Why calling it 'equality' when it should be 'achievement'? A proposal to un-correct the 'corrected gender gaps' in the EU Gender Equality Index

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Abstract: This study critically reviews the new Gender Equality Index (GEI) proposed by the European Institute for Gender Equality (EIGE) in 2013 arguing that the way in which it has been defined can be misleading for its potential users. The GEI is defined to ensure that good scores in the index are reflective of both low gender gaps *and* high levels of overall achievement. The study finds that the GEI values are largely driven by differences in overall achievement levels *between* countries rather than by gender differences *within* them, a disturbing issue that unduly penalizes low-income countries for factors that are not related to gender norms or discriminatory practices and which might lead to the elaboration of ill-targeted policies. In order to overcome this problem, we introduce a new version of the GEI that gets rid of its achievement component and which is much simpler to interpret.

1. Introduction

On June 13th 2013, the European Institute for Gender Equality (EIGE) launched the brand new 'Gender Equality Index' (GEI). The index was built with the purpose of assessing the levels of gender equality across the 27 member states of the European Union (EU-27 or EU for short) in a wide range of dimensions that are essential for human well-being. Among many other things, the new GEI is to be welcomed for bringing to the fore essential gender inequality information that is comparable across all member states–an extremely difficult task that has quite successfully been achieved by the EIGE team. The index attempts to uncover existing gender inequalities across six core domains ('work', 'money', 'knowledge', 'time', 'power' and 'health') and in two satellite domains ('intersecting inequalities' and 'violence'). These domains–the choice of which has been guided by different theoretical frameworks like the 'equality of condition' perspective suggested by Baker et al (2004) or Amartya Sen's Capability Approach (see, for instance Robeyns 2003 or Nussbaum 2003)–have been carefully selected after an exhaustive literature review and an open dialogue with gender experts all over Europe. The accomplishment of gender equality in these areas is crucial to face current social challenges, secure social justice and reach the objectives set by the EU in the Europe 2020 growth strategy. To the extent that the new measure is taken up by policy-makers as an indicator of progress in the different EU member states, it could help to focus and inform policy debates on gender inequality, its causes and consequences. To this end, however, it is important that the new index is critically scrutinized by different actors (including, but not limited to, policy-makers, Statistical Offices, NGOs and academics) so that one can overcome its eventual limitations in the near future. In this context, this paper aims to critically analyze the way in which the GEI and its main predecessors have been defined and indicate the implications that the choice of one methodology or another entails for the interpretation of their values and the proposal of gender related policies.

In the last few years, the growing interest in gender related issues and the increasing availability of internationally comparable datasets has stimulated international institutions and individual researchers alike to propose different measures of gender (in)equality (Endnote#1). Since these quite numerous measures have been designed with different purposes, it is important to analyze what aspects of the new GEI are shared with the currently existing measures and what other aspects stand out, making of it a truly differentiated entity. For that purpose, we will overview the literature on gender indices and briefly review the main conceptual issues that are involved in their creation (see sections 2 and 3). In section 4, we continue the discussion focusing on several methodological aspects that must be addressed when constructing indices of gender equality.

Of particular interest for the purposes of this paper is the study of the basic underlying metric that is used to measure the gender gaps in a given variable–an apparently minor technical point that has passed through seemingly unnoticed but which does have

enormous implications both from a conceptual-theoretical point of view and from a practical-empirical perspective (see section 4). When defining such basic gender gap metric, the GEI designers have succinctly introduced the so-called 'correction coefficient' to ensure that good scores in the index are reflective of both low gender gaps *and* high levels of overall achievement. At first sight, the term 'correction coefficient' might be suggestive of some small adjustments that have been introduced to control for some undesirable properties or irregularities of the raw distribution but which, overall, are likely to have minor consequences on the main message conveyed by the index. Yet, this important point is not clarified anywhere in the report. In this context, it seems natural to ask: what is the extent of this correction? Are the original (*i.e.*: un-corrected) gender gaps very different form the corrected ones? How much does the correction factor contribute to the reported value of the index? Since the basic ingredients of the index are composed of an equality and achievement components, it is fundamental to unravel which of them is more important in shaping the final values of the index (see section 5.1). This paper aims to address these different issues and frame the GEI methodology within currently existing approaches in the measurement of gender equality.

As will be argued in detail below, the way in which the new GEI has been defined can be misleading for its potential users and might lead to inopportune misinterpretations. In order to address such eventual confusions, in this paper we suggest redefining the GEI by un-correcting the 'corrected gender gaps' (*i.e.*: getting rid of the overall achievement component) so that the new version of the index becomes a measure of gender inequality *per se*, which is more transparent and much easier to interpret. As is to be expected, the values of such new version of the GEI index *do* differ with respect to the current version. We will investigate the extent to which the two versions of the index diverge–both within and between countries–and whether or not they offer a coherent picture of the prevailing levels of gender inequality in the EU-27 (see section 5.2). In this respect, we will also investigate the relationship between the economic performance of the different member states and their gender equality levels according to the two versions of the GEI (the official one and the one proposed in this paper). We conclude the paper in section 6 with some final comments and remarks on the implications of our findings.

2. Literature overview

The United Nations Development Program (UNDP) pioneered the construction of global-scope gender-related indices taking into account disparities between women and men in a large number of countries. In 1995 the UNDP published the *Gender-related Development Index* (GDI), an indicator that measures development in the same dimensions as the well-known *Human Development Index* (HDI), discounting them for gender inequality. These dimensions are: 'longevity' (measured by life expectancy at birth), 'educational attainment' (measured by adult literacy rate and school enrolment ratios) and 'standard of living' (measured by the GDP per capita). In that year, the

UNDP also published the *Gender Empowerment Measure* (GEM). While the GDI takes into account the gender gaps in human development, the GEM focuses more specifically on women's opportunities by taking into account the dimensions of 'political participation and decision-making power' (measured by women's and men's percentage shares of parliamentary seats), 'economic participation and decision-making power' (measured by women's and men's percentage shares of positions as legislators, senior officials and managers and the percentage shares of professional and technical positions) and 'power over economic resources' (measured by women's and men's estimated earned income). The impact of these two measures has been enormous in both academic and nonacademic circles, and their values have been widely used all over the world (Schüler 2006). Among other things, these indices were particularly useful to raise awareness of gender-related issues in the context of human development. The launch of the GDI and GEM in 1995 set the stage for the proliferation of gender inequality indices among policy-makers and academia. Different authors have already made exhaustive reviews of these indices (e.g.: Dijkstra 2002, Permanyer 2010, Mills 2010, Bericat 2011 or Hawken and Munck 2013), so here we will only summarize the ones which, for conceptual or technical reasons, are related to the GEI.

Despite their relevance, both the GDI and GEM have been criticized for not measuring gender inequality in itself, but rather a combination of gender equality and levels of overall achievement (Dijkstra and Hanmer 2000, Dijkstra 2002 and Klasen 2006). Such criticism motivated the proposal of new indices of gender equality both from individual researchers and international institutions. Among the scholarly contributions, Dijkstra and Hanmer (2000) proposed the *Relative Status of Women* (RSW) index, an innovative measure that uses the same components of the GDI but does not include a relation with absolute levels of achievement, that is: it simply averages the gender gaps. Two years later, Dijkstra (2002) proposed the *Standardized Index of Gender Equality* (SIGE), a new version of her own index aiming to control for the fact that those variables with higher variance had the strongest implicit weight in the overall index. Later on, Beneria and Permanyer (2010) and Klasen and Schüler (2011) proposed improved versions of the RSW that coherently aggregated the gender gap ratios across alternative dimensions. In the last years, different authors have proposed gender inequality indices restricted to the European context only: Plantenga et al (2009), who introduced the *European Union Gender Equality Index* (EUGEI) and Bericat (2011), who introduced the *European Gender Equality Index* (EGEI).

