



Main Challenges in Measuring Gender Inequality

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Abstract: The paper tracks the effort to standardize measurement of a gender inequality resulting in the creation of an innovative Gender Inequality Index (GII). The aim of this paper is to identify the shortcomings and limitations of the GII and to open the discussion about the necessity of including other important dimensions to the existing measure, especially the wage inequality between men and women. To detect wage discrimination, the authors try to implement the Gender pay gap indicator into the GII calculation.

Keywords: Human Development Report, Gender Inequality Index, Gender pay gap

1 Introduction

The European Union and international institutions use a variety of policy instruments contributing to greater equality and equal chances both sexes. To realise this policy, it's necessary to find out a full picture of the actual situation in terms of this issue. For this reason,

The United Nations under its Development Programme (UNDP) introduced an innovative new Gender Inequality Index (GII) in 2010 [1]. The GII is one of the three experimental indices¹ first officially introduced in the gender inequality across countries.

¹ The Inequality-adjusted Development Index (IHDI), the Multidimensional Human Poverty Index (MPI) and the Gender Inequality Index (GII) [1].

The main objective of the GII is to help governments and others understand the ramifications of gaps between women and men and to compare these gaps across the different countries which has been widely neglected for decades.

This paper tracks the effort to standardize measurement of gender inequality resulting in the creation of an innovative new Gender Inequality Index (GII). The aim is to identify the strengths and weaknesses of the GII and to open a discussion about the possible extension of this index to another pertinent dimension – the wage discrimination measured with the Gender pay gap indicator.

2 Creation of the GII

Since 1995, the UNDP have measured gender inequality by two indices – Gender-related Development Index (GDI) and Gender Empowerment Measure (GEM) [1]. The GDI is composed from following indicators: “Life expectancy”, “Educational attainment” and “Adjusted real income”. The GEM measurement consists from three indicators: “Female and male shares of parliamentary seats”, “Female and male shares of positions as legislators, managers and of professional and technical positions” and “Female and male estimated earned income”.

Both the GDI and the GEM are not the only indices that are used to detect gender inequality.² But data availability in a wide range of countries made these indices a popular and suitable source of information for the public debate about the gender equality issue. This kind of popularity and public discussion can be also a key to improving social, economic and political environment of many countries.

Both the GDI and the GEM, as constructed, don’t provide a complete and sufficient measure of women’s status. The criticism concerns especially the choice of variables [4]. Neglecting this debate, both indices have caused a raising interest and attention among academics and policy makers towards the gender issue.

2.1 New gender inequality measure

Due to the mentioned shortcomings in the GDI and the GEM measurement, several attempts to develop a new improved index have appeared. One of the alternative measures was named the Gender Inequality Index (GII) and it represents a major step towards monitoring gender inequality and reflecting various dimensions of women’s disadvantages in the society.

² For example, there exist (a) the Gender parity index (GPI) used by the UNESCO to measure females’ and males’ level of access to education at primary, secondary and tertiary school [2]; (b) the Gender Equity Index (GEI) computed by the Social Watch to classify countries and rank them according to indicators in three dimensions – education, economic participation and empowerment [3].

2.1.1 Gender Inequality Index

The GII shows the loss in human development resulting from inequality between men and women. This index has an ambition to provide a comprehensive view of a gender-related issues faced by each country. Thanks to the GII, we are able to compare the status of women cross-nationally with respect to the particular aspects in examined countries.

The GII is innovative in one essential point – it includes five indicators in three dimensions which means the broader perspective on the entire issue. These dimensions are reproductive health, empowerment and labour market. The GII ranges from 0, which indicates no inequality, to 1, which means absolute inequality in all measured dimensions [1].

The “Reproductive health” indicator as one of the GII main components measures a maternal mortality ratio and an adolescent fertility rates. First mentioned can relatively reliably detect health care that women receive during childbirth. Many women lose their lives due to an inadequate antenatal care and a prevention which involves a regular medical visit by pregnant women. The adolescent fertility rate measures the number of births to women aged from 15 to 19 years.

The high level of both indicators occurs especially in developing countries as implies the recent work of Reynolds; Wong and Tucker [5]. This study proves that poor access to information about family planning and about prevention of early motherhood cause the higher probability of parenthood among teenagers and greater risk of pregnancy complications.

Women’s representation in parliament described in the “Indicator of agency” [1] is the result of inadequate women’s educational achievements and of the electoral systems, which enhance the ability of men in their access to political leadership. The perception of female political candidates has slowly changed in Scandinavian countries [6] having an almost gender-equal parliament. The Scandinavian approach is based on the belief that women’s participation at some level of politics will positively affect future political activity of other women.

Female parliamentary representation is closely associated with their educational attainment and vice versa. This is the reason why the second GII subindicator reflects differences between men and women in educational attainment. The increase in female educational attainment resulted in increased opportunities for women at the labour market, in improving the long-term socioeconomic well-being of women and in a higher participation in public life.

