authors' elaboration

Thus, in many of the less wealthy countries, an improvement in child well-being is not possible without necessarily equalizing income levels while also reducing fertility and birth rates. As Lucas (2004) states, this could even be counterproductive for some countries. In other words, with the same resources it would be possible to improve the quality of life of groups of fewer children. This paves the way to collaborating in achieving an essential demographic adjustment on a world scale that could favour environmental sustainability. Social well-being is crucial for creating the bases to detain fertility (*anonymous reference)*.

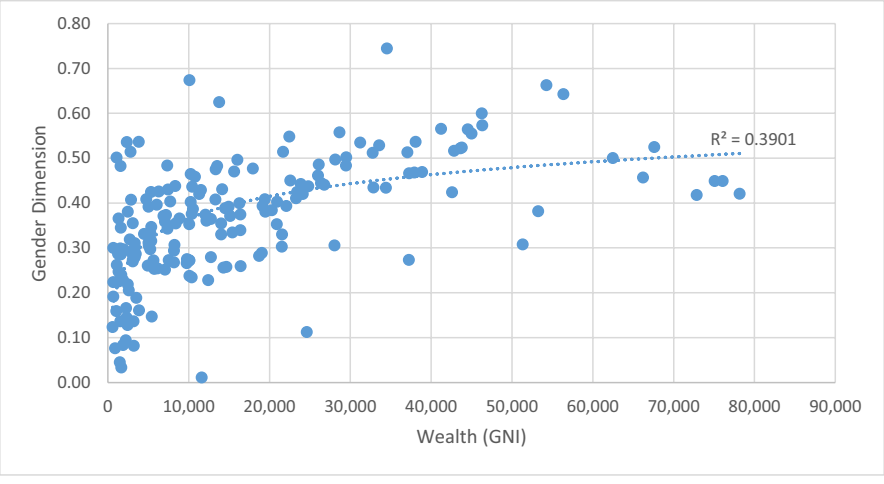

Fig. 8 Wealth and gender dimension in CWI_{14}. Source: Authors' elaboration

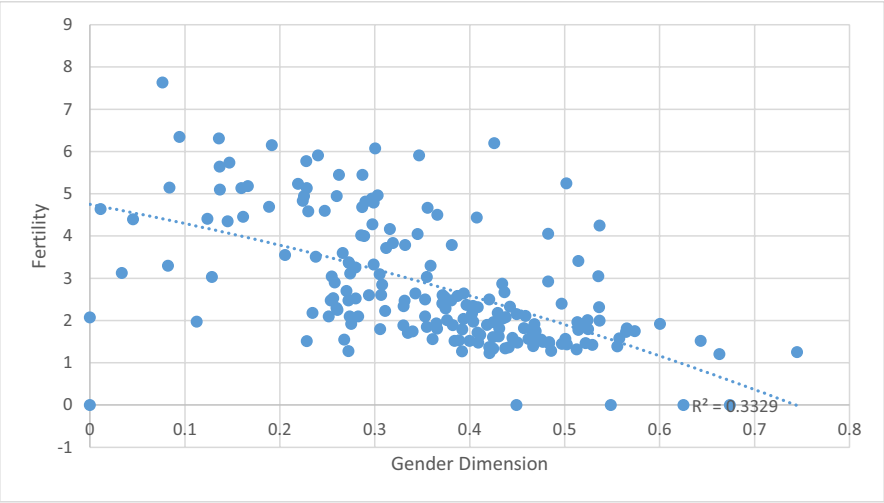

Fig. 9 Fertility and gender dimension in $CWI_{14.}$ Source: Authors' elaboration

Figure 9 shows that, fortunately, a child-friendly economic growth relationship is possible. As the value on the horizontal axis called gender dimension (*Gender_dim*) of CWI_{14} grows, it evidently produces a positive transformation effect on the average fertility rate of the countries.[13]

This means that an improvement in CWI_{14} – particularly in its gender dimension – translates into a lever that reduces population growth in less wealthy countries. Conversely, adequate fertility control (e.g., in China or Cuba) allows a country to achieve a high CWI_{14} for its gender component, even when the country's wealth is lower than other countries where fertility is far higher.