During the same period of time, different international institutions have also proposed their own indices of gender inequality. One of them is the *African Gender Status Index* (AGSI), which was created in 2004 by the United Nations Economic Commission for Africa but which has not yet seen the light of day. One year later, the World Economic Forum published the *Gender Gap Index* (GGI), which is being updated on a yearly basis. Commemorating the 20th anniversary of the Human Development Reports, the UNDP presented the new *Gender Inequality Index* (GII) in 2010, which has been critically analyzed by Permanyer (2013). Lastly, in 2013 the European Institute for

Gender Equality launched the *Gender Inequality Index* that is being analyzed in this paper.

3. Conceptual issues in the measurement of gender equality

As illustrated by the plethora of indices proposed in the last few years, the concept of 'gender inequality' is somewhat vague and does mean very different things to different people (Endnote #2). Since the construction of composite indices of gender inequality is a complex process that involves many difficult and somehow arbitrary decisions, it is important for its designers to clarify and being explicit about the overarching concept they seek to measure. In what follows, we delineate some of the basic conceptual issues that must be addressed when constructing a coherent measure of gender equality.

Achievement vs. Gender Equality

On many occasions, scholars have attempted to create gender-specific achievement indices to measure in *absolute* terms the level of status attained by women or men separately. For instance, if one wants to compare the achievements of women between countries it is customary to create a composite index with women-specific indicators. Alternatively, when one is interested in assessing the *relative* position of women vis-à-vis men (or vice versa) it makes more sense to create a measure of gender equality comparing the achievements of both groups. For the sake of coherence and conceptual clarity, researchers agree that it is preferable to keep both approaches separate and use one or the other depending on the goal of the study (Dijkstra and Hanmer 2000, Dijkstra 2002, Klasen 2006, Schüler 2006, Beneria and Permanyer 2010, Permanyer 2011, 2013, Klasen and Schüler 2011, Bericat 2011). Indeed, the individual researchers' proposals reviewed in section 2 have only used the 'gender equality approach'. In sharp contrast, the majority of indices proposed by international institutions (*e.g.*: the GDI, GEM, GII and, as will be analyzed below, the GEI itself) conflate into a single measure an absolute achievement and a relative gender equality component, therefore muddying the waters and creating confusion on the meaning of the published results (Schüler 2006, Permanyer 2013).

Outcomes vs. Opportunities

The circumstances in which women and men are raised and educated are quite different from one another. Even if several efforts have been made to level the playing field in many regions of the world, women still face more difficulties than men in securing a profitable job or in pulling the levers of power. For this reason, it has been argued that one should focus the attention on the distribution of opportunities rather than on the distribution of outcomes. According to this perspective, what matters is not whether women and men get the same jobs or salaries but whether they regard the outcomes as fair because they have the same opportunities or face the same constraints when they

have to make a relevant choice. Important as it is, one could argue that the equality of opportunities approach would be more suitable to construct a measure of gender *equity* rather than gender equality (Endnote#3). So far, all existing indices–including the GEI–have focused on the distribution of outcomes.

Agency vs. Well-Being

Another debate that has permeated the construction of gender equality indices is whether they should focus on the factors that contribute to enhance human agency (*i.e.*: individual's ability to act on behalf of goals that matter to them; see Sen 1999) or on human well-being. While some of the indices proposed so far have tended to favor the well-being approach (this is the case of the GDI, RSW, AGSI or GGI) and others have given more emphasis to individuals' agency (for instance, the GEM, EUGEI and EGEI), one might argue that all indices partially support both approaches at the same time because these are not mutually exclusive (for instance: education can empower individuals while simultaneously being a dimension of well-being). As shown in section 4.1, the GEI has many indicators that support both the agency and well-being approaches, without clearly favoring any of the two.

Geographical Scope

The pioneering UNDP indices were very useful to make a broad brush assessment of global gender-related disparities. However, the use of the same set of indicators across the world does inevitably question their meaning and validity: are those indicators equally relevant and meaningful in all world regions and countries? As shown in Permanyer (2011), the GDI variables might be appropriate to capture gender inequalities for low and middle-income countries, but they are nowadays not very useful for most European countries where most gender gaps have either vanished or are measured on shaky grounds. This suggests that, for certain purposes, it might be more meaningful to define region-specific measures at the European level only, an issue that has already been attempted in other recent papers (*e.g.*: Plantenga et al. 2009; Bericat 2011). In this respect, the GEI is an index that has been specifically crafted to suit the context of the European Union, so it is better equipped to capture gender disparities in Europe than other global-scale indices like the GDI, GEM, GII or GGI.

4. Methodological issues in the measurement of gender inequality

After clarifying the overarching concept one wants to measure, there are still a number of methodological decisions that must be taken for the construction of a composite index of gender equality. In particular, one has to decide how to measure gender gaps in each indicator before aggregating across dimensions, a crucial decision that will determine not only the overall levels of gender equality but also their substantive *meaning*. The choice of the specific measure has to be guided by way in which the notion of 'gender in/equality' has been conceptualized (see section 3). We will briefly

discuss some of the issues involved in the construction of such basic metric (Endnote#4).

Direction of inequality

When measuring gender disparities for a given indicator, one might be interested in capturing the extent to which the achievements of women and men are different *irrespective of whether these differences favor one sex or the other*: this is the so-called 'non-directional approach'. In this approach, what matters is the extent of dissimilarity between both outcomes, but not their relative position (*i.e.*: whether gender gaps go in one direction or another is not meaningful). Alternatively, in the 'directional approach' one wants to know not only whether disparities exist between women and men but also whether such disparities benefit the former or the latter. If we denote by x and y the average achievement levels of women and men, simple examples of directional gender gaps could be $x - y$ or x/y (*i.e.*: differences or ratios). The non-directional counterparts of those gaps would be $|x - y|$ and $\min\{x,y\}/\max\{x,y\}$ respectively. An inconvenient of non-directional gender gaps is that it is not possibly to identify if one sex is systematically discriminated against (*i.e.*: if all inequalities go in the same direction). Alternatively, the problem with the directional approach is that gender gaps running in opposite directions might eventually cancel out each other giving a false impression of gender equality (see Klasen 2006 and Permanyer 2010 for extensive discussions on this problem). While there does not seem to be a consensus on whether one approach is indisputably better than the other, the directional approach has been adopted more often than the non-directional one (the former has been used in AGSI, GGI, EGEI, RSW and its improved versions suggested by Beneria and Permanyer 2010 and Klasen and Schüler 2011, while the latter has been used in Plantenga et al's EUGEI). Before being 'corrected', the gender gaps used in the GEI are non-directional (see equation (A3) in the appendix). As a consequence, the values of GEI are not informative on the relative position of women vis-à-vis men. Interestingly, the directional/non-directional dichotomy is not exhaustive: as shown below, some well-known gender-related indices have followed a completely different approach.