The third subindicator of the GII is the “Labour force participation” which measures female involvement in paid work.³ Generally accepted idea is that the increase in female labour force participation goes along with the improvement of the female socioeconomic status and enhancement of their economic or financial independence.

³ The labour force is economically active population – either employed or unemployed (but actively seeking work and currently available for work), labour force classification from [7].

The GII value is calculated according to the formula presented in the Human Development Report's technical notes [1]. To identify the GII, we must accomplish following steps⁴. First, create aggregation across certain dimensions for women and men separately, using geometric mean:

$$G_F = \sqrt[3]{\left(\frac{1}{MMR} \times \frac{1}{AFR}\right)^{\frac{1}{2}} \times \left(\frac{PR_F}{100} \times \frac{SE_F}{100}\right)^{\frac{1}{2}} \times \frac{LFPR_F}{100}} \quad (1)$$

$$G_M = \sqrt[3]{1 \times \left(\frac{PR_M}{100} \times \frac{SE_M}{100}\right)^{\frac{1}{2}} \times \frac{LFPR_M}{100}} \quad (2)$$

MMR=Maternal mortality ratio
 AFR=Adolescent fertility rate
 PR=Share of parliamentary seats
 SE=Attainment at secondary and higher education
 LFPR=Labour force participation rate
 M=Male
 F=Female

Human Development Report's technical notes [1] explain that using the harmonic mean of geometric means within groups captures the inequality between women and men and adjusts for association between dimensions:

$$HARM(G_F, G_M) = \left(\frac{(G_F)^{-1} + (G_M)^{-1}}{2}\right)^{-1} \quad (3)$$

Final step consists in calculation of the geometric mean of the arithmetic means of each dimension:

$$G_{\bar{F}, \bar{M}} = \sqrt[3]{\overline{Health} \times \overline{Empowerment} \times \overline{Labour\ market}} \quad (4)$$

Where:

$$\overline{Health} = \frac{\sqrt{\frac{1}{MMR} \times \frac{1}{AFR}} + 1}{2} \quad (5)$$

⁴ The GII is computed using association-sensitive inequality measure which is based on the general mean of general means of different orders [1].

$$\overline{\text{Empowerment}} = \frac{\sqrt{\frac{PR_F}{100} \times \frac{SE_F}{100}} + \sqrt{\frac{PR_M}{100} \times \frac{SE_M}{100}}}{2} \quad (6)$$

$$\overline{\text{Labour market}} = \frac{\frac{LFPR_F}{100} + \frac{LFPR_M}{100}}{2} \quad (7)$$

In the last step, the division of (3) and (4) is needed. As a result, we obtain formula (8) that is used to determine the degree of gender inequality.

$$GII = 1 - \frac{HARM_{(G_F, G_M)}}{G_{F, M}} \quad (8)$$

2.1.2 Criticism⁵

The new composite GII index was the one of the main achievements on the way to search for an appropriate approach to capture the true gender inequality. The relationship between a gender equality and a development has been supported in several studies [8].

There are still significant conditions lying outside general interest. The most neglected aspects are related to labour force participation. First, the GII doesn't contain the information about wage differences. Differences in wages between men and women are important because of a large number of people who are affected [9]. The gender pay gap varies considerably across countries not only in the Europe. Although part of this gap can be explained by the differences in education, age, skills and experience, some persistent differences can't be explained by objective reasons. Part of the wage gap remains unexplained and potentially related to discrimination and Glass Ceiling phenomenon⁶.

Second, there should be mentioned a measure of the degree of occupational segregation by gender in the labour market. This is significantly important in light of the fact that the male occupations tend to be paid more with a variety of different benefits too. At the same time, occupations for women are strongly consistent with gender roles and stereotypes [10].

Gender stereotypes are also an obstacle to the participation of women in the labour market which is interlinked with material satisfaction of women. Housework, childcare and care of elderly relatives represent women's unpaid work – indispensable financial

⁵ Detailed analysis can be found in Szabová (Bartůsková) [18].

⁶ The Glass Ceiling describes an invisible barriers that affect women in their rising to the decision making positions in an organization, resulting in less frequent promotion of women.

benefit to the entire economy. Moreover, several studies [11, 12] show that the value of these home-produced goods and services contributes strongly to the well-being of all the nation.

The unequal amount of the unpaid work results also in the distribution of family income and economic assets within the married couples with the strong implication in poverty experience for example in case of a divorce. Women who own or have access to the ownership of land, housing and other assets, can more easily improve their status or become economically independent with all the related benefits. That's why authors consider material possessions as a crucial implication which is not captured by the GII as well as widespread gender-based violence leading to a number of consequences not only for victim itselfs but also for those who witness it, especially children.

All these dimensions are related with the developments of anti-discrimination legislation and policy which differ from country to country. In genera, the current legal protection against discrimination is still insufficient. This is also the reason why the principle of equal treatment of women and men has become a hallmark of the European Union's gender equality policy [13].

3 Gender pay gap as a new dimension of the GII⁷

Inequality in earnings of men and women remains relatively high in the European Union with considerable differences among each region [14]. Respecting the above mentioned arguments, the inequality in wages should a part of the overall index.