5 Conclusions

Evaluating whether the growth and level of a territory's developing wealth is transformed requires more sophisticated measures than per capita GDP. O´Hare and Gutierrez (2012) or Casas et al. (2013) show that multidimensional synthesis indicators are much better tools insofar as they take into account many relevant vectors at the same time to deal with very heterogeneous situations across. And this fact is especially relevant when the level of well-being quantified is childhood, given the particular characteristics of this population group.

Our contribution to this multidimensional approach to children well-being is fourfold. First, we show that the degree of heterogeneity between countries is very high in relation to child well-being. Same levels of wealth do not involve same levels in terms of the situation of children, since some countries manage the transformation

[13] This dimension includes three indicators: percentage of female students in preschool, percentage of female students in primary school and birth rate among adolescents (Table 4).

of their growth better than others. Iceland and Finland are good examples of child-friendly economic growth behaviour. The United States and Canada are the opposite.

Second, we verify the advantages of incorporating as many observations as possible in the studies. Extending the sample involves more robust results and enables more refined comparisons between territories. For instance, comparisons among different groups of countries or with specific dimensions of the synthesis indicator. This would not be possible in the case of a reduced number of countries.

Third, we bring to the literature new and dimensions to measure the degree of child well-being. It means an improvement in quantitative terms, but also allows for the identification of those dimensions for which a country behaves better and those for which it does not. This makes it possible to diagnose and identify where particular efforts should be made to improve child well-being in each territory. The specific cases of the educational dimension in Cuba or the health dimension in Iceland adequately illustrate this situation.

Finally, the inclusion of a gender dimension, usually set aside in the literature, allows us to identify typologies in the transformation of wealth into well-being, whilst also allowing us to draw the fourth conclusion in relation to the average fertility of countries. We verify that the improvement of this dimension is a valuable tool to slow population growth in less wealthy countries. Since less wealth does not necessarily imply a lower level of child well-being, these countries would represent good benchmarks for defining their well-being policies in less wealthy countries with low fertility. In recent years, the gender perspective has drawn great attention in budgeting (Downes et al., 2017; Quinn, 2017). The results justify that childhood should gain relevance as a cleavage of budgets. The information provided by our indicator should help to determine the intensity of the efforts required to achieve the convergence of a given territory with respect to an average or the leaders that are considered relevant in each case.

From a methodological standpoint, the main advantage of our synthetic Child Well-being Index (CWI_{14}) is that it relies upon a single data source (UNDP) and the extended HDI methodology and allows for results worldwide (189 countries). Moreover, our approach avoids compensation between dimensions and it does not soften the UNICEF´s diagnosis whilst it also includes a very revealing gender dimension (inexistent in the one published by UNICEF). These advantages (in seven times as many countries) for a global scale analysis seem robust for two reasons:

a) The indicators are all offered by UNDP in a statistical block related to childhood
b) The rankings of our index and the one published by UNICEF (evaluating only 29 countries—see Tab. 5) offer results in the same direction (promotions for Iceland or Finland and setbacks for the United States, Austria or Canada)

Finally, from a policy standpoint, this paper confirms what Sen (2015) noted: the obsession for growth is not particularly useful if it is considered as something important in itself. Instead, evaluations should be based on the opportunities to improve people's lives. The use of our CWI_{14}, allows for a more precise evaluation of the social consequences derived from the economic transformations that take

place in a territory. Hence, these indicators should be used at an international level for the sake of comparing countries as well as the regions of each country. The relative position of each society and its evolution over time should justify and motivate the strengthening of budgetary and non-budgetary governmental actions.

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