Inequality sensitive welfare indices

The GDI is not defined as a measure of gender inequality *per se*, but rather as a measure of overall well-being that penalizes the existence of disparities between the achievements of women and men (Dijkstra and Hanmer 2000). In this respect, the GDI does not measure gender gaps for each indicator explicitly, but uses an overall achievement function that is corrected downwards when the achievements between women and men differ (in technical terms, such function is also known as an '*inequality sensitive welfare index*', see equation (A7) in the appendix). As documented by Schüler (2006), this has generated widespread confusion because many users wrongly identify the GDI with a measure of gender inequality that simply averages gender gaps across dimensions. Despite the widely documented criticism against the use of inequality

sensitive welfare indices as gender inequality measures, the UNDP successor of the GDI–the new GII–goes quite in the same direction. In this occasion, the values of the GII are conceptualized as the welfare loss that can be attributed to the different achievement levels of women and men, but the gender gaps are not being measured explicitly. For this reason, and since its methodology is particularly (and unnecessarily) complicated (Permanyer 2013), the GII risks being as misinterpreted as its predecessor. One of the adverse consequences of using inequality sensitive welfare indices rather than simple gender gaps is that both the GDI and GII are very highly correlated with macro-economic performance indicators like the GDP per capita (Dijkstra and Hanmer 2000, Permanyer 2013).

Interestingly, the EIGE team has made an effort to start from scratch and it has proposed a related–yet apparently different–approach to measure gender equality. As shown in the next subsection, rather than correcting overall achievement (*i.e.*: welfare) by existing disparities between women and men (as the GDI does), the GEI goes the other way around correcting the gender gaps depending on the corresponding overall achievement levels.

4.1. How is gender equality measured in the GEI?

The GEI is a hierarchically structured index composed of six core domains, each further sub-divided into two sub-domains (giving a total of 12 sub-domains). The domains (and corresponding sub-domains between parentheses) are: 'Work' ('Participation', 'Segregation and Quality of Work'), 'Money' ('Financial Resources', 'Economic Situation'), 'Knowledge' ('Educational Attainment and Segregation', 'Lifelong Learning'), 'Time' ('Care Activities', 'Social Activities'), 'Power' ('Political', 'Economic') and 'Health' ('Status', 'Access'). In addition, each sub-domain consists of several individual indicators that are disaggregated by sex. Overall, there are 27 individual indicators across all sub-domains (all details of the architecture of the index can be found in EIGE's webpage: http://eige.europa.eu/). For each individual indicator, the GEI constructs the so-called 'gender gaps corrected by levels of achievement' (from now onwards referred to as 'corrected gender gaps'). Now, what is the nature of this correction? And more importantly: what are its implications? According to the GEI technical report (see EIGE 2013), for each individual indicator the corrected gender gaps are defined as

$$\Gamma = 1+99\cdot[\alpha\cdot(1-g)], \qquad (1)$$

where α is the so-called 'correcting coefficient' and g is the gender gap between women and men in the corresponding indicator. The values of the gender gap g are bounded between 0 and 1. In case of perfect gender equality (*i.e.*: when women and men perform equally), g takes a value of 0 and in case of extreme inequality (*i.e.*: when the achievements of women and men are at opposite extremes of the distribution), g takes a value of 1. The correcting coefficient is a normalized average of the achievements of women *and* men in that specific indicator. It takes values between 0 and 1 and penalizes

those countries with low overall achievement in the corresponding indicator–technical details are given in the appendix. Smaller values of α are conducive to higher penalizations and vice versa (whenever α equals 1 there is no penalization whatsoever). By construction, the values of Γ are bounded between 1 and 100 and the latter can only be attained when women and men perform equally well *at the top of the corresponding distribution*. Essentially, the GEI is an average of the different corrected gender gaps that are defined for each of the 27 individual indicators composing the index.

An analytical result

As shown in the appendix, it is straightforward to prove that the corrected gender gaps presented in equation (1) can be exactly rewritten as

$$\Gamma(x, y)=1+c\cdot\min\{x, y\} \qquad (2)$$

where x and y are the female and male achievement levels in the corresponding indicator, $\min\{x, y\}$ is the minimum between x and y and c is a normalization constant that bounds the values of Γ between 1 and 100. According to the welfare economics literature, equation (2) is an example of an inequality sensitive welfare index known as the 'Rawlsian social welfare function' (see, for instance, Sen and Foster 1997). Such function ranks social states on the basis of the achievement of the least well-off member in a given society (where women and men are treated as a uniform group). As is known, social welfare analysis takes into consideration the total *amount* of a certain good (that is the achievement part) as well as its degree of inequality. Therefore, the ranking of alternative distributions on social welfare grounds is completely different to ranking alternative distributions on inequality grounds. To clarify, consider the hypothetical case in which the achievement of women and men in a given indicator (bounded between 0 and 100) is equal to 40 (that is: $(x_1, y_1) = (40, 40)$, a case of perfect gender equality). Imagine now that after a certain period of time, the achievement of men increases dramatically while the achievement of women remains constant, so that $(x_2, y_2) = (40, 100)$. Interestingly, $\Gamma(40, 40) = \Gamma(40, 100)$, that is: the corrected gender gap Γ is completely insensitive to the dramatic enlargement of the gender gap because such deterioration in equality is compensated by increases in overall achievement (40=(40+40)/2 vs. 70=(40+100)/2).

Ironically, equations (1) and (2) show that correcting gender gaps by overall achievement as done by the GEI or correcting overall achievement by the gender gaps as done by the GDI end up being the same in analytical terms: in both cases an inequality sensitive welfare index is used as a measuring rod to capture gender disparities. Yet, it is not entirely clear whether the potential users of the GEI who want to have an idea of the gender inequality levels prevailing in the EU would agree with this way of measuring gender disparities.

5. Results

5.1. Disentangling the contribution of the 'equality' and 'achievement' components

As can be seen in equation (1), the corrected gender gaps have two separate ingredients: gender inequality (as measured by g) and overall achievement of women and men (as measured by α). We are now going to present a very simple procedure to estimate the contribution of these two components to the values of the corrected gender gaps Γ. Since g is a measure of gender *inequality* bounded between 0 and 1, $1 - g$ is a measure of gender *equality*. Defining $e = 1 - g$, the corrected gender gaps shown in equation (1) can be rewritten as $\Gamma = 1+99 \cdot \alpha \cdot e$, which, in turn, can be reasonably rescaled and approximated as $\Gamma/100 \cong \alpha \cdot e$. In this form, it is clear that the corrected gender gaps used in the construction of the GEI are composed of an equality component (measured with the equality index 'e') and an achievement one (captured with the correction function α). Taking natural logs in the previous expression, one obtains the additive decomposition: $\ln(\Gamma/100) \cong \ln(\alpha) + \ln(e)$. Therefore, the percent contribution of the correction coefficient to the corrected gender gap can be approximated as $C_\alpha = 100 \cdot \ln(\alpha)/\ln(\Gamma/100)$. Analogously, the contribution of the equality component is approximated as $C_e = 100 \cdot \ln(e)/\ln(\Gamma/100)$. By construction, both contributions add up to 100%. The contribution of the achievement and gender equality components to the corrected gender gaps are therefore given by (C_α, C_e).