To analyse the statistics about gender disparities in the work place, there exists an effective and widely used measure for detection of significant women's disadvantage – the Gender pay gap (GPG) indicator.

The GPG is defined by Eurostat as the relative difference (in percentage) between the average gross hourly earnings of women and men [14]. The higher result, the higher wage difference between the sexes within the economy.

Number of studies explains reasons for existence of the GPG and its size. The research of Olsen and Walby [15] presents one of the most important reasons of the GPG existence – a degree of segregation by sex across different occupations. Another possible reason is connected with an effort to combine family responsibilities and paid employment. Connolly and Gregory [16] suggest that women's employment is concentrated on the part-time work associated with poor labour market conditions. The pay penalty related to the part-time work arises from differences in lifetime working patterns.

⁷ Details about the calculation method as well as application for the CEE countries can be found in Szabová (Bartůšková) [19].

There are many factors affecting the size of the GPG such as educational attainment, qualifications and special skills, experience, amount of time spent at work etc. These factors give reasonable explanations of gender differences in measured characteristics. However, the GPG can't be fully explained by any rational factors. The unexplained part is often attributed to the labour market discrimination [17].

The authors decided to integrate the GPG into the GII calculation for especially because of its common usage, easy accessibility of information and a large database. The key assumption is, that the increase of the GPG should lead to an increase of the GII too. The authors proposed alternative Gender Inequality Index* (GII*) with intergrated GPG indicator. The proposed form is following:

$$G_F^* = \sqrt[3]{\left(\frac{1}{MMR} \cdot \frac{1}{AFR}\right)^{\frac{1}{2}} \cdot \left(\frac{PR_F}{100} \cdot \frac{SE_F}{100}\right)^{\frac{1}{2}} \cdot \left(\frac{LFPR_F}{100} \cdot \frac{1}{GPG_F}\right)^{\frac{1}{2}}} \quad (9)$$

MMR = Maternal mortality ratio
 AFR = Adolescent fertility rate
 PR = Share of parliamentary seats
 SE = Attainment at secondary and higher education
 LFPR = Labour force participation rate
 GPG = Gender pay gap
 F = Female
 M = Male

For a geometric mean of the $LFPR_M$ and of the GPG, we add "1" to equation (10) because the GPG has only a positive value. This fact means that an average men gross hourly wage is bigger than that of women, which can be demonstrated from the available Eurostat data [14].

$$G_M^* = \sqrt[3]{1 \times \left(\frac{PR_M}{100} \times \frac{SE_M}{100}\right)^{\frac{1}{2}} \times \left(\frac{LFPR_M}{100} \times 1\right)^{\frac{1}{2}}} \quad (10)$$

When aggregating equations (9) and (10) using harmonic mean, we gain one of the fundamental parts of the GII*:

$$HARM(G_F^*, G_M^*)^* = \left[\frac{(G_F^*)^{-1} + (G_M^*)^{-1}}{2} \right]^{-1} \quad (11)$$

The crucial part of our effort – the dimensional expansion, is introduced by a geometric mean of $LFPR_F$ and of the GPG (12). The same step is made for men as well.

$$\overline{Labour\ market}^* = \frac{\left(\frac{LFPR_F}{100} \cdot \frac{1}{GPG}\right)^{\frac{1}{2}} + \left(\frac{LFPR_M}{100} \cdot 1\right)^{\frac{1}{2}}}{2} \quad (12)$$

Note that by creating equation (13) we follow the same process as the author of the current GII [1].

$$G_{\bar{F},\bar{M}}^* = \sqrt[3]{\text{Health} \cdot \text{Empowerment} \cdot \text{Labour market}} \quad (13)$$

As a result we obtain the Gender Inequality Index* (GII*), an alternative GII based on the consideration of the additional dimension.

$$GII^* = 1 - \frac{HARM(G_F, G_M)}{G_{\bar{F},\bar{M}}} \quad (14)$$

Any effort to improve the GPG value will ensure a lower value of the GII* and higher equality.

4 Conclusions

It's generally recognized that concept of gender equality is a pervasive phenomenon and an important social and economic issue. This results in searching for an approach that will reveal the true level of inequality. The Gender Inequality Index (GII) has an ambition to provide a comprehensive view on gender-related issues faced by each country. This paper highlights shortcomings and limitations of the GII and tries to open the discussion about the necessity of including other important dimensions to the existing measures, especially the wage inequality between men and women which depends of different factors and it is not sufficiently theoretically explained.

To detect significant women's disadvantage – wage discrimination, the authors tried to implement the Gender pay gap (GPG) into the GII calculation. The GPG is widely recognised and used index which is, at the same time, easily interpretable. To implement the wage discrimination into the GII could have a positive impact in terms of raising interest and attention among academics, policy makers and public towards this issue. This is fully in accordance with the efforts of the European Commission [8].

As there are many factors and determinant influencing the GPG, the possible usage of this indicator within the GII measure should be discussed and tested. The theoretical proposal for a new indicator is only the first step which needed to be verified experimentally too.

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