In Table 1, we show the contribution of the gender equality component to the corrected gender gaps (C_e) for all indicators and countries included in the GEI (Endnote#5). As is clear, there is a big heterogeneity across indicators and countries. At one extreme, the gender equality component contributes as much as 80% (on average across countries) to the corrected gender gap associated to the 'Domestic Activities' indicator (labeled as I15 in Table 1). At the other extreme, that contribution barely reaches the 7% (on average across countries) for the 'Mean equivalised net income' indicator (labeled as I8 in Table 1). Despite such heterogeneity, it is remarkable that in most country-indicator cases shown in Table 1 (in 72.2% of the cells to be precise) the percent contribution of the gender equality component (e) to the corresponding corrected gender gaps (Γ) is below the threshold of 50%. Roughly speaking this means that when constructing the GEI's corrected gender gaps, in three out of four cases the contribution of the correction component is larger than the contribution of the gender equality one. Indeed, if one averages the values of C_e across all indicators and countries included in the dataset (Endnote#6), one obtains a surprisingly low value of 31.6%. These quite remarkable results prove that the GEI's correction coefficients α are not minor adjustments introduced to eventually correct small inadequacies or irregularities of the raw data, but a major and crucial factor that largely contributes to shape the final values reported in the GEI and which will eventually guide gender related policies and analysis.

[[[Table 1 around here]]]

5.2. Un-correcting the corrected gender gaps

If we are interested in capturing gender equality *per se* it is necessary to introduce another gender gap that is not contaminated by the achievement component–as is the case with Γ. A simple way of creating such a gender equality measure (while keeping all else equal) consists in un-correcting the corrected gender gaps. For this purpose, one can simply get rid of the correction coefficient of Γ and define $\Gamma^* = 1+99 \cdot e$, which is an index that takes the maximal value of 100 whenever women and men attain the same level irrespective of what this level is. An immediate consequence of suppressing the correction coefficient is that for many indicators, the distribution of the Γ^* across countries is much less disperse and more concentrated at the top of the distribution. Figure 1 clearly illustrates this point for the indicator 'Mean monthly earnings': while the corrected gender gaps range between 20 and 100, the un-corrected ones just range between 80 and 100 (analogous figures arise when considering many other indicators included in the construction of the GEI). This noticeable loss of variability (which is reminiscent of the problem identified in Permanyer (2011) regarding the lack of variability of the indicators included in UNDP's GDI for Europe) might be one of the reasons that have motivated the introduction of a correction factor in the definition of the GEI.

[[[Figure 1 around here]]]

Taking the un-corrected gender gaps (Γ^*) rather than the corrected ones as the basic building blocks, one can use exactly the same averaging methodology across indicators, sub-domains and domains to construct a new version of the Gender Equality Index, which will be denoted as GEI* to distinguish it from the official GEI. Unlike GEI, GEI* takes the normatively desirable value of 100 whenever there are no gaps between women and men across the different indicators. While the values of GEI are an average of 27 corrected gender gaps (which are a mixture between overall achievement and gender equality), the values of GEI* are simply an average of 27 gender gaps. The values of GEI and GEI* differ considerably across countries (see Table 2). As expected, the values of GEI* are substantially larger than those of GEI: the EU-27 average for the values of GEI equals 54 while for GEI* that average equals 75.3. Since the potential maximum of those indices equals 100, EIGE (2013) concluded that the EU-27 was 'halfway towards gender equality' according to the values of the GEI in 2010. Using the new GEI* the message is clearly more optimistic: according to its values, the EU-27 would have already covered three quarters of its way towards complete gender equality.

The association between GEI and GEI* is moderately strong: the rank correlation coefficient equals 0.74 and Kendall's tau coefficient of association equals 0.55 (Endnote#7). Overall this means that, even their absolute levels are quite different, both indices tend to rank countries in a relatively consistent way, although there are quite a lot of exceptions. In Table 2, we can see not only the rankings of the EU-27 member states according to the values of those indices but also the changes in ranking positions that takes place when we move from the values of GEI to those of GEI*. As can be seen,

some countries loose more than five ranking positions: Ireland (-6), Cyprus (-8), Austria (-8) and, most notably, Luxembourg (-14). On the opposite side, other countries advance more than five positions: Portugal (+6), Slovakia (+6), Latvia (+7), Lithuania (+7) and, most notably, Bulgaria (+13). Given the fact that there are only 27 units of analysis, the changes experienced by those countries are quite substantial. In between, countries like Sweden, Finland, Denmark and the Netherlands do not suffer much alterations and consistently remain in the top four positions according to the values of both the GEI and GEI*. The good performance of these countries in both measures is explained by the fact that the corresponding achievements of women and men are not only very similar but also very near the top of the different indicators' distributions.

[[[Table 2 around here]]]

The fact that countries like Luxembourg or Austria deteriorate their relative position when shifting from GEI to GEI* while countries like Bulgaria, Latvia and Lithuania greatly improve their positions does suggest that countries' performance on those indicators might be linked to their economic wealth. In order to investigate this issue in more detail, Figure 2 plots the levels of countries' GDP per capita (in Purchasing Power Standard–PPS) jointly with the corresponding shift in ranking positions when moving from GEI to GEI*. A clear negative relationship is observed (the correlation coefficient equals –0.73 and is statistically significant), therefore indicating that wealthy countries tend to occupy lower (*i.e.*: better) positions with GEI and lower income countries tend to occupy better positions with GEI*. This stylized result does not change when Luxembourg (a strong outlier that because of its atypical characteristics might bias the results) is eliminated from the sample. Given the strong influence that the correction coefficient α (a measure of aggregate achievement that is expected to be positively correlated with the GDP) has in shaping the values of the GEI, these results are not very surprising. Again, they confirm the previous findings that lower income countries are penalized by the GEI for their poor performance in aggregate achievement; a factor that, *a priori*, is not related to gender-related norms or discriminatory practices.

[[[Figure 2 around here]]]

In this context, it is also interesting to complement the previous analysis exploring the relationship between gender inequality measures and a relevant macro-economic variable like the GDP per capita. This way, one is able to ascertain the extent to which economic performance is associated with higher gender equality levels or not–a matter of great concern among social scientists interested in development, economic growth and well-being (see, for instance, Berik et al. 2009). As shown in Figure 3 (right panel), the relationship between the values of GDP per capita (in PPS) and the official GEI is moderately strong: richer member states tend to have higher levels of gender equality as measured by that index. The correlation coefficient between them equals 0.48 and it

increases up to 0.75 if Luxembourg (*the* big outlier in the distribution) is dropped from the list of admissible observations. On the other hand, the association between GDP per capita and the new GEI* is not particularly strong (see left panel in Figure 3). The correlation coefficient equals 0.03 for the whole sample and increases up to 0.4 when Luxembourg is not taken into account. As expected, the wealth of a country is a worse predictor of the levels of gender equality if we shift from the official GEI to the GEI* proposed in this paper. Therefore, the GEI* is more successful in capturing new information not encapsulated in the strictly economic dimension. These results are in line with the findings of Dijkstra and Hanmer (2000) and Permanyer (2013) showing analogous results for the cases of the GDI and GII respectively.

[[[Figure 3 around here]]]

So far, we have only explored changes between countries when shifting from GEI to GEI*. However, it is also illuminating to investigate the assessments of gender equality provided by those different indices *within* each country. If the policy-makers of a given country guided the elaboration of gender-related policies on the basis of those indices, what picture would emerge if we shifted from the values of GEI to those of GEI*? Stated in more precise terms: if the size of gender gaps were used to rank indicators within countries to decide what area of policy intervention should receive priority attention from the government, would the results provided by Γ and Γ^* be consistent or not? To answer this question, Table 2 reports the values of Kendall's tau coefficient of association between the corrected and un-corrected gender gaps for all indicators within each of the 27 EU member states (Endnote#8). When that coefficient is close to its maximal value of one, the two indicators rankings derived from the values of Γ and Γ^* are highly consistent. When it approaches zero, there is no association and the two rankings look as if they were generated independently. As can be seen in Table 2, the values of Kendall's tau range from a minimum of 0.35 observed in Bulgaria to a maximum of 0.7 observed in Slovenia, with an EU-27 average of 0.56. Therefore, the country-level pictures that emerge when shifting from corrected to un-corrected gender gaps change to a sizeable extent, so the policy interventions that would be derived from the values of those indices would not be particularly consistent as they would prioritize alternative areas of intervention.

6. Discussion and concluding remarks

On June 2013, the EIGE presented the new GEI to assess gender equality levels across the 27 member states of the European Union. Being an index specifically crafted for the EU context, it is much better equipped to capture gender disparities in Europe than other global-scale gender indices like the GDI, GEM, GII or GGI. In order to make sure that the normatively desirable values of the index are only attainable whenever women and men perform equally well at the top of the corresponding distribution, its designers have introduced the so-called 'correction coefficient': a component that penalizes those countries with low overall (*i.e.*: population level) achievement levels. Because of the

way in which it has been designed, the GEI trades off gender equality by overall achievement, so it considers that a highly gender-unequal society where overall achievement is relatively high has the same level of gender inequality than another society where women and men perform equally but at a lower aggregate achievement level than in the former society. While perfectly defensible from a normative point of view in case one wanted to construct a gender-inequality sensitive overall welfare measure (something which has not been mentioned anywhere in the EIGE reports), we contend that this interpretation and operationalization of gender inequality might create some misunderstandings among potential users of the index–quite in the same way as it has already happened with UNDP's GDI during the last twenty years (Schüler 2006).

In this paper we have investigated in detail the ways in which the new GEI measures gender equality. In particular, we have quantified the contribution of the correction coefficient (*i.e.*: the achievement component) to the values of the index. As demonstrated in our analysis, the values of the new Gender Equality Index are largely driven by the achievement component rather than the egalitarian one. Stated otherwise: the GEI values are basically determined by differences *between* countries in average achievement levels of women *and* men rather than by gender differences *within* them, a result that is somewhat disturbing for an index of gender equality. In light of these results–and mimicking the name of UNDP's GDI–it might be tempting to rename EIGE's measure as the 'Gender-related Achievement Index'. We contend that the inclusion of an achievement component to an equality index does muddy the waters creating confusion when interpreting the true meaning of its values. Among other things, the mixing of achievement and equality components in a single index makes comparisons over time particularly difficult. Whenever a corrected gender gap changes over time, one does not know if such change has been driven by improvements (or deteriorations) in the gap between women and men, by changes in overall achievement or by changes in both of them.

When designing large scale gender-related indices like the GEI, GDI, GEM or GII, international institutions like EIGE or UNDP seem reluctant to generate indices of gender inequality *in itself*, that is: indices that measure equality between women and men irrespective of the level where such equality has been achieved. Arguably, this might be guided by political correctness and respond to the desire of preventing some countries where the status of women is very low to show up in a privileged position of the final ranking. However, in such countries the status of men might be quite poor as well (*i.e.*: the corresponding gender gaps might not be so large after all), so it is not entirely obvious that they should be expelled altogether from the better positions of a ranking that aims to order countries in terms of gender equality levels. As discussed elsewhere (*e.g.*: Dijkstra and Hanmer 2000, Benería and Permanyer 2010), it is necessary to complement information on equality with other achievement and contextual indicators to clarify whether equality is achieved at the top or at the bottom of the distribution. In the context of economic inequality measurement, income inequality indices are published for every country no matter if equality is achieved at

any of the extremes of the distribution. If everyone takes the values of the Gini index (or any other inequality measure) at face value, why should one follow a different approach in the case of gender inequality measurement? In other words: why should countries be penalized for insufficient achievement, a factor that *a priori* is not related to gender-related norms or discriminatory practices? Echoing a recent reflection of William Easterly on the unfair treatment to Africa in the international assessments of welfare improvements (Easterly 2009, 2010), one is left pondering whether the proposed 'corrections' to the gender gaps might be geared to provide a more 'logical' or 'expected' ordering of European countries that is in accordance with conventional wisdom. In this respect, the fact that none of the indices proposed by individual researchers so far have attempted to 'correct' their assessments of gender equality by overall achievements suggests that they might not be as constrained by political correctness as some international institutions might be.

In order to capture gender equality levels in Europe more accurately, we suggest un-correcting the corrected gender gaps and construct a new version of the Gender Equality Index–denoted as GEI*–on the basis of that information alone (that is: removing the achievement component from the basic metric of the index). When comparing the values of the official GEI with the new GEI* proposed in this paper, important differences arise. Since economic performance indicators like the GDP per capita naturally tend to be positively correlated with the achievement component of the GEI, it is not surprising to find that lower income countries tend to rank in better positions when shifting from the official index to the new one and vice versa. At the country level, it turns out that the corrected and un-corrected gender gaps are quite different across indicators. If the size of those gaps were used to rank indicators within countries to decide what area of policy intervention should receive priority attention from the government, the assessment provided by both indices would be quite inconsistent. In order to avoid mis-targeting the most urgent areas of policy intervention, it is essential to pursue the debate further, take a firmer stance and decide consensually what is the most appropriate way of measuring gender equality.

As shown in this paper, the values of GEI* are much larger than those of GEI (the EU-27 average for the former equals 75.3 and for the later 54). Essentially, this is caused by the surprisingly small size of the uncorrected gender gaps vis-à-vis their corrected counterparts–an issue that is reminiscent of the lack of variability of the indicators included in UNDP's GDI for Europe identified in Permanyer (2011). Rather than being 'halfway towards equality' (as announced in the EIGE 2013 report), the values of GEI* suggest that the EU has already covered three quarters of its way towards complete gender equality–a much more optimistic message. While more optimistic messages are likely to be less telling and less efficient than the existing one in order to raise public awareness about gender differences–which is arguably one of the goals pursued with the construction of GEI–the values of the new GEI* have the advantage of being much more transparent and easy to understand, so they might be in a better position to guide and

inform successful policies aiming at reducing real disparities between women and men in Europe.

Appendix.

Functional form of the corrected gender gaps.

In the EIGE (2013) report the corrected gender gaps are defined as

$$\Gamma = 1 + \left[\alpha \cdot (1 - g)\right] \cdot 99 \qquad (A1)$$

We are now going to show step by step how this formula can be rewritten as the function shown in equation (2). Assume that, for a given indicator, the average achievements of women and men are denoted as x and y respectively.

Step 1. According to the EIGE (2013) report, the gender gap g is explicitly defined as

$$g(x, y) = \left| \frac{x}{\left((x + y)/2\right)} - 1 \right| \qquad (A2)$$

Step 2. After basic algebraic manipulations, this can be rewritten as

$$g(x, y) = \frac{|y - x|}{y + x} \qquad (A3)$$

Step 3. It is straightforward to show that

$$1 - g(x, y) = \begin{cases} \dfrac{2x}{y + x} & \text{if} \quad y > x \\ \dfrac{2y}{y + x} & \text{if} \quad x > y \end{cases} = 2\frac{\min\{x, y\}}{y + x} \qquad (A4)$$

Step 4. According to the EIGE (2013) report, the correction coefficient α is explicitly defined as

$$\alpha = \frac{\left(\dfrac{x + y}{2}\right)}{M} \qquad (A5)$$

where M is the maximum observed value of the average $(x + y)/2$ across countries. This way, α is bounded between 0 and 1.

Step 5. Plugging equations (A4) and (A5) into (A1) and manipulating algebraically, one obtains the desired formula:

$$\Gamma(x,y) = 1 + \frac{\min\{x,y\}}{M} = 1 + c \cdot \min\{x,y\} \qquad (A6)$$

where c is the normalization constant that bounds the values of Γ between 1 and 100.

Essentially, this functional form is a particular member of the class of indices used in the construction of UNDP's GDI. In that context, Anand and Sen (1995) introduced the following inequality-sensitive welfare index:

$$W(x,y) = \left(p_f x^{1-\varepsilon} + p_m y^{1-\varepsilon}\right)^{1/(1-\varepsilon)} \qquad (A7)$$

where p_f and p_m represent the share of women and men in the population under consideration and $\varepsilon \geq 0$ is a parameter representing the degree of 'aversion to inequality' (see Atkinson 1970). For any $\varepsilon > 0$, $W(x,y)$ is an average of x and y that is smaller than the classic arithmetic mean $p_f x + p_m y$ (the larger the value of ε the larger the difference between the two). When ε increases indefinitely, $W(x,y)$ converges towards the minimum between x and y. Therefore, $\Gamma(x,y)$ can be seen as a member of the class of inequality sensitive welfare indices $W(x,y)$ in the limiting case where $\varepsilon \to \infty$.

Endnotes

1. Given their complementarity, the terms 'gender equality index' and 'gender inequality index' will be used interchangeably in the text when no confusion arises.

2. Since the terms 'gender equality' and 'gender inequality' are natural complements to one another (if there is no 'equality' then there is 'inequality' and vice-versa), they will be used indistinctly throughout the text.

3. According to McDonald (2013): "Gender equity is a more subtle and therefore more problematic concept because it allows for different outcomes for men and women, so long as men and women regard the outcomes as fair or at least not grossly unfair and so long as there is equality of opportunity rather than equality of outcome. Thus gender equity is about perceptions of fairness and opportunity rather than strict equality of outcome."

4. The technical discussion presented in this section is by no means exhaustive; it only deals with certain aspects that are pertinent for our analysis of the GEI. A more comprehensive analysis of the technical issues surrounding the construction of composite indices of gender inequality can be found in Permanyer (2010), Bericat (2011) and Hawken and Munck (2013).

5. It should be pointed out that our definition of 'contribution to the corrected gender gaps' for the five variables counting the share of women and men in different political or economic institutions is ill-defined, so they have not been included in Table 1. For

those specific variables, the average achievement of women and men is (by definition) always equal to 50% because both achievements add up to 100% (e.g. 20% and 80%, or 10% and 90%, and so on). Since this happens for all countries, the correction coefficient is tautologically equal to 1 (see the appendix for the technical details on the definition of α), so it makes no sense to talk about the contribution of the achievement component to the corrected gender gaps (C_α).

6. This average does not include the five indicators counting the shares of women and men in different institutions for the reasons outlined in the previous endnote.

7. Both Spearman's rank correlation coefficient and Kendall's tau are standard measures of statistical association taking values between –1 and 1. The extreme values are taken in case of extreme positive or negative association, and in case there is no association they take a value of 0. Spearman's rank correlation coefficient assesses how well the relationship between two variables can be described using a monotonic function. Kendall's tau assesses the similarity of the rankings that are derived from the values of two different indicators.

8. By definition, Kendall's tau coefficient is the most appropriate way of assessing whether two different indicators rank alternative states of affairs in a consistent way. Nevertheless, reporting the values of the correlation coefficient or those of Spearman's rank correlation coefficient does not alter our results in a substantive way.

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Tables and Figures

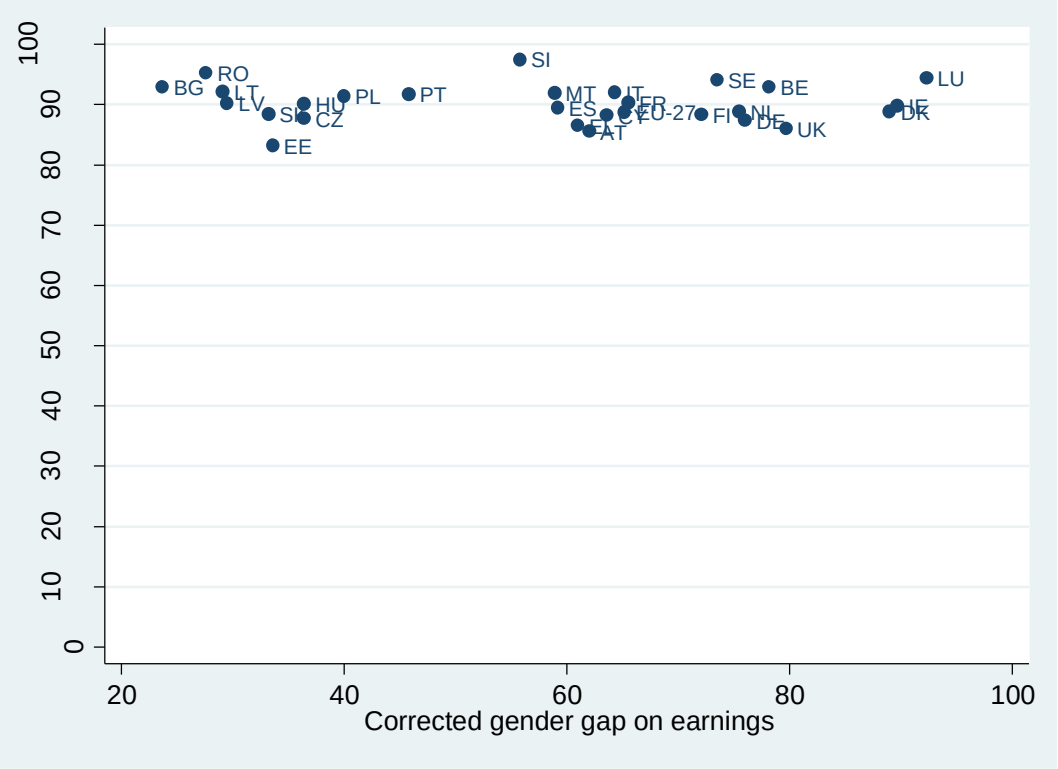

Figure 1. Scatterplot of the corrected gender gap on earnings (horizontal axis) and the un-corrected gender gap on earnings (vertical axis) for the 27 EU member states. Country labels follow the ISO3166 codes. Source: Author calculations using EIGE (2013) data.

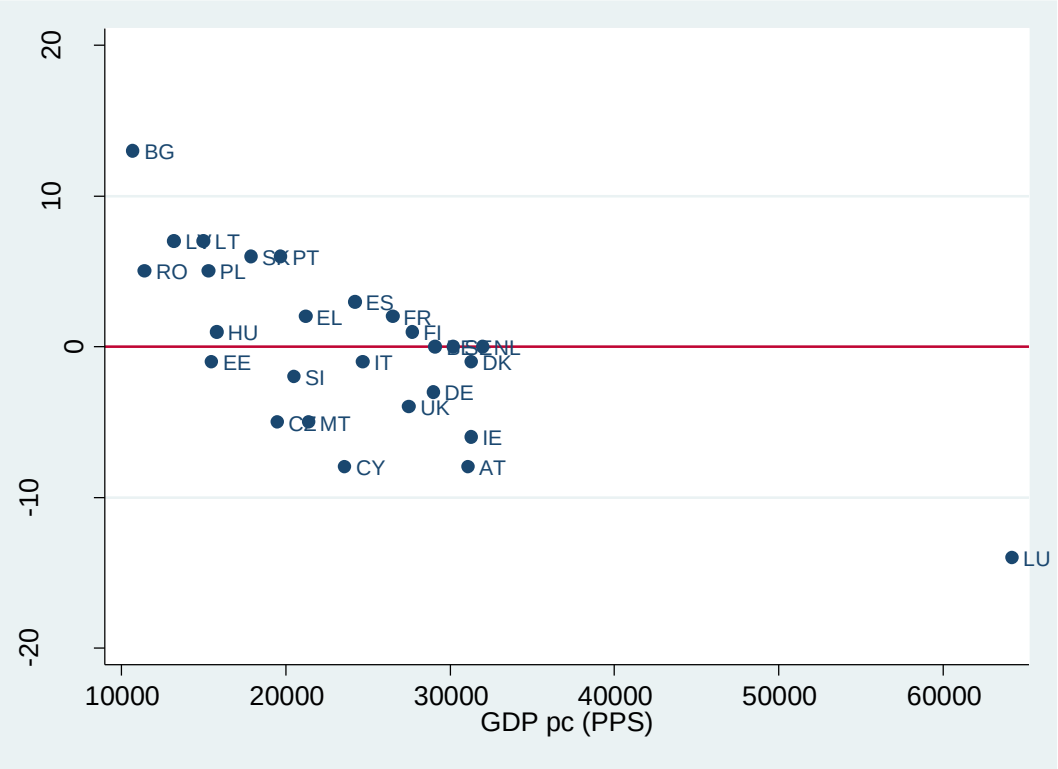

Figure 2. Scatterplot of GDP per capita (PPS) versus the GEI rank minus GEI* rank across the 27 EU member states. Country labels follow the ISO3166 codes. Author calculations using EIGE (2013) data.

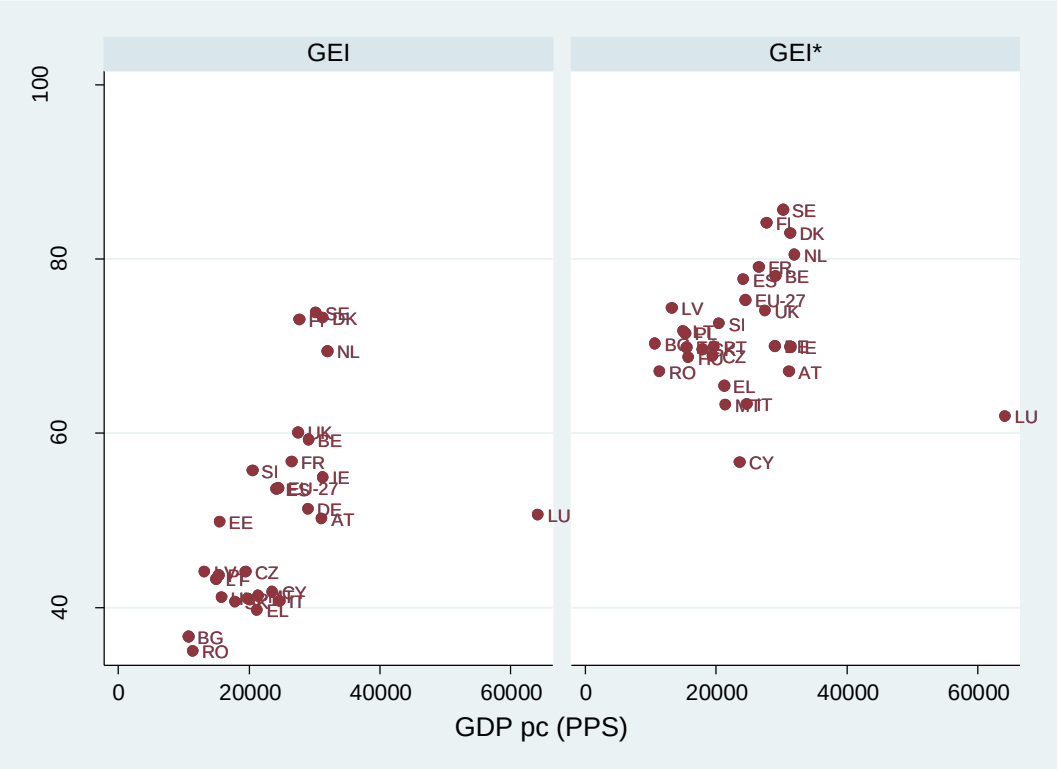

Figure 3. Scatterplot of GDP per capita (PPS) versus the GEI (left panel) and GEI* (right panel) across the 27 EU member states. Country labels follow the ISO3166 codes. Author calculations using EIGE (2013) data.

Country	GEI	GEI rkg	GEI*	GEI* rkg	Δ Rank	GDP pc (PPS)	Kendall tau
BE	59.6	6	78.0	6	0	29100	0.53
BG	37.0	26	70.3	13	13	10700	0.35
CZ	44.4	14	68.9	19	-5	19500	0.60
DK	73.6	2	82.9	3	-1	31300	0.54
DE	51.6	11	70.0	14	-3	29000	0.53
EE	50.0	16	69.9	17	-1	15500	0.60
IE	55.2	9	70.0	15	-6	31300	0.63
EL	40.0	25	65.5	23	2	21200	0.46
ES	54.0	10	77.7	7	3	24200	0.41
FR	57.1	7	79.1	5	2	26500	0.58
IT	40.9	23	63.4	24	-1	24700	0.63
CY	42.0	19	56.7	27	-8	23600	0.62
LV	44.4	15	74.3	8	7	13200	0.40
LT	43.6	18	71.7	11	7	15000	0.49
LU	50.7	12	61.9	26	-14	64200	0.64
HU	41.4	21	68.7	20	1	15800	0.52
MT	41.6	20	63.3	25	-5	21400	0.62
NL	69.7	4	80.6	4	0	32000	0.58
AT	50.4	13	67.1	21	-8	31100	0.61
PL	44.1	17	71.5	12	5	15300	0.46
PT	41.3	22	69.9	16	6	19700	0.49
RO	35.3	27	67.1	22	5	11400	0.36
SI	56.0	8	72.6	10	-2	20500	0.70
SK	40.9	24	69.7	18	6	17900	0.50
FI	73.4	3	84.2	2	1	27700	0.48
SE	74.3	1	85.6	1	0	30200	0.56
UK	60.4	5	74.1	9	-4	27500	0.67
EU-27	54.0	-	75.3	-	-	24500	0.56

Table 2. Values of GEI, GEI*, GDP per capita and other related indicators for the 27 EU member states. Country labels follow the ISO3166 codes. Authors calculations from EIGE (2013) data.

Country	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12	I13	I14	I15	I16	I17	I23	I24	I25	I26	I27
BE	52.9	27.9	83.5	14.3	17.9	32.5	29.6	5.0	10.9	0.0	46.4	88.6	1.7	71.7	78.8	22.4	3.8	20.0	57.0	8.5	14.3	6.9
BG	36.2	17.4	54.9	15.7	7.4	38.3	5.0	1.1	15.2	4.2	30.6	28.9	0.4	42.3	75.0	13.6	1.9	27.4	31.0	25.6	1.9	0.0
CZ	83.9	38.8	61.2	20.9	4.0	59.8	12.7	2.7	100	47.4	4.8	57.4	1.7	50.7	69.3	22.4	3.4	12.3	41.7	13.3	5.9	14.2
DK	72.0	70.2	100	26.4	3.6	100	100	3.3	1.8	15.5	33.8	100	100	60.1	84.5	12.1	7.9	13.8	41.2	4.8	0.0	29.7
DE	61.0	46.2	66.2	18.1	14.1	50.3	48.4	6.5	13.3	7.5	34.5	81.0	1.4	22.9	79.7	1.2	3.8	6.6	57.5	3.3	4.1	1.8
EE	37.3	7.9	65.5	20.7	31.2	22.6	16.5	2.5	6.5	11.1	79.5	58.9	9.9	83.7	89.9	24.0	9.1	9.4	45.1	13.4	5.3	4.6
IE	50.6	44.0	78.1	32.3	19.8	80.2	97.7	5.1	5.8	5.6	100	72.9	2.4	45.7	81.7	17.2	12.1	100	61.4	10.4	17.2	11.6
EL	54.8	42.2	50.0	19.0	3.0	32.9	21.3	2.7	6.1	0.0	2.1	46.6	0.0	57.3	80.6	4.3	6.4	24.2	55.6	14.2	15.0	4.9
ES	47.7	39.5	53.5	10.0	18.5	31.3	20.8	1.6	4.8	2.9	16.1	60.7	5.8	66.7	92.5	15.2	4.0	26.4	94.1	3.5	13.0	8.0
FR	44.2	26.1	70.0	22.1	8.7	33.3	23.8	5.4	17.9	0.0	18.9	54.4	2.4	51.5	72.6	16.3	14.8	14.8	84.9	8.9	5.4	0.7
IT	53.7	39.2	60.0	30.3	7.5	74.6	18.4	5.3	15.3	0.0	8.4	50.9	3.5	72.5	76.5	11.6	7.9	20.4	100	0.0	12.5	7.1
CY	100	56.6	43.1	15.4	12.8	33.8	27.3	6.3	22.5	12.5	63.3	52.9	2.1	76.4	81.3	24.5	8.1	23.5	73.8	6.6	8.9	8.3
LV	30.6	3.8	66.1	10.3	33.7	25.6	8.2	0.9	0.4	10.8	40.2	47.4	6.1	68.9	100	25.8	0.8	16.3	37.6	10.2	6.1	0.6
LT	21.2	3.1	65.6	10.0	16.1	37.1	6.5	1.3	5.6	13.2	48.5	47.4	1.4	48.8	82.6	19.4	3.4	15.4	40.1	18.5	16.7	12.9
LU	69.0	33.5	61.1	9.0	18.6	0.5	70.2	100	8.1	15.3	63.3	50.2	2.2	67.1	74.7	5.7	22.7	16.1	62.9	14.9	12.9	16.4
HU	39.5	18.4	61.7	15.1	7.2	35.6	10.1	0.9	0.0	100	12.7	40.2	1.4	66.5	71.9	4.0	23.2	14.9	35.5	8.5	5.2	12.2
MT	69.3	53.6	67.6	9.5	13.3	54.2	15.7	2.2	13.0	0.0	4.3	66.4	1.1	52.2	67.3	32.4	9.2	13.4	69.2	58.5	8.8	10.9
NL	65.6	72.8	85.5	18.9	26.4	93.6	41.6	5.2	37.5	16.9	31.6	76.0	3.5	100	78.8	1.5	100	31.7	59.1	5.3	0.0	17.5
AT	73.5	42.9	59.9	15.6	4.8	50.4	32.1	6.1	31.9	11.7	17.4	57.8	6.5	46.8	76.4	4.4	42.3	16.6	62.9	5.5	8.6	1.2
PL	57.0	26.0	61.7	16.4	4.3	44.7	9.7	0.9	3.0	5.0	24.3	49.4	3.8	44.4	74.5	16.0	0.0	14.2	43.4	16.0	5.5	5.7
PT	74.4	36.5	63.5	13.4	19.7	30.2	10.8	1.4	11.8	1.7	19.3	56.7	1.4	74.1	88.1	12.7	7.8	18.1	54.4	10.1	16.6	9.5
RO	59.2	27.3	47.5	6.5	0.3	4.3	3.7	0.4	2.8	0.0	0.0	23.6	0.0	63.7	75.8	17.4	8.0	31.2	32.2	0.0	15.1	9.1
SI	70.4	23.8	60.5	14.9	12.9	17.1	4.2	2.1	29.9	47.4	26.8	43.6	12.0	69.1	82.8	9.0	37.5	15.3	56.8	3.8	100	100
SK	61.1	30.0	66.2	16.6	4.2	46.0	10.9	2.1	8.3	23.9	9.8	66.0	2.8	58.5	71.0	1.9	19.7	21.9	37.1	0.9	2.9	4.8
FI	53.5	17.4	83.5	100	100	6.8	37.2	4.5	11.1	33.6	89.8	72.5	31.0	12.0	73.8	100	0.0	9.7	60.8	1.3	22.4	5.0
SE	76.2	100	95.6	27.4	5.9	18.3	19.4	5.4	27.1	0.0	57.7	90.0	45.9	13.1	83.7	13.2	33.8	42.5	71.8	100	11.3	0.7
UK	62.1	58.3	85.8	1.1	16.1	75.5	65.3	7.4	11.8	5.6	65.0	87.6	17.4	41.7	93.2	15.0	10.5	15.6	53.3	4.9	8.6	5.8
EU-27	**58.4**	**37.2**	**67.3**	**19.6**	**16**	**41.8**	**28.4**	**6.97**	**15.6**	**14.5**	**35.1**	**60.3**	**9.93**	**56.6**	**79.9**	**17.2**	**14.9**	**21.9**	**56.3**	**13.7**	**12.7**	**11.5**

Table 1. Percent contribution of the equality component to the corrected gender gaps as measured by C_e. The indicator labels are as follows: I1=Full-time equivalent employment, I2= Duration of working life, I3= Sectoral segregation, I4= Flexibility of working time, I5= Training at work, I6= Health and safety, I7= Earnings, I8= Income, I9= Poverty, I10= Income distribution, I11= Tertiary education, I12= Segregation, I13=Lifelong learning, I14=Childcare activities, I15=Domestic activities, I16=Sport, culture and leisure, I17= Volunteering and charitable activities, I23= Self-perceived health, I24= Life expectancy, I25= Healthy life years, I26= Unmet medical needs, I27= Unmet dental needs. Source: Authors' calculations using data from EIGE (2